AGENDA

October 20, 2021

CITY COUNCIL
HOUSING SUCCESSOR
6:00 p.m.
Council Chambers
311 Vernon Street
Roseville, California
www.roseville.ca.us/CORTV

The meeting may be viewed on Comcast channel 14, Consolidated Communications channel 73, and AT&T U-Verse. City Council meetings are also video streamed live on the City's website at roseville.ca.us/watch and roseville.ca.us/agenda, and the City's YouTube channel at youtube.com/CityofRosevilleCa.

If you need a disability-related modification or accommodation to participate in this meeting, please contact Voice: 916-774-5200, TDD: 916-774-5220. Requests must be made as early as possible.

THE CITY OF ROSEVILLE WELCOMES YOUR PARTICIPATION

If an agenda item is open to public comment, such public comment shall be addressed to the chair of the meeting.

Public Comment - Speakers have three minutes under Public Comment to speak on issues that are not listed on the agenda and are within the City's jurisdiction. The Brown Act does not permit any action or discussion on items not listed on the agenda.

Consent Calendar - If applicable, the Consent Calendar consists of routine items that may be approved by one motion. Any person can remove an item from the Consent Calendar to be discussed separately.

Agenda Items - Speakers have five minutes to address items that are listed on the agenda.

Americans with Disabilities Act - Notify the City Clerk or Secretary at least 72 hours in advance if special assistance is required to participate in a meeting including the need of auxiliary aids or services.

Audio/Visual Presentations - If making a presentation regarding an agenda item, audio/visual materials must be submitted to the City Clerk or Secretary at least 72 hours in advance.

Security procedures are in place to attend Roseville City Council meetings. All attendees must

successfully pass through a security metal detector. Any person with a prohibited item will not be allowed entry. Prohibited items include, but are not limited to: firearms (even with valid CCW), knives, pepper spray/mace, explosives of any kind/ any weapons and/or dangerous devices of any kind, illegal drugs and alcohol.

1. CALL TO ORDER

2. ROLL CALL

3. PLEDGE OF ALLEGIANCE

4. MEETING PROCEDURES

5. PRESENTATIONS

5.1. Roseville Chamber of Commerce - SPLASH Proceeds

Presentation to the City Parks, Recreation and Libraries Department of the proceeds from the 2021 SPLASH event to benefit youth programs within the City.

CONTACT: Wendy Gerig 916-757-6882 wagerig@rosevilleareachamber.com

5.2. Renewable Placer - Waste Action Plan Update

CONTACT: Eric Oddo 916-543-3984 eoddo@placer.ca.gov

6. PUBLIC COMMENTS

7. CONSENT CALENDAR

BEGINNING OF CONSENT CALENDAR

Minutes

7.1. Minutes of Prior Meetings

Memo from Assistant City Clerk Helen Dreyer and City Clerk Sonia Orozco recommending the City Council approve the minutes of the September 1, 2021 City Council and Housing Authority meeting, the September 9, 2021 City Council Special Virtual meeting, the September 15, 2021 City Council Closed Session, the September 15, 2021 City Council meeting and the October 6, 2021 City Council meeting.

CC #: 1764

File #: 0102-03

CONTACT: Helen Dreyer 916-774-5356 hdreyer@roseville.ca.us

Bids / Purchases / Services

7.2. 116 S. Grant Street Furniture - Contract Purchase Agreements

Memo from Project Coordinator Lori Hogan and Public Works Director Jason Shykowski recommending the City Council adopt RESOLUTION NO. 21-435 APPROVING A CONTRACT PURCHASE AGREEMENT, BY AND

BETWEEN THE CITY OF ROSEVILLE AND VERTEX OFFICE SOLUTIONS, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE (3001670); and adopt RESOLUTION NO. 21-436 APPROVING A CONTRACT PURCHASE AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND SEATS AND STATIONS CONSULTING CORP, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE (3001671). Staff requests Council approval of two contract purchase agreements with Seats and Stations Consulting Corp in the amount of $197,310.33 and Vertex Office Solutions in the amount of $357,049.83 for 116 S. Grant Street office furniture purchases. The total cost of these contracts is $554,360.16. Funding for this work is included in the Electric Fund FY2021-22 budget.

CC #: 1759

File #: 0203-04

CONTACT: Lori Hogan 916-774-5707 lhogan@roseville.ca.us

7.3. Vehicle Purchases & Public Safety Vehicle Parts and Services - Contract Purchase Agreement

Memo from Fleet Manager Brian Craighead and Public Works Director Jason Shykowski recommending the City Council adopt RESOLUTION NO. 21-429 APPROVING A CONTRACT PURCHASE AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND STOMMEL INC. DBA LEHR, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE (3001675). Staff requests Council approval of a contract purchase agreement with Stommel, Inc. dba LEHR to provide public safety vehicle parts and services utilizing Placer County's contract# SCN104242 in the amount not to exceed $400,000 for FY2021-22; and approve a purchase order to Napa Valley Ford Lincoln Mercury, Inc. dba Napa Ford Lincoln for eighteen Ford Police Interceptor Utility Hybrids utilizing RFQ 10-3307 in the amount of $785,797. Funding for these vehicles and the contract purchase agreement is included in the FY2021-22 Fleet Replacement budget.

CC #: 1751

File #: 0203-01

CONTACT: Brian Craighead 916-774-5731 bcraighead@roseville.ca.us

Resolutions

7.4. South Feather Water and Power Authority – Power Purchase Agreement

Memo from Electric Resource Planner Brian Schinstock and Electric Utility Director Michelle Bertolino recommending the City Council adopt RESOLUTION NO. 21-432 APPROVING THE THIRD PHASE AGREEMENT FOR POWER PURCHASE AGREEMENT WITH SOUTH FEATHER WATER AND POWER AGENCY. Staff requests approval of a 10-year third phase agreement between Northern California Power Agency (NCPA) and the City and other NCPA members. This agreement is for the City to participate in NCPA's Power Purchase Agreement with the South Feather Water

and Power Authority project. The agreement provides Roseville no less than a 16.46% (20 MW) share from four existing hydroelectric powerhouses with an average melded price of $54.80/MWh, or $4,000,000 a year. Funds are available in the FY2021-22 Electric budget, and ongoing funds will be requested in future year budgets.

CC #: 1754

File #: 0800-03

CONTACT: Brian Schinstock 916-746-1658 bschinstock@roseville.ca.us

7.5. 60kV Overhead Conductor Replacement - Union Pacific Railroad Wireline Crossing Agreement

Memo from Power Engineer Austin Kurth and Electric Utility Director Michelle Bertolino recommending the City Council adopt RESOLUTION NO. 21-433 APPROVING A WIRELINE CROSSING AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND UNION PACIFIC RAILROAD COMPANY, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff requests Council approval of a Wireline Crossing Agreement with Union Pacific Railroad near Industrial Substation to enable the replacement of the existing 60kV overhead conductor. The cost of this agreement is $5,000. Funding for this project is available in the Electric Department FY2021-22 capital improvement project budget.

CC #: 1755

File #: 0900-03

CONTACT: Austin Kurth 916-774-5661 akurth@roseville.ca.us

7.6. Verizon Cellular Site at 2005 Hilltop Circle - Lease Agreement and Memorandum of Lease Agreement

Memo from IT Program Manager Karl Grover and Chief Information Officer Hong Sae recommending the City Council adopt RESOLUTION NO. 21-430 APPROVING A LEASE AGREEMENT AND MEMORANDUM OF LEASE AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND SACRAMENTO-VALLEY LIMITED PARTNERSHIP DBA VERIZON WIRELESS, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff requests Council approve an upgrade to Verizon's cellular site located at the City's Corporation Yard. The current cellular system is outdated and needs to be upgraded in order to improve coverage and performance for both City employees and Corporation Yard visitors. All design, upgrade and maintenance costs will be incurred by Verizon so there are no costs to the City.

CC #: 1752

File #: 0800-05

CONTACT: Karl Grover 916-774-5145 kgrover@roseville.ca.us

7.7. Budget Development and Management System Support - Professional Services Agreement

Memo from Budget Manager Scott Pettingell and Assistant City Manager/Chief

Financial Officer Dennis Kauffman recommending the City Council adopt RESOLUTION NO. 21-428 APPROVING A PROFESSIONAL SERVICES AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND CHERRYROAD TECHNOLOGIES INC., AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff requests Council approve a professional services agreement with CherryRoad Technologies Inc. to provide ongoing support and implement enhancements to the City's budget development and management system. The total value of the agreement is not to exceed $186,000. Estimated spending of $86,000 for the first year of the agreement is included in the Finance Department's FY2021-22 budget. Future year funding is subject to Council approval of the annual budget.

CC #: 1749

File #: 0200

CONTACT: Scott Pettingell 916-746-1306 spettingell@roseville.ca.us

7.8. Prairie Town Way Improvement Plans - Notice of Completion

Memo from Construction Inspector Danny Jacobo and Development Services Director Mike Isom recommending the City Council adopt RESOLUTION NO. 21-427 ACCEPTING THE PUBLIC WORK KNOWN AS IMPROVEMENT PLANS FOR PRAIRIE TOWN WAY PROJECT, APPROVING THE "NOTICE OF COMPLETION", AND AUTHORIZING AND DIRECTING THE CITY ENGINEER TO EXECUTE SAID NOTICE ON BEHALF OF THE CITY OF ROSEVILLE, THEREFORE, AND ACCEPTING A PORTION OF THE DEDICATIONS OFFERED ON THE RECORDED MAP OF THE SUBDIVISION. The Engineering Division has made final inspection of the project and has found the civil improvement work complete in accordance with the improvement plans and City specifications. This action has no impact to the City's General Fund. Construction costs were paid by the developer.

CC #: 1747

File #: 0400-04-09

CONTACT: Danny Jacobo 916-223-7486 djjacobo@roseville.ca.us

7.9. Federico - Phase 2 - Earl Rush Drive and Silver Spruce Drive - Notice of Completion

Memo from Construction Inspector Andrew Druck and Development Services Director Mike Isom recommending the City Council adopt RESOLUTION NO. 21-425 ACCEPTING THE PUBLIC WORK KNOWN AS FEDERICO – PHASE 2 EARL RUSH DRIVE AND SILVER SPRUCE DRIVE PROJECT, APPROVING THE "NOTICE OF COMPLETION", AND AUTHORIZING AND DIRECTING THE CITY ENGINEER TO EXECUTE SAID NOTICE ON BEHALF OF THE CITY OF ROSEVILLE, THEREFORE, AND ACCEPTING A PORTION OF THE DEDICATIONS OFFERED ON THE RECORDED MAP OF THE SUBDIVISION. The Engineering Division has made final inspection of the project and has found the civil improvement work complete in accordance with the improvement plans and City specifications. This action has no impact to the City's General Fund. Construction costs were paid by the developer.

CC #: 1745

File #: 0400-04-09-1

CONTACT: Andrew Druck 916-223-7577 adruck@roseville.ca.us

7.10. Federico - Phase 1 - Village 22A - Notice of Completion

Memo from Construction Inspector Andrew Druck and Development Services Director Mike Isom recommending the City Council adopt RESOLUTION NO. 21-424 ACCEPTING THE PUBLIC WORK KNOWN AS FEDERICO – PHASE 1 – VILLAGE 22A PROJECT, APPROVING THE "NOTICE OF COMPLETION", AND AUTHORIZING AND DIRECTING THE CITY ENGINEER TO EXECUTE SAID NOTICE ON BEHALF OF THE CITY OF ROSEVILLE, THEREFORE, AND ACCEPTING ALL DEDICATIONS OFFERED ON THE RECORDED MAP OF THE SUBDIVISION. The Engineering Division has made final inspection of the project and has found the civil improvement work complete in accordance with the improvement plans and City specifications. This action has no impact to the City's General Fund. Construction costs were paid by the developer.

CC #: 1743

File #: 0400-04-09-1

CONTACT: Andrew Druck 916-223-7577 adruck@roseville.ca.us

7.11. Federico - Phase 2 - Village 1 Subdivision - Final Map and Subdivision Agreement

Memo from Associate Engineer David Samuelson and Development Services Director Mike Isom recommending the City Council adopt RESOLUTION NO. 21-426 APPROVING A SUBDIVISION AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND TAYLOR MORRISON OF CALIFORNIA, LLC, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE; and approve the Federico Phase 2 Village 1 Final Map. Staff has completed its review of the final map and found that it is in compliance with the approved tentative map. This map will create 74 residential lots. The actions requested have no fiscal impact on the City's General Fund.

CC #: 1746

File #: 0400-04-12-1 & 0400-07

CONTACT: David Samuelson 916-774-5442 dsamuelson@roseville.ca.us

7.12. Sierra Vista KT-1B Subdivision - Final Map and Subdivision Agreement

Memo from Assistant Engineer Kerry Andrews and Development Services Director Mike Isom recommending the City Council adopt RESOLUTION NO. 21-431 APPROVING A SUBDIVISION AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND SIERRA VISTA COMMUNITIES, LLC, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE; and approve the Sierra Vista KT-1B final map. The Engineering Department has completed its review of the final map and found that it is in compliance with the approved tentative map. This map will create 95 residential lots and 3 public landscape lots. The actions requested

have no fiscal impact on the City's General Fund.
CC #: 1753

File #: 0400-04-12-1 & 0400-07

CONTACT: Kerry Andrews 916-774-5346 kandrews@roseville.ca.us

Ordinances (for introduction and adoption - appropriation/urgency measures)

7.13. Community Development Block Grant - Budget Adjustment

Memo from Housing Analyst Kristine Faelz and Assistant City Manager Ryan DeVore recommending the City Council adopt ORDINANCE NO. 6403 AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff requests Council approval of a budget adjustment for the FY2021-22 Community Development Block Grant Fund to increase revenues and expenditures in the amount of $755,312 for unexpended Coronavirus Aid, Relief and Economic Security Act funding awarded to the City in FY2020-21, unexpended availability from prior years, and additional program income. This budget adjustment involves federal funds and has no impact on the City's General Fund.

CC #: 1750

File #: 0113-02 & 0201-01

CONTACT: Kristine Faelz 916-774-5451 kpfaelz@roseville.ca.us
Claudia Carreno 916-774-5276 ccarreno@roseville.ca.us

7.14. Regional Transportation Funding and Financing Plan for Riego Road/Baseline Road Improvements - Memorandum of Understanding and Budget Adjustment

Memo from Administrative Assistant Lainie Anderson and Public Works Director Jason Shykowski recommending the City Council adopt RESOLUTION NO. 21-434 APPROVING A MEMORANDUM OF UNDERSTANDING BETWEEN COUNTY OF PLACER, THE CITY OF ROSEVILLE, AND THE COUNTY OF SUTTER (COLLECTIVELY THE “PARTICIPATING AGENCIES”), AND THE PLACER COUNTY TRANSPORTATION PLANNING AGENCY (“PCTPA”)., AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE; and adopt ORDINANCE NO. 6405 AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff requests Council approval of the Memorandum of Understanding for the Regional Transportation Funding and Financing Plan and Implementation Plan for Riego Road/Baseline Road Improvements. Placer County Transportation Planning Agency's (PCTPA) cost for this initial work is estimated not to exceed $60,000, which shall be shared equally by the participating agencies subject to unanimous PDT approval of PCTPA’s proposed budget. The total contribution by each participating agency shall not exceed $20,000. Additionally, staff requests approval of a budget adjustment in the amount of $20,000 from the City/County Mitigation Fee Fund

to reimburse the Placer County Transportation Planning Agency for completing this first phase of work. There is no impact to the General Fund.

CC #: 1758

File #: 0900-04-01 & 0201-01

CONTACT: Lainie Anderson 916-774-5331 landerson@roseville.ca.us

7.15. Junction Crossing Affordable Housing Project - Budget Adjustment

Memo from Housing Analyst Suzanne Acrell and Assistant City Manager Ryan DeVore recommending the City Council, acting as the Housing Successor Agency, adopt ORDINANCE NO. 6402 AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff requests a budget adjustment to fund a loan to the Junction Crossing affordable housing project. This will include transferring $200,000 of unspent Housing Taxable Bonds from the Successor Agency to the former Redevelopment Agency Fund to the Housing Successor Low and Moderate Income Fund (Low Mod Fund), expending $600,000 from the Low Mod Fund; and transferring $3,760,000 from the Housing Trust Fund to the Affordable Housing in Lieu of Program Equity Fund. The budget adjustment has no impact on the City's General Fund, and all activities of the Housing Successor Agency are separate from City operations and funding.

CC #: 1748

File #: 0709-01 & 0201-01

CONTACT: Suzanne Acrell 916-774-5469 sacrell@roseville.ca.us

7.16. Corporation Yard Vehicle Wash Systems Replacement Project – Budget Adjustment

Memo from Project Coordinator Rebecca McCoy and Public Works Director Jason Shykowski recommending the City Council adopt ORDINANCE NO. 6404 AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff requests Council approval of a budget adjustment for $85,000 for additional costs associated with replacing the City vehicle wash systems. This $85,000 budget adjustment will be funded by $8,500 from the Facility Rehabilitation Fund by way of the General Fund, $59,500 from the Waste Services Rehabilitation Fund, $16,575 from the Transit Fund, and $425 from the Electric Fund. This adjustment will bring the total project budget to $745,000.

CC #: 1756

File #: 0900-04 & 0201-01

CONTACT: Rebecca McCoy 916-241-6471 ramccoy@roseville.ca.us

Ordinances (for second reading and adoption)

7.17. Second Reading - Proposed Amendments to Campaign Finance Ordinance

ORDINANCE NO. 6409 OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTIONS 2.60.065, 2.60.070, AND 2.60.090

OF CHAPTER 2.60 OF TITLE 2 OF THE ROSEVILLE MUNICIPAL CODE REGARDING CAMPAIGN FINANCE DISCLOSURE, for second reading and adoption.

CC #: 1763

File #: 0502

CONTACT: Joseph Speaker 916-774-5325 jspeaker@roseville.ca.us
Sonia Orozco 916-774-5269 sorozco@roseville.ca.us

7.18. Second Reading - Sierra Vista Specific Plan Parcels FD-2, FD-5, FD-9, FD-40, FD-63, FD-64 – Development Agreement Amendment

ORDINANCE NO. 6407 OF THE COUNCIL OF THE CITY OF ROSEVILLE ADOPTING A FIFTH AMENDMENT OF THE DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF ROSEVILLE, SOLAIRE COMMUNITY BUILDERS AS ASSIGNEE OF WESTPARK SIERRA VISTA, LLC, AS ASSIGNEE OF WESTPARK FEDERICO, LLC, MOURIER INVESTMENTS, LLC, AND FEDERICO-TYLER FAMILY LIMITED PARTNERSHIP RELATIVE TO THE SIERRA VISTA SPECIFIC PLAN AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE, for second reading and adoption.

CC #: 1761

File #: 0400-04-12-1 & 0400-03 & 0400-04

CONTACT: Sean Morales 916-774-5282 smorales@roseville.ca.us

7.19. Second Reading - Roseville Municipal Code Amendment to Sign Ordinance

ORDINANCE NO. 6408 OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTION 17.17.035 OF CHAPTER 17.17 OF TITLE 17 OF THE ROSEVILLE MUNICIPAL CODE REGARDING SIGNS ON PUBLIC PROPERTY, for second reading and adoption.

CC #: 1762

File #: 0321

CONTACT: Robert Cline 916-746-1172 racline@roseville.ca.us

Ceremonial Documents

7.20. Proclamation - Extra Mile Day November 1, 2021

Proclaim November 1, 2021, to be Extra Mile Day and urge individuals in the community to “go the extra mile” and celebrate individuals who make the world a better place.

CC #: 1746

File #: 0102-06

CONTACT: Blair Hutchison 916-774-5266 bmhutchison@roseville.ca.us

END OF CONSENT CALENDAR

8. ORDINANCES

8.1. Roseville Electric Utility Rate Proposal

Memo from Assistant Electric Utility Director Shawn Matchim and Electric Utility Director Michelle Bertolino recommending the City Council introduce for first reading an ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTIONS 14.24.040, 14.24.050, 14.24.051 AND 14.24.055 OF CHAPTER 14.24 OF TITLE 14 OF THE ROSEVILLE MUNICIPAL CODE REGARDING ELECTRICAL ENERGY. Staff requests Council approve amendments to Section 14.24 of the Municipal Code to reflect Roseville Electric Utility's recommended electric rate adjustments effective January 2022 and January 2023. The proposed rate changes will result in $8.1 million of additional revenue annually for the electric utility after the two year implementation. The proposed changes align the revenues collected from customers with the costs of operating the utility.

CC #: 1757

File #: 0800-03 & 0215

CONTACT: Shawn Matchim 916-746-1620 smatchim@roseville.ca.us

8.2. Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Construction Project - Award of Design-Assist and Construction Agreement and Budget Adjustment

Memo from Senior Engineer Janice Gainey and Environmental Utilities Director Richard Plecker recommending the City Council adopt RESOLUTION NO. 21-437 APPROVING A DESIGN-ASSIST CONSTRUCTION AGREEMENT, BY AND BETWEEN AUBURN CONSTRUCTORS, LLC AND THE CITY OF ROSEVILLE, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE; and adopt ORDINANCE NO. 6406 AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff requests approval and award of a Design-Assist Construction Agreement to Auburn Constructors for the Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) project in the amount of $14,525,300 and authorization for the Environmental Utilities Director or designee to approve and pay for contract change orders that could increase the contract amount by no more than 10 percent or $1,452,530 for a not-to-exceed total contract amount of $15,977,840. Staff also requests approval of construction plans and specifications and a budget adjustment of $7,750,000 from the Water Construction Fund to fully fund all additional project costs. The Water Construction Fund's main revenue is developer-paid water connection fees.

CC #: 1760

File #: 0900-02 & 0201-01

CONTACT: Janice Gainey 916-774-5535 jrgainey@roseville.ca.us

9. SPECIAL REQUESTS/REPORTS/PRESENTATION

9.1. Council Discretionary Funds - Downtown Roseville Partnership

Memo from Management Assistant Heather Blanco and City Clerk Sonia Orozco recommending the City Council consider a request for $2,000 from Council Discretionary Funds to The Downtown Roseville Partnership for the 60th Annual Sylvia Besana Holiday Parade. There is no fiscal impact on the City's General Fund.

CC #: 1740

File #: 0102

CONTACT: Heather Blanco 916-746-1171 hblanco@roseville.ca.us

9.2. Council Discretionary Funds - Placer Breast Cancer Foundation

Memo from Management Assistant Heather Blanco and City Clerk Sonia Orozco recommending the City Council consider a request for $2,000 from Council Discretionary Funds for the Placer Breast Cancer Foundation's 2nd Annual Paint Placer Pink campaign. There is no fiscal impact on the City's General Fund.

CC #: 1741

File #: 0102

CONTACT: Heather Blanco 916-746-1171 hblanco@roseville.ca.us

9.3. Council Discretionary Funds - Wreaths Across America

Memo from Management Assistant Heather Blanco and City Clerk Sonia Orozco recommending the City Council consider a request for a $3,000 sponsorship from the Council Discretionary Funds for Wreaths Across America for the National Wreaths Across America ceremony at Roseville District Cemetery on December 18, 2021, at noon. This sponsorship would produce 200 wreaths to be placed on fallen soldiers and veteran graves at the Roseville District Cemetery at 421 Berry Street. The goal is to raise awareness and enough money to place a wreath on all 2,344 graves this year. There is no fiscal impact on the City's General Fund.

CC #: 1742

File #: 0102

CONTACT: Heather Blanco 916-746-1171 hblanco@roseville.ca.us

10. DEPARTMENT UPDATES

10.1. Police Department Update

CONTACT: Troy Bergstrom 916-774-5010 tbergstrom@roseville.ca.us

11. REPORTS / PUBLIC COMMENTS

12. ADJOURNMENT

COUNCIL COMMUNICATION

CC #: 1764
File #: 0102-03

Title: Minutes of Prior Meetings
Contact: Helen Dreyer 916-774-5356 hdreyer@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.1.

RECOMMENDATION TO COUNCIL

Recommend the City Council approve the minutes of the September 1, 2021 City Council and Housing Authority meeting, the September 9, 2021 City Council Special Virtual meeting, the September 15, 2021 City Council Closed Session, the September 15, 2021 City Council meeting, and the October 6, 2021 City Council meeting.

BACKGROUND

There is no background associated with this item. The request is to approve the minutes of previous meetings.

FISCAL IMPACT

Not applicable.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment CEQA Guidelines §15061(b)(3). The approval of minutes does not include the potential for a significant environmental effect, and therefore is not subject to CEQA.

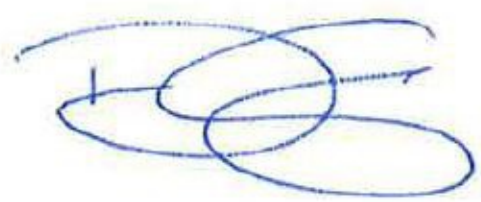
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal B - Support community engagement and advocacy

Respectfully Submitted,

Helen Dreyer, Assistant City Clerk

Sonia Orozco, City Clerk



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Dominick Casey, City Manager

ATTACHMENTS:

Description

September 9, 2021 Special Virtual City Council Minutes

September 1, 2021 City Council and Housing Authority Minutes

September 15, 2021 City Council Closed Session Minutes

September 15, 2021 City Council Minutes

October 6, 2021 City Council Minutes

MINUTES
September 9, 2021

SPECIAL MEETING NOTICE
VIRTUAL MEETING OF
ROSEVILLE CITY COUNCIL
4:00 p.m.
311 Vernon Street
Roseville, California
www.roseville.ca.us/CORTV

The meeting may be viewed on Comcast channel 14, Consolidated Communications channel 73 and AT&T U-verse. City Council meetings are also video streamed live and are available on the City's website at roseville.ca.us/watch and roseville.ca.us/agenda, and on the City's YouTube channel at youtube.com/CityofRosevilleCa.

Members of the public may offer public comment by the following means:
Dial in Phone Number: 916-774-5353

If you need a disability-related modification or accommodation to participate in this meeting, please contact Voice: 916-774-5200, TDD: 916-774-5220. Requests must be made as early as possible.

1. CALL TO ORDER

Councilmember Pauline Roccucci, serving as Chair, called the meeting to order at 4:00 p.m.

2. ROLL CALL

Present: Alvord, Mendonsa, Roccucci

Absent: Houdeshelt, Bernasconi

3. PUBLIC COMMENTS

No public comment received.

4. RESOLUTIONS

4.1. Emergency Generation Capacity for California Department of Water Resources - Energy Services Agreement and Operations and Maintenance Agreement

Memo from Power Supply Manager William Forsythe and Electric Utility Director Michelle Bertolino recommending the City Council adopt RESOLUTION NO. 21-408 APPROVING AN ENERGY SERVICES AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND THE CALIFORNIA DEPARTMENT OF WATER RESOURCES, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE; and adopt RESOLUTION NO. 21-409 APPROVING AN OPERATIONS AND MAINTENANCE AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND THE CALIFORNIA DEPARTMENT OF WATER RESOURCES, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff requests Council approval of two agreements, the Energy Services Agreement and Operations and Maintenance Agreement, with the California Department of Water Resources (CDWR) relating to the installation of temporary electric generation facilities at the Roseville Energy Park. The Energy Services Agreement sets forth the roles and responsibilities for fuel procurement, scheduling, and settling, as directed by CDWR. The Operations and Maintenance Agreement sets forth the responsibilities for operating and maintaining the temporary electric generation facilities. These two agreements are associated with the Site Use and Installation Agreement that was previously approved by City Council on September 1, 2021. CDWR will pay Roseville a total of $1.15 million in revenue for services provided under these two agreements; $460,000 for the Energy Services Agreement, and $690,000 for the Operations and Maintenance Agreement. All costs for construction, operations and maintenance will be borne or reimbursed by CDWR.

CC #: 1718

File #: 0800-02

CONTACT: William Forsythe 916-774-5619 wforsythe@roseville.ca.us

Electric Utility Director Michelle Bertolino made the presentation to the City Council.

No public comment received.

Motion by Scott Alvord, seconded by Tracy Mendonsa, to adopt RESOLUTION NO. 21-408 APPROVING AN ENERGY SERVICES AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND THE CALIFORNIA DEPARTMENT OF WATER RESOURCES, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE; and adopt RESOLUTION NO. 21-409 APPROVING AN OPERATIONS AND MAINTENANCE AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND THE CALIFORNIA DEPARTMENT OF WATER RESOURCES, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. The Motion Passed.

Roll call vote: Ayes: Alvord, Mendonsa, Roccucci

Absent: Bernasconi, Houdesheldt

5. ADJOURNMENT

Motion by Councilmember Scott Alvord, seconded by Councilmember Tracy Mendonsa to adjourn the meeting.

Vote: All ayes

Meeting adjourned at 4:12 p.m.

MINUTES
September 1, 2021

CITY COUNCIL
HOUSING AUTHORITY
6:00 p.m.
Council Chambers
311 Vernon Street
Roseville, California
www.roseville.ca.us/CORTV

The meeting may be viewed on Comcast channel 14, Consolidated Communications channel 73, and AT&T U-Verse. City Council meetings are also video streamed live on the City's website at roseville.ca.us/watch and roseville.ca.us/agenda, and the City's YouTube channel at youtube.com/CityofRosevilleCa.

Members of the public may offer public comment by phone:

Dial in Phone Number: 916-774-5353

If you need disability-related modification or accommodation to participate in this meeting, please contact: Voice: 916-774-5200, TDD: 916-774-5220. Requests must be made as early as possible.

1. CALL TO ORDER

Mayor Krista Bernasconi called the meeting to order at 6:00 p.m.

2. ROLL CALL

Present: Houdesheldt, Alvord, Roccucci, Mendonsa, Bernasconi

3. PLEDGE OF ALLEGIANCE

Vice Mayor Bruce Houdesheldt led the Pledge of Allegiance.

4. MEETING PROCEDURES

Assistant City Clerk Helen Dreyer announced the procedures for addressing the

City Council.

5. PRESENTATIONS

5.1. Proclamation - Prostate Cancer Awareness Month - September 2021

Proclaim September 2021 as Prostate Cancer Awareness Month and urge citizens to acquaint themselves with the issues involved in Prostate Cancer Awareness.

CONTACT: Katrina Six 916-774-5267 kmsix@roseville.ca.us

Councilmember Tracy Mendonsa presented the proclamation to Beverly Nicholson, Support Group Facilitator of the California Prostate Cancer Coalition of Greater Sacramento, who responded.

No public comment received.

For information only. No action required.

5.2. City Response to COVID-19

CONTACT: Dominick Casey 916-774-5362 dcasey@roseville.ca.us

City Manager Dominick Casey made the presentation to the City Council.

Local Update

- As of August 31, there are 59% more people (54) in Placer County ICU's than at any point in the pandemic
- 92% of those hospitalized are unvaccinated (2 of 3 hospitals are sharing this data)
- Ten people died in Placer County because of COVID over the previous reporting period (Thursday, August 26 to Tuesday, August 31)
- The case rate and positivity percentage have recently leveled-off
- Cal OSHA has not issued any new workplace requirements since the update on June 17
- Face coverings are recommended indoors for vaccinated or unvaccinated in the state and Placer County
- 7-Day Test Positivity Rate is 9.7% and the 7-Day Average Daily Case Rate is 32.4 cases per 100,000

Vaccine Update

- Only 70% of eligible (ages 12+) Placer County residents have at least one dose of vaccine. Only 61% of the total population have at least one dose
- The Pfizer vaccine has received full FDA approval for those 16 years of age or older. Emergency approval is still in place for those aged 12-15
- Booster shots are now available for people with moderately to severely compromised immune systems
- Visit covid19.ca.gov for more information on vaccines and COVID in general

State Update

- Mega Events: Mega events are indoor events with 1,000 or more people and outdoor events with 10,000 or more people
- Mega Event Requirements:
  - For indoor events with 1,000 or more people attendees must provide proof that they:
    - Are fully vaccinated, or
    - Have received a negative COVID-19 test
    - After September 20, 2021, attendees cannot self-attest to verify vaccination status or a negative test result
  - For outdoor events with 10,000 or more people, CDPH recommends that attendees provide proof that they:
    - Are fully vaccinated, or
    - Have received a negative COVID-19 test

Organizations to contact for further information:
CDC - www.cdc.gov/coronavirus/2019-ncov/index.html
CDPH - https://covid19.ca.gov/
Placer County Health and Human Services - www.placer.ca.gov
City of Roseville - https://www.roseville.ca.us/government/COVID-19 information

No public comment received.

Item for information only. No action taken.

6. PUBLIC COMMENTS

No public comment received.

7. CONSENT CALENDAR

BEGINNING OF CONSENT CALENDAR

Assistant City Clerk Helen Dreyer announced the procedures of approving the Consent Calendar.

No public comment received.

Motion by Pauline Roccucci, seconded by Scott Alvord, to approve the Consent Calendar as recommended. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

Bids / Purchases / Services

7.1. Roseville Aquatics Complex Slide and Water Play Structure Replacement Project - Approval of Plans and Specifications and Authorization to Call for Bids

Memo from Park Development Project Manager Heather Buck and Parks, Recreation & Libraries Director Jill Geller recommending the City Council approve the plans and specifications for the Roseville Aquatics Complex Slide and Water Play Structure Replacement project and authorize staff to call for bids. The existing slide and water play structure are located at the Roseville Aquatics Complex. The project includes removal and replacement of the existing pool slide, water play structure, and associated piping, pool deck modifications, replacement of existing pool equipment for the water play structure, and replaster of the existing recreation pool. Funding for the project is provided through the Parks, Recreation & Libraries Capital Projects Fund within the FY2021-22 budget, with a project estimate of $1,600,000. Maintenance of the existing aquatics complex is provided by the General Fund and will remain unchanged.

CC #: 1685

File #: 0707

CONTACT: Heather Buck 916-774-5254 hcbuck@roseville.ca.us

7.2. Buljan Park Play Structure Improvements - Contract Purchase Agreement

Memo from Park Planning & Development Superintendent Tara Gee and Parks, Recreation & Libraries Director Jill Geller recommending the City Council adopt RESOLUTION NO. 21-385 APPROVING A CONTRACT PURCHASE AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND PLAYPOWER LT FARMINGTON INC., AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE (3001566). Staff recommends approval of a contract purchase agreement with Playpower LT Farmington, Inc. for $87,000 for additional play elements to the play structure at Buljan Park. The play structure at Buljan Park was replaced in 2019. After completion of the replacement, neighbors surrounding the park expressed the need to have a bigger play structure that better matched what previously existed. Neighbors rallied together and raised $10,000 to contribute towards the addition of more play elements. The contract purchase agreement piggybacks National Joint Powers Alliance Contract #030117-LTS. Funding for this project was approved in the FY2021-22 budget using funds from the Parks, Recreation & Libraries Capital Projects Fund. Ongoing maintenance costs are anticipated to remain the same and are already included in the Parks, Recreation & Libraries budget in the General Fund.

CC #: 1686

File #: 0704-01

CONTACT: Tara Gee 916-774-5253 tgee@roseville.ca.us

7.3. Washington Boulevard at All America City Boulevard Roundabout Project - Approval of Plans and Specifications and Authorization to Call for Bids

Memo from Assistant Engineer Beth Taylor and Public Works Director Jason Shykowski recommending the City Council approve plans and specifications for the Washington Boulevard at All America City Boulevard Roundabout Project and authorize staff to call for bids. The construction scope of this project consists of clearing and grubbing, excavation, concrete and asphalt paving, sidewalk, lighting, storm drain, waterline, urban design, and landscape improvements. The project is

estimated to cost $5.7 million and will be funded with Congestion Mitigation and Air Quality Improvement funds, Local Transportation Funds and Environmental Utility Water Rehabilitation Funds. No General Fund resources will be used for the project construction. This project includes landscaping improvements along the corridor that will require maintenance by the City. The estimated landscaping maintenance cost increase as a result of the improvements is $300 per month ($3,600 annually). At project award a budget adjustment will be requested from the General Fund to cover the additional maintenance cost in the appropriate operations budget.

CC #: 1690

File #: 0900-04-02

CONTACT: Beth Taylor 916-746-1300 bftaylor@roseville.ca.us

Resolutions

7.4. Hewlett Packard 2 Campus Oaks 64 (HP2/CO64) City-Wide Park - Master Plan and Park Development Agreement

Memo from Park Planning & Development Superintendent Tara Gee and Parks, Recreation & Libraries Director Jill Geller recommending the City Council adopt RESOLUTION NO. 21-389 APPROVING A PARK DEVELOPMENT AGREEMENT FOR HP2/CO64 CITY-WIDE PARK SITE IMPROVEMENTS, BY AND BETWEEN THE CITY OF ROSEVILLE AND BBC ROSEVILLE OAKS, LLC, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. The master plan proposes a design that includes multi-use grass areas, pickle ball courts, a fenced off-leash dog park, shaded picnic areas, a restroom, a parkour or challenge fitness course for juniors and adults, a skate track and a BMX track. A walkway/bike path loops along the park edges and through the park. In lieu of paying city-wide park fees per home, the developer will incur the cost of the park and build it on behalf of the City, per city standards. The City will also contribute 20.5 percent of the cost of construction of the park from the Campus Oaks Neighborhood Park fund, consistent with the development agreement. Once complete, the park will be deeded to the City for operations and maintenance. The budget for the design and construction of the park is approximately $3.7 million. This includes permitting, inspections and engineering costs, in addition to landscape architectural design. Maintenance costs are estimated at approximately $140,000 per year. Consistent with all city-wide parks, the funding source for maintenance will be provided through the General Fund.

CC #: 1693

File #: 0704-01

CONTACT: Tara Gee 916-774-5253 tgee@roseville.ca.us

7.5. 2020 Power Source Disclosure Annual Reports and 2020 Power Content Labels

Memo from Electric Resources Analyst David Siao and Electric Utility Director Michelle Bertolino recommending the City Council adopt RESOLUTION NO. 21-384 APPROVING SUBMISSION OF THE 2020 POWER SOURCE DISCLOSURE ANNUAL REPORTS AND 2020 POWER CONTENT LABELS, AND ATTESTATION OF THE VERACITY OF THE ANNUAL REPORT. The

2020 Power Source Disclosure Annual Reports and 2020 Power Content Labels are state-mandated reports detailing Roseville Electric Utility's 2020 energy supply. There is no fiscal impact with the approval of these reports.

CC #: 1683

File #: 0800-03

CONTACT: David Siao 916-746-1613 dsiao@roseville.ca.us

7.6. Westbrook - Phase 3 Villages WB-22 And WB-23 - Notice of Completion

Memo from Construction Inspector Andrew Druck and Development Services Director Mike Isom recommending the City Council adopt RESOLUTION NO. 21-388 ACCEPTING THE PUBLIC WORK KNOWN AS WESTBROOK – PHASE 3 – VILLAGES WB-22 AND WB-23 PROJECT, APPROVING THE "NOTICE OF COMPLETION", AND AUTHORIZING AND DIRECTING THE CITY ENGINEER TO EXECUTE SAID NOTICE ON BEHALF OF THE CITY OF ROSEVILLE, THEREFORE, AND ACCEPTING ALL DEDICATIONS OFFERED ON THE RECORDED MAP OF THE SUBDIVISION. The Engineering Division has made final inspection of the project and has found the civil improvement work complete in accordance with the improvement plans and City specifications. This action has no impact to the City's General Fund. Construction costs were paid by the developer.

CC #: 1692

File #: 0400-04-12-1

CONTACT: Andrew Druck 916-223-7577 adruck@roseville.ca.us

7.7. Federico - Phase 1 - Village 20A - Notice of Completion

Memo from Construction Inspector Andrew Druck and Development Services Director Mike Isom recommending the City Council adopt RESOLUTION NO. 21-386 ACCEPTING THE PUBLIC WORK KNOWN AS FEDERICO – PHASE 1 – VILLAGE 20A PROJECT, APPROVING THE "NOTICE OF COMPLETION", AND AUTHORIZING AND DIRECTING THE CITY ENGINEER TO EXECUTE SAID NOTICE ON BEHALF OF THE CITY OF ROSEVILLE, THEREFORE, AND ACCEPTING ALL DEDICATIONS OFFERED ON THE RECORDED MAP OF THE SUBDIVISION. The Engineering Division has made final inspection of the project and has found the civil improvement work complete in accordance with the improvement plans and City specifications. This action has no impact to the City's General Fund. Construction costs were paid by the developer.

CC #: 1687

File #: 0400-04-09-01

CONTACT: Andrew Druck 916-223-7577 adruck@roseville.ca.us

7.8. Fiddyment Ranch Phase 3 Village F-10 Phase 2 - Final Map and Subdivision Agreement

Memo from Assistant Engineer Robert Medina and Development Services Director Mike Isom recommending the City Council adopt RESOLUTION NO. 21-

387 APPROVING A SUBDIVISION AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND JEN CALIFORNIA 15, LLC, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE; and approve the Fiddyment Ranch Phase 3 Village F-10 Phase 2 final map. Staff has completed its review of the final map and found that it is in compliance with the approved tentative map. This map will create 110 residential lots. The actions requested have no fiscal impact to the City's General Fund.

CC #: 1688

File #: 0400-04-09-1 & 0400-07

CONTACT: Robert Medina 916-774-5517 rmedina@roseville.ca.us

7.9. Emergency Housing Voucher Services - Professional Services Agreement

Memo from Housing Manager Trisha Isom and Assistant City Manager Ryan DeVore recommending the City Council adopt RESOLUTION NO. 21-391 APPROVING A PROFESSIONAL SERVICES AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND HOMELESS RESOURCE COUNCIL OF THE SIERRAS, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff requests Council approval of a contract with the Homeless Resources Council of the Sierras to administer $125,000 in Emergency Housing Voucher Services Fees to benefit homeless residents. The Emergency Housing Voucher Services Fee is federally funded through the US Department of Housing and Urban Development (HUD). Through this HUD-funded program, the Roseville Housing Authority provides an important social service to ensure safe and affordable housing for the under-housed population. The Emergency Housing Voucher program does not create additional costs to the City's General Fund.

CC #: 1696

File #: 0709-02-01 & 0201-01

CONTACT: Trisha Isom 916-746-1239 tisom@roseville.ca.us

7.10. Oak Ridge Drive Bridge Replacement Project - Notice of Completion

Memo from Associate Engineer Rjahja Canlas and Public Works Director Jason Shykowski recommending the City Council adopt RESOLUTION NO. 21-392 ACCEPTING THE PUBLIC WORK KNOWN AS THE OAK RIDGE DRIVE BRIDGE REPLACEMENT PROJECT, APPROVING THE "NOTICE OF COMPLETION," AND AUTHORIZING THE PUBLIC WORKS DIRECTOR TO EXECUTE SAID NOTICE ON BEHALF OF THE CITY OF ROSEVILLE. This project removed the existing functionally obsolete and hydraulically inadequate bridge and constructed a longer, wider two-lane bridge with shoulders and sidewalks on both sides of the road. The project was funded by Federal Highway Bridge Program grant funds, with the exception of $50,000 of Roadway funds budgeted for non-participating project costs. No General Fund resources were used for the project.

CC #: 1698

File #: 0900-04-02

CONTACT: Rjahja Canlas 916-746-1300 rcanlas@roseville.ca.us

Ordinances (for introduction and adoption - appropriation/urgency measures)

7.11. Sierra Vista Specific Plan Phase 1 Bike Trail Project - Reimbursement Agreements and Budget Adjustment

Memo from Alternative Transportation Analyst Jeannie Gandler and Public Works Director Jason Shykowski recommending the City Council adopt RESOLUTION NO. 21-390 APPROVING TWO CITY/DEVELOPER REIMBURSEMENT AGREEMENTS, BY AND BETWEEN THE CITY OF ROSEVILLE AND JOHN MOURIER CONSTRUCTION, INC., AND AUTHORIZING THE CITY MANAGER TO EXECUTE THEM ON BEHALF OF THE CITY OF ROSEVILLE; and adopt ORDINANCE NO. 6392 OF THE CITY OF ROSEVILLE AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff requests Council approve two reimbursement agreements with John Mourier Construction, Inc., a California Corporation, for grading trail segments adjacent to JM-41, JM-81 and JM-83 ($112,418) and for paving trail segments adjacent to JM-41 and JM-83 ($184,104) within the Sierra Vista Specific Plan and adopt an ordinance approving a budget adjustment in the amount of $296,522. Funding for the project is from the Sierra Vista bike trial development fees. General Fund resources will not be used for this project.

CC #: 1694

File #: 0721-05 & 0201-01

CONTACT: Jeannie Gandler 916-746-1289 jgandler@roseville.ca.us

7.12. Warnick Property - Transfer of Property and Budget Adjustment

Memo from Refuse and Stormwater Manager Devin Whittington and Environmental Utilities Director Richard Plecker recommending the City Council adopt ORDINANCE NO. 6393 OF THE CITY OF ROSEVILLE AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff is requesting Council approve the transfer of the Warnick Property from the Pleasant Grove Drainage Basin Fund to Environmental Utilities (Waste Services Operations Fund and Water Operations Fund) to support future utility operations. The Waste Services Operations Fund will contribute $2,920,000 and the Water Operations Fund will contribute $730,000. The Pleasant Grove Drainage Basin Fund will receive transfers totaling $1,159,344 for the original proportional purchase price of the property plus interest and the Strategic Improvement Fund will receive transfers totaling $2,490,656 for the difference between the property purchase price of $3,650,000 and the amount going to the Pleasant Grove Drainage Basin Fund. Property maintenance costs are included in the FY2021-22 Water Operations Fund and Solid Waste Operations Fund budgets.

CC #: 1695

File #: 1002 & 0800-02 & 0201-01

CONTACT: Devin Whittington 916-774-5783 dwhittington@roseville.ca.us

Ordinances (for second reading and adoption)

7.13. Second Reading - Creekview Specific Plan – Rezone and Development Agreement Amendment

ORDINANCE NO. 6394 OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING ZONING ORDINANCE NO. 5428 OF THE CITY OF ROSEVILLE CHANGING THE ZONING OF CERTAIN REAL PROPERTY LOCATED WITHIN THE CITY OF ROSEVILLE; and adopt ORDINANCE NO. 6395 OF THE COUNCIL OF THE CITY OF ROSEVILLE ADOPTING A SECOND AMENDMENT OF THE DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF ROSEVILLE AND ANTHEM UNITED CREEKVIEW DEVELOPMENTS LIMITED PARTNERSHIP RELATIVE TO THE CREEKVIEW SPECIFIC PLAN AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE, for second reading and adoption.

CC #: 1697

File #: 0400-04-13-2 & 0400-02

CONTACT: Kinarik Shallow 916-746-1309 kshallow@roseville.ca.us

Reports / Requests

7.14. Out-of-State Travel Request - Public Works Department

Memo from Facility Manager Dan Allen and Public Works Director Jason Shykowski recommending the City Council approve an out-of-state travel request for two Public Works staff members to attend the International Facility Management Association World Workplace Conference and Expo in Florida in October of 2021. The costs are estimated to be $6,000, and are included in the FY2021-22 operating budget in the Facility Services Fund.

CC #: 1684

File #: 0600-02

CONTACT: Dan Allen 916 774-5741 dallen@roseville.ca.us

7.15. HOUSING AUTHORITY - Quarterly Status Report

Memo from Housing Supervisor Suzi Cook-Turner and Assistant City Manager Ryan DeVore recommending the City Council accept a quarterly report on the Housing Authority's Housing Choice Voucher Program. This report is for informational purposes only and has no impact on the City's General Fund.

CC #: 1689

File #: 0709-02-01

CONTACT: Suzi Cook-Turner 916-774-5414 smcook-turner@roseville.ca.us

END OF CONSENT CALENDAR

8. RESOLUTIONS

8.1. Emergency Generation Capacity for California Department of Water Resources - Site Use and Installation Agreement

Memo from Power Supply and Portfolio Administrator William Forsythe and Electric Utility Director Michelle Bertolino recommending the City Council adopt RESOLUTION NO. 21-393 APPROVING A SITE USE AND INSTALLATION AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND THE CALIFORNIA DEPARTMENT OF WATER RESOURCES, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff recommends the Council approve the Site Use and Installation Agreement between the City and the California Department of Water Resources (CDWR) relating to the installation of temporary electric generation facilities at the Roseville Energy Park. The Site Use Agreement grants CDWR a temporary license to use and occupy the site for the installation and operation of the facilities through December 31, 2023. CDWR will pay Roseville $8 million for services provided under the Site Use Agreement over the term of the contract. All costs for construction, operations and maintenance will be borne or reimbursed by CDWR. In addition, Roseville will have the option to procure the generating units at the end of the contract term for an agreed upon purchase price.

CC #: 1699

File #: 0800-02

CONTACT: William Forsythe 916-774-5619 wforsythe@roseville.ca.us

Electric Utility Director Michelle Bertolino made the presentation to the City Council.

Senior Deputy City Attorney Joe Mandell continued the presentation to the City Council.

No public comment received.

Motion by Pauline Roccucci, seconded by Tracy Mendonsa, to adopt RESOLUTION NO. 21-393 APPROVING A SITE USE AND INSTALLATION AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND THE CALIFORNIA DEPARTMENT OF WATER RESOURCES, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

9. SPECIAL REQUESTS/REPORTS/PRESENTATION

9.1. The American Rescue Plan Act of 2021 - Update

Memo from Assistant City Manager/Chief Financial Officer Dennis Kauffman

recommending the City Council receive an update on the Coronavirus State and Local Fiscal Recovery Funds included in the American Rescue Plan Act of 2021. There is no fiscal impact.
CC #: 1691
File #: 0300
CONTACT: Dennis Kauffman 916-774-5313 dkauffman@roseville.ca.us

Assistant City Manager/Chief Financial Officer Dennis Kauffman made the presentation to the City Council.

No public comment received.

For information only. No action taken.

10. REPORTS / PUBLIC COMMENTS

No public comment received.

Moment of Silence - Mayor Krista Bernasconi requested a moment of silence in respect for the sacrifices of Marine Sargeant Nicole Gee, for of the individuals killed on 9-11-2001, for first responders, for the law enforcement community, and for the military.

Vigil Held for Marine Sargeant Nicole Gee - Mayor Krista Bernasconi, Vice Mayor Bruce Houdesheldt, and Councilmember Scott Alvord spoke on the event.

Northern California Water Association Meeting - Councilmember Pauline Roccucci and Vice Mayor Bruce Houdeshelt attended the meeting at the future site of the Sites Reservoir.

Roseville Strike Teams - Councilmember Tracy Mendsonsa spoke on the Roseville firefighters participating in multiple fires and requested residents keep them in their thoughts and prayers.

September 11, 2001 - Vice Mayor Bruce Houdesheldt and Councilmember Scott Alvord spoke on where they were when the events occurred.

Placer County Local Agency Formation Commission - Councilmember Scott Alvord defined duties and announced the hiring of new executive director Michelle McIntyre.

Placer County Air Pollution Control District Meeting - Councilmember Scott Alvord reported on air quality concerns.

Sacramento Area Council of Governments Meeting - Mayor Krista Bernasconi reported on attendance.

Placer County Association of Realtors Meeting - Mayor Krista Bernasconi

reported on attendance.

11. ADJOURNMENT

Motion by Pauline Roccucci, seconded by Scott Alvord, to adjourn the meeting at 7:16 p.m. in honor of Marine Sargeant Nicole Gee. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

MINUTES

September 15, 2021

AMENDED
CLOSED SESSION
5:00 p.m.
Civic Center Meeting Rooms 1 & 2
311 Vernon Street
Roseville, California
www.roseville.ca.us

A. CLOSED SESSION CALL TO ORDER

Mayor Krista Bernasconi called the meeting to order at 5:00 p.m.

B. CLOSED SESSION SILENT ROLL CALL

Present: Houdesheldt, Alvord, Roccucci, Mendonsa, Bernasconi

C. CLOSED SESSION PUBLIC COMMENTS

No public comment received.

D. CLOSED SESSION

D.1. Conference with Labor Negotiators

Pursuant to California Government Code Section 54957.6
Agency designated representative: Stacey Peterson and Tim Davis
Employee Organizations: Roseville Firefighters; Roseville Police Officers' Association; Roseville Police Association; International Union of Operating Engineers, Stationary Engineers, Local 39; and Management/Confidential Employees, unrepresented employees.

CONTACT: Stacey Peterson 916-774-5374 slpeterson@roseville.ca.us

Closed Session Disclosure: No reportable action taken.

E. CLOSED SESSION ADJOURNMENT

Council consensus to adjourn the meeting.

MINUTES
September 15, 2021

CITY COUNCIL
6:00 p.m.
Council Chambers
311 Vernon Street
Roseville, California
www.roseville.ca.us/CORTV

The meeting may be viewed on Comcast channel 14, Consolidated Communications channel 73, and AT&T U-Verse. City Council meetings are also video streamed live on the City's website at roseville.ca.us/watch and roseville.ca.us/agenda, and the City's YouTube channel at youtube.com/CityofRosevilleCa.

Members of the public may offer public comment by phone:

Dial in Phone Number: 916-774-5353

If you need a disability-related modification or accommodation to participate in this meeting, please contact Voice: 916-774-5200, TDD: 916-774-5220. Requests must be made as early as possible.

1. CALL TO ORDER

Mayor Krista Bernasconi called the meeting to order at 6:00 p.m.

2. ROLL CALL

Present: Houdesheldt, Alvord, Roccucci, Mendonsa, Bernasconi

3. PLEDGE OF ALLEGIANCE

Retired Placer County Sheriff Ed Bonner led the Pledge of Allegiance.

4. MEETING PROCEDURES

Assistant City Clerk Helen Dreyer announced the procedures for addressing the City Council.

5. PRESENTATIONS

5.1. Proclamation - In Recognition of PRIDE INDUSTRIES during National Disability Employment Awareness Month

Proclaim the month of October 2021 as National Disability Employment Awareness Month, and recognize PRIDE Industries, and encourage all residents to work together to advance the message that with a little bit of help, people with disabilities can do anything.

CONTACT: Blair Hutchison 916-774-5266 bhmutchison@roseville.ca.us

Mayor Krista Bernasconi made the presentation to Pride Industries President and CEO, Jeff Dern, who responded.

6. PUBLIC COMMENTS

Gathering Inn CEO Keith Diedrich - Thanked City Council for their approval of a discretionary fund request of $5,000 for the Gathering Inn's fourth annual "Gathering for Hope" event.

Mayor Krista Bernasconi presented the Constitution Week proclamation to Peg Winney, who responded.

Cheryl Charleston - Spoke on safety concerns for pedestrians on the Washington underpass walkway.

7. CONSENT CALENDAR

BEGINNING OF CONSENT CALENDAR

Motion by Bruce Houdesheldt, seconded by Pauline Roccucci, to drop Item 7.4 from the Consent Calendar to be relisted on the October 6, 2021 City Council agenda, to present Item 7.12 separately, and approve the remaining items as recommended. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

Minutes

7.1. Minutes of Prior Meeting

Memo from Assistant City Clerk Helen Dreyer and City Clerk Sonia Orozco recommending the City Council approve the minutes of the July 21, 2021 City Council Closed Session, the July 21, 2021 City Council meeting, the August 4, 2021 City Council and Housing Authority meeting, the August 16, 2021 Special City Council meeting, and the August 18, 2021 City Council meeting.

CC #: 1707

File #: 0102-03

CONTACT: Helen Dreyer 916-774-5356 hdreyer@roseville.ca.us

Bids / Purchases / Services

7.2. Office Supplies - Open Purchase Order

Memo from Buyer Becky Philipp and Assistant City Manager/Chief Financial Officer Dennis Kauffman recommending the City Council adopt RESOLUTION NO. 21-398 APPROVING A PURCHASE ORDER FOR OFFICE SUPPLIES. Staff requests Council approve an open purchase order with Office Depot, Inc. to provide office supplies on an as-needed basis. Staff requests authorization to renew without further Council approval, contingent upon budget approval each year, until the contract expires or until City staff determines that continuing with the same vendor is not in the City's best interest. The estimated cost of the office supply purchases is not to exceed $235,000 for FY2021-22. Funding is included in each department's FY2021-22 budget. Spending for future years will be contingent upon Council approval of budgets.

CC #: 1709

File #: 0203-04

CONTACT: Becky Philipp 916-774-5724 bphilipp@roseville.ca.us

7.3. Water Efficiency Software Platform – Contract Purchase Agreement

Memo from Water Conservation Specialist John Shannon and Environmental Utilities Director Richard Plecker recommending the City Council adopt RESOLUTION NO. 21-395 APPROVING A CONTRACT PURCHASE AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND EAGLE AERIAL PHOTOGRAPHY INC. DBA EAGLE AERIAL SOLUTIONS, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE (3001519). Staff requests Council approval of a three-year contract purchase agreement with Eagle Aerial Photography Inc. dba Eagle Aerial Solutions (WaterView Software) for a software platform to meet water efficiency and allocation requirements. This tool will enhance mapping data, which will assist in meeting the efficiency and allocation requirements established under California water use efficiency legislation Senate Bill 606 and Assembly Bill 1668. Approval of this contract purchase agreement would allow the City to be equipped with the right tools to be able to meet future water use targets. The total estimated cost of this three-year agreement will not exceed $140,020 and is budgeted in the Water Efficiency Operations budget within the Water Operations Fund, which receives revenue from water utility sales. The annual cost of this agreement is $45,000, with a one-time initial set up fee of $5,020 added to the first year of the agreement.

CC #: 1705

File #: 0800-02

CONTACT: John Shannon 916-774-5768 jshannon@roseville.ca.us

Resolutions

7.4. Fiddyment Ranch - Phase 3 Village F-10 Phase 1 - Notice of Completion

Memo from Senior Construction Inspector Darin Crockett and Development Services Director Mike Isom recommending the City Council adopt RESOLUTION NO. 21-400 ACCEPTING THE PUBLIC WORK KNOWN AS Fiddyment Ranch-Phase 3 Village F-10 Phase 1 PROJECT, APPROVING THE "NOTICE OF COMPLETION", AND AUTHORIZING AND DIRECTING THE CITY ENGINEER TO EXECUTE SAID NOTICE ON BEHALF OF THE CITY OF ROSEVILLE, THEREFORE, AND ACCEPTING ALL DEDICATIONS OFFERED ON THE RECORDED MAP OF THE SUBDIVISION. The Engineering Division has made final inspection of the project and has found the civil improvement work complete in accordance with the improvement plans and City specifications. This action has no impact to the City's General Fund. Construction costs were paid by the developer.

CC #: 1711

File #: 0400-04-09-1

CONTACT: Darin Crockett 916-751-9196 dcrockett@roseville.ca.us

7.5. Relocation of Overhead Electric Lines on Parcel F-55 - Easement Relocation Agreement

Memo from Assistant Engineer Beth Taylor and Public Works Director Jason Shykowski recommending the City Council adopt RESOLUTION NO. 21-407 APPROVING AN EASEMENT RELOCATION AGREEMENT, BY AND BETWEEN PACIFIC GAS AND ELECTRIC COMPANY AND THE CITY OF ROSEVILLE, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff requests Council approve the Easement Relocation Agreement for the relocation of an existing PG&E easement. The Easement Relocation Agreement would transfer the existing easement held by PG&E to the new alignment of the overhead electrical line relocation planned along Blue Oaks Blvd. on two City-owned properties. No costs are associated with this easement relocation agreement.

CC #: 1717

File #: 0800-03

CONTACT: Beth Taylor 916-746-1300 bftaylor@roseville.ca.us

7.6. Roseville Utility Exploration Center Exhibit Upgrade Project - Professional Design Services Agreement

Memo from Assistant Engineer Rana Moore and Environmental Utilities Director Richard Plecker recommending the City Council adopt RESOLUTION NO. 21-394 APPROVING A PROFESSIONAL DESIGN SERVICES AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND BART HAYS EXHIBITION DESIGN, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff request Council approve a professional design services agreement with Bart Hays Exhibition Design (BartXD) to provide professional design services to update exhibits at the Roseville Utility Exploration Center (UEC) and to design exhibits for the future utility customer service center located at 116 S. Grant Street. The total

contract value of the agreement with BartXD is not to exceed $322,892. Of this contract amount, $263,492 is for the UEC portion of the project and $59,400 is for the 116 S. Grant Street building. Funding for both activities is included in the Roseville Electric Fund, Water Rehabilitation Fund, Wastewater Rehabilitation Fund, and the Waste Services Rehabilitation Fund FY2021-22 capital improvement project budgets.

CC #: 1704

File #: 0800-02 & 0800-03

CONTACT: Rana Moore 916-223-2867 rcmoore@roseville.ca.us

7.7. Torrente at Sierra Vista Community Facilities District No. 1 (Public Facilities District) - Intent to Form

Memo from Management Analyst Jeannine Thrash and Assistant City Manager/Chief Financial Officer Dennis Kauffman recommending the City Council adopt RESOLUTION NO. 21-401 TO FORM A COMMUNITY FACILITIES DISTRICT AND TO AUTHORIZE THE LEVY OF A SPECIAL TAX THEREIN TO FINANCE PUBLIC FACILITIES AND PUBLIC SERVICES IN AND FOR SUCH COMMUNITY FACILITIES DISTRICT; and adopt RESOLUTION NO. 21-402 INTENTION TO INCUR BONDED INDEBTEDNESS TO FINANCE THE ACQUISITION AND CONSTRUCTION OF CERTAIN PUBLIC FACILITIES IN AND FOR THE CITY OF ROSEVILLE TORRENTE AT SIERRA VISTA COMMUNITY FACILITIES DISTRICT NO. 1 (PUBLIC FACILITIES). CGB Properties, the landowner proposed to be included in the public infrastructure district, has requested the City form a Community Facilities District (CFD) under the Mello-Roos Community Facilities Act of 1982, as amended, to provide funding for certain authorized public facilities within the property, as detailed in the List of Authorized Facilities and Services. The objective of establishing a CFD is to create a land-secured funding mechanism to be used to finance acquisition and construction of authorized facilities of the CFD. The CFD will generate special taxes that will be paid by the property owners sufficient to pay the costs of debt service, CFD administration, and any authorized pay-as-you-go facilities, as well as provide funding in the future for maintenance/replacement of constructed facilities. The issuance of bonds will not impact the City's General Fund.

CC #: 1714

File #: 0206-03-01

CONTACT: Jeannine Thrash 916-774-5473 jthrash@roseville.ca.us
Dennis Kauffman 916-774-5313 dkauffman@roseville.ca.us

Ordinances (for introduction and adoption - appropriation/urgency measures)

7.8. Fiscal Year 2020-21 Year-End - Budget Adjustments

Memo from Budget Manager Scott Pettingell and Assistant City Manager/Chief Financial Officer Dennis Kauffman recommending the City Council adopt ORDINANCE NO. 6396 OF THE COUNCIL OF THE CITY OF ROSEVILLE AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2020-21 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. As part of the FY2020-21

year-end close process, staff analyzes budget to actual results to ensure compliance with the annual budget ordinance no. 6239. Staff has completed this review and has identified administrative adjustments to the FY2020-21 budget. The report summarizes the adjustments, including recommended changes to expenses/expenditures, revenues, and available resources. The net impact to the General Fund is an increase in available resources of $188,636.

CC #: 1713

File #: 0201 & 0201-01

CONTACT: Scott Pettingell 916-746-1306 spettingell@roseville.ca.us

Reports / Requests

7.9. Appointment to Local Sales Tax Citizens' Oversight Committee - Bi-Annual Vacancy

Memo from Deputy City Clerk Katrina Six and City Clerk Sonia Orozco recommending the City Council appoint Stephanie Hill to the Local Sales Tax Citizens' Oversight Committee.

CC #: 1712

File #: 0103-22

CONTACT: Katrina Six 916-774-5267 kmsix@roseville.ca.us

7.10. League of California Cities Annual Conference 2021 - Consideration of Annual Conference Resolutions

Memo from Government Relations Administrator Mark Wolinski and Deputy City Manager Megan Scheid recommending the City Council provide direction to the City's voting delegate regarding the City's position on the League of California Cities resolutions being considered at its annual conference. This year, the League of California Cities Annual Conference is being held September 22-24, 2021 in Sacramento, CA. The annual business meeting will be held at noon on Friday, September 24, 2021 when the membership takes action on resolutions that establish League policy. Designated voting delegates or their alternates registered to attend the Annual Conference constitute the League's General Assembly. At the August 18, 2021 City Council meeting, the Council appointed Council Member Scott Alvord as the City's voting delegate. Annual conference resolutions guide cities and the League in efforts to improve the quality, responsiveness and vitality of local government in California. There is no financial impact associated with this action.

CC #: 1700

File #: 0102-12

CONTACT: Mark Wolinski 916-774-5179 mwolinski@roseville.ca.us

7.11. Out-of-State Travel - National Police Memorial Week

Memo from Chief of Police Troy Bergstrom recommending the City Council approve an out-of-state travel request for members of the Police Department Honor Guard and other staff to attend National Police Memorial Week ceremonies

in Washington D.C. in remembrance of the 25th Anniversary of the loss of Officer Mark White. The trip has been delayed twice by COVID-19 restrictions and rescheduled to October 13-16, 2021. There are no travel or lodging costs to the City for this event. All travel costs are covered through a combination of private donations and attendee self-funding.

CC #: 1701

File #: 0600-02

CONTACT: Troy Bergstrom 916-774-5010 tbergstrom@roseville.ca.us

Ceremonial Documents

7.12. Proclamation - Constitution Week September 17 - 23

Proclaim September 17 - 23, 2021 as CONSTITUTION WEEK and encourage all citizens to reaffirm the ideals of the Framers of the Constitution by vigilantly protecting the freedoms guaranteed to all through the Constitution of the United States of America.

CC #: 1702

File #: 0102-06

CONTACT: Blair Hutchison 916-774-5266 bmhutchison@roseville.ca.us

7.13. Resolution - Renee Laffey

Commend Frances (Renee) Laffey for her 15 years of outstanding service and dedication to the City of Roseville, congratulate her for her accomplishments, and wish her a long, healthy, and enjoyable retirement.

CC #: 1706

File #: 0102-10

CONTACT: Blair Hutchison 916-774-5266 bmhutchison@roseville.ca.us

END OF CONSENT CALENDAR

8. RESOLUTIONS

8.1. Baseline at Sierra Vista Community Facilities District No. 1, Series 2021 - Bond Issuance

Memo from Management Analyst Jeannine Thrash and Assistant City Manager/Chief Financial Officer Dennis Kauffman recommending the City Council adopt RESOLUTION NO. 21-403 AUTHORIZING THE ISSUANCE OF SPECIAL TAX BONDS FOR AND ON BEHALF OF IMPROVEMENT AREA NO. 1 OF THE CITY OF ROSEVILLE BASELINE AT SIERRA VISTA COMMUNITY FACILITIES DISTRICT NO. 1 (PUBLIC FACILITIES), APPROVING AND DIRECTING THE EXECUTION OF A FISCAL AGENT AGREEMENT, BOND PURCHASE AGREEMENT, AND ACQUISITION AGREEMENT, APPROVING THE FORM OF PRELIMINARY OFFICIAL STATEMENT, APPROVING SALE OF SUCH BONDS, AND APPROVING

OTHER RELATED DOCUMENTS AND ACTIONS. The 2021 bonds are the first series of bonds being issued at the developer's request, in an amount not to exceed $9 million to: i) construct and/or acquire certain authorized public facilities, (ii) provide for a deposit to a debt service reserve fund, (iii) provide capitalized interest for debt service due on the Bonds, and (iv) pay costs of issuance of the bonds. The Community Facilities District (CFD) generates special taxes paid by the property owners sufficient to pay the costs of debt service associated with the bonds, CFD administration, and any authorized pay-as-you-go facilities, as well as provide funding in the future for maintenance/replacement of constructed facilities. The issuance of these bonds will not impact the City's General Fund.

CC #: 1715

File #: 0206-03-01

CONTACT: Jeannine Thrash 916-774-5473 jthrash@roseville.ca.us
Dennis Kauffman 916-774-5313 dkauffman@roseville.ca.us

Assistant City Manager/Chief Financial Officer Dennis Kauffman made the presentation to the City Council.

Nick Alexander on behalf of DF Properties - Spoke in support of the item.

Motion by Tracy Mendonsa, seconded by Scott Alvord, to adopt RESOLUTION NO. 21-403 AUTHORIZING THE ISSUANCE OF SPECIAL TAX BONDS FOR AND ON BEHALF OF IMPROVEMENT AREA NO. 1 OF THE CITY OF ROSEVILLE BASELINE AT SIERRA VISTA COMMUNITY FACILITIES DISTRICT NO. 1 (PUBLIC FACILITIES), APPROVING AND DIRECTING THE EXECUTION OF A FISCAL AGENT AGREEMENT, BOND PURCHASE AGREEMENT, AND ACQUISITION AGREEMENT, APPROVING THE FORM OF PRELIMINARY OFFICIAL STATEMENT, APPROVING SALE OF SUCH BONDS, AND APPROVING OTHER RELATED DOCUMENTS AND ACTIONS. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

9. SPECIAL REQUESTS/REPORTS/PRESENTATION

9.1. Northwest Landscaping and Lighting District - Ballot Initiative

Memo from Management Analyst Jeannine Thrash and Assistant City Manager/Chief Financial Officer Dennis Kauffman recommending the City Council adopt RESOLUTION NO. 21-404 INITIATING PROCEEDINGS TO LEVY PROPOSED NEW OR INCREASED ASSESSMENTS FOR NORTHWEST ROSEVILLE SPECIFIC PLAN LANDSCAPING AND LIGHTING DISTRICT FOR FISCAL YEAR 2022/2023 AND ORDERING THE ENGINEER TO PREPARE AND FILE AN ENGINEER'S REPORT IN ACCORDANCE WITH ARTICLE 4 OF CHAPTER 1 OF SAID ACT; and adopt RESOLUTION NO. 21-405 DECLARING ITS INTENTION TO BALLOT PROPERTY OWNERS FOR PROPOSED NEW OR INCREASED ASSESSMENTS FOR THE NORTHWEST ROSEVILLE SPECIFIC PLAN LANDSCAPING AND LIGHTING DISTRICT, FISCAL YEAR 2022/2023, SETTING A TIME AND PLACE FOR A PUBLIC HEARING, AND AUTHORIZING STAFF TO

PROCEED WITH THE BALLOTING PROCEDURES; and adopt RESOLUTION NO. 21-406 PRELIMINARY APPROVAL OF THE ENGINEER'S LEVY REPORT REGARDING PROPOSED NEW OR INCREASED ASSESSMENTS FOR FISCAL YEAR 2022/2023 FOR THE NORTHWEST ROSEVILLE SPECIFIC PLAN LANDSCAPING AND LIGHTING DISTRICT. In order to fund needed improvements within the Northwest Lighting & Landscape District (NWLLD), staff recommends sending out a ballot to ask all homeowners within the NWLLD to vote for an assessment increase so that the annual levy for all homeowners would be $260 per parcel. The ballot will also ask for approval of an annual inflationary adjustment. If the ballot passes, the increase of the maximum assessment by $160 per unit in Zone A from $100 to $260 per unit would allow for an addition of $739,520 to be used in the FY2022-23 budget year for authorized services for the district. The increase of the maximum assessment by $112.80 per unit in Zone B from $147.20 to $260.00 per unit would allow for an additional $14,664 per year. There would be no fiscal impact to the General Fund.

CC #: 1716

File #: 0206-08-01

CONTACT: Jeannine Thrash 916-774-5473 jthrash@roseville.ca.us
Dennis Kauffman 916-774-5313 dkauffman@roseville.ca.us

Parks, Recreation & Libraries Director Jill Geller introduced Park Planning & Development Superintendent Tara Gee.

Park Planning & Development Superintendent Tara Gee made the presentation to the City Council.

No public comment received.

Motion by Scott Alvord, seconded by Pauline Roccucci, to adopt RESOLUTION NO. 21-404 INITIATING PROCEEDINGS TO LEVY PROPOSED NEW OR INCREASED ASSESSMENTS FOR NORTHWEST ROSEVILLE SPECIFIC PLAN LANDSCAPING AND LIGHTING DISTRICT FOR FISCAL YEAR 2022/2023 AND ORDERING THE ENGINEER TO PREPARE AND FILE AN ENGINEER'S REPORT IN ACCORDANCE WITH ARTICLE 4 OF CHAPTER 1 OF SAID ACT; and adopt RESOLUTION NO. 21-405 DECLARING ITS INTENTION TO BALLOT PROPERTY OWNERS FOR PROPOSED NEW OR INCREASED ASSESSMENTS FOR THE NORTHWEST ROSEVILLE SPECIFIC PLAN LANDSCAPING AND LIGHTING DISTRICT, FISCAL YEAR 2022/2023, SETTING A TIME AND PLACE FOR A PUBLIC HEARING, AND AUTHORIZING STAFF TO PROCEED WITH THE BALLOTING PROCEDURES; and adopt RESOLUTION NO. 21-406 PRELIMINARY APPROVAL OF THE ENGINEER'S LEVY REPORT REGARDING PROPOSED NEW OR INCREASED ASSESSMENTS FOR FISCAL YEAR 2022/2023 FOR THE NORTHWEST ROSEVILLE SPECIFIC PLAN LANDSCAPING AND LIGHTING DISTRICT. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

10. DEPARTMENT UPDATES

10.1. Electric Department Update

CONTACT: Michelle Bertolino 916-774-5636 mbertolino@roseville.ca.us

Electric Utility Director Michelle Bertolino made the presentation to the City Council.

LaMills Garrett - Inquired if precautions have been taken by the electric utility with regard to ransomware and are there any planned housing projects to accommodate City workforce.

Electric Utility Director Michelle Bertolino and City Manager Dominick Casey responded.

For information only. No action required.

11. PUBLIC HEARING

11.1. Community Facilities District No. 3 (Municipal Services) - Annexation No. 26 (Baseline at Sierra Vista) - Annexation of Territory

Memo from Management Analyst Jeannine Thrash and Assistant City Manager/Chief Financial Officer Dennis Kauffman recommending the City Council adopt RESOLUTION NO. 21-396 A RESOLUTION OF ANNEXATION OF TERRITORY TO COMMUNITY FACILITIES DISTRICT, AUTHORIZING THE LEVY OF A SPECIAL TAX AND SUBMITTING LEVY OF TAX TO QUALIFIED ELECTORS; and adopt RESOLUTION NO. 21-397 A RESOLUTION DECLARING RESULTS OF SPECIAL ANNEXATION ELECTION, DETERMINING VALIDITY OF PRIOR PROCEEDINGS, AND DIRECTING RECORDING OF AMENDED NOTICE OF SPECIAL TAX LIEN. The landowner is obligated under their Development Agreement by and between the City and DF Properties, Inc. relative to the Sierra Vista Specific Plan, to annex into the existing Municipal Services Community Facilities District (CFD) No. 3. The annexation into CFD No. 3 helps offset the property's impact on City General Fund resources available to pay for municipal services and therefore will not negatively impact the General Fund.

CC #: 1708

File #: 0400-04-17-1

CONTACT: Jeannine Thrash 916-774-5473 jthrash@roseville.ca.us
Dennis Kauffman 916-774-5313 dkauffman@roseville.ca.us

Mayor Krista Bernasconi opened the public hearing.

Assistant City Manager/Chief Financial Officer Dennis Kauffman made the presentation to the City Council.

Nick Alexander on behalf of DF Properties - Spoke in support of the item.

Assistant City Clerk Helen Dreyer announced the ballot results:
Votes Eligible: 154
Votes in Favor: 154
Votes in Opposition: 0

Assistant City Clerk Helen Dreyer announced the landowners approval of the annexation.

Mayor Krista Bernasconi closed the Public Hearing.

Motion by Bruce Houdesheldt, seconded by Pauline Roccucci, to adopt RESOLUTION NO. 21-396 A RESOLUTION OF ANNEXATION OF TERRITORY TO COMMUNITY FACILITIES DISTRICT, AUTHORIZING THE LEVY OF A SPECIAL TAX AND SUBMITTING LEVY OF TAX TO QUALIFIED ELECTORS; and adopt RESOLUTION NO. 21-397 A RESOLUTION DECLARING RESULTS OF SPECIAL ANNEXATION ELECTION, DETERMINING VALIDITY OF PRIOR PROCEEDINGS, AND DIRECTING RECORDING OF AMENDED NOTICE OF SPECIAL TAX LIEN. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

11.2. Community Development Block Grant 2020 Consolidated Annual Performance and Evaluation Report

Memo from Housing Analyst Kristine Faelz and Assistant City Manager Ryan DeVore recommending the City Council adopt RESOLUTION NO. 21-399 APPROVING THE 2020 CONSOLIDATED ANNUAL PERFORMANCE AND EVALUATION REPORT (CAPER) AND AUTHORIZING THE CITY MANAGER OR HIS DESIGNEE TO SUBMIT THE COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG) 2020 CAPER TO THE U.S. DEPARTMENT OF HOUSING & URBAN DEVELOPMENT (HUD). Staff requests Council approval of the City's Consolidated Annual Performance and Evaluation Report (CAPER) for the federal Community Development Block Grant Program, and authorization to submit the CAPER to the federal Department of Housing and Urban Development. The Community Development Block Grant funding is provided as a federal grant to the City. These grants are used to offset potential costs to the General Fund and to serve the community. This item does not impact the City's General Fund.

CC #: 1710

File #: 0113-02 & 0709

CONTACT: Kristine Faelz 916-774-5451 kpfaelz@roseville.ca.us

Mayor Krista Bernasconi opened the public hearing.

Assistant City Manager Ryan DeVore introduced Housing Analyst Kristine Faelz.

Housing Analyst Kristine Faelz made the presentation to the City Council.

Cheryl Charleston - Thanked City Council for use of the funds for the homeless community.

Mayor Krista Bernasconi closed the public hearing.

Motion by Pauline Roccucci, seconded by Bruce Houdesheldt, to adopt RESOLUTION NO. 21-399 APPROVING THE 2020 CONSOLIDATED ANNUAL PERFORMANCE AND EVALUATION REPORT (CAPER) AND AUTHORIZING THE CITY MANAGER OR HIS DESIGNEE TO SUBMIT THE COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG) 2020 CAPER TO THE U.S. DEPARTMENT OF HOUSING & URBAN DEVELOPMENT (HUD). The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

12. REPORTS / PUBLIC COMMENTS

No public comment received.

Flood Mapping by the Federal Emergency Management Agency - Councilmember Pauline Roccucci spoke on looking forward to seeing results in 2022.

Dedication of Harry Crabb Park - Councilmember Tracy Mendonsa announced the event to be held September 17, 2021, at 10:00 a.m.

Capitol Corridor Joint Powers Authority Meeting - Vice Mayor Bruce Houdesheldt spoke on the approval to pursue almost $89M in funding that would increase the number of passenger rail trips from Historic Roseville to Sacramento.

Pistacho Park Phase 1 - Councilmember Scott Alvord spoke on the park dedication ceremony.

Grants Advisory Commission Meeting - Councilmember Scott Alvord spoke on the reports provided by the grants recipients.

MoJoe's Cafe - Councilmember Scott Alvord spoke on the first retail establishment to open West of Fiddyment.

Marine Sergeant Nicole Gee Funeral Procession and Service - Mayor Krista Bernasconi announced the events to occur on Friday and Saturday and asked for residents to be patient with traffic.

13. ADJOURNMENT

Mayor Krista Bernasconi adjourned the meeting at 7:20 p.m.

MINUTES
October 6, 2021

CITY COUNCIL
6:00 p.m.
Council Chambers
311 Vernon Street
Roseville, California
www.roseville.ca.us/CORTV

The meeting may be viewed on Comcast channel 14, Consolidated Communications channel 73, and AT&T U-Verse. City Council meetings are also video streamed live on the City's website at roseville.ca.us/watch and roseville.ca.us/agenda, and the City's YouTube channel at youtube.com/CityofRosevilleCa.

If you need a disability-related modification or accommodation to participate in this meeting, please contact Voice: 916-774-5200, TDD: 916-774-5220. Requests must be made as early as possible.

1. CALL TO ORDER

Mayor Krista Bernasconi called the meeting to order at 6:00 p.m.

2. ROLL CALL

Present: Houdesheldt, Alvord, Roccucci, Mendonsa, Bernasconi

3. PLEDGE OF ALLEGIANCE

The Pledge of Allegiance was led by former Roseville Mayor Carol Garcia.

4. MEETING PROCEDURES

Assistant City Clerk Helen Dreyer announced the procedures for addressing the City Council.

5. PRESENTATIONS

5.1. Proclamation - Breast Cancer Awareness Month October 2021

Proclaim October 2021 as Breast Cancer Awareness Month and urge citizens and civic organizations to acquaint themselves with the issues involved in Breast Cancer Awareness.

CONTACT: Blair Hutchison 916-774-5266 bmhutchison@roseville.ca.us

Mayor Krista Bernasconi made the presentation to Placer Breast Cancer Foundation member Carol Garcia, who responded.

5.2. Proclamation - Children's Environmental Health Month October 2021

Proclaim October 2021 as Children's Environmental Health Month and urge all citizens to observe this month with awareness-raising and environmental health and stewardship activities to create a healthier environment for our children.

CONTACT: Blair Hutchison 916-774-5266 bmhutchison@roseville.ca.us

Councilmember Pauline Roccucci made the presentation to California Alliance of Nurses for Healthy Environments Member Lorraine Thiebaud who responded.

6. PUBLIC COMMENTS

Kathleen Crawford - Spoke on concerns regarding no public comment call-in option offered for City Council meetings and shared COVID statistics in Placer County. City Attorney Michelle Sheidenberger shared information regarding the recent Assembly Bill 361signed by the Governor regarding remote meetings and call-in options.

Lisa Larkin - Spoke in opposition to no phone-in option for City Council meetings.

Patrick Ganguet- representing the Roseville Police Officers Association - Spoke on staffing levels, working conditions, and lack of resources.

7. CONSENT CALENDAR

BEGINNING OF CONSENT CALENDAR

Motion by Bruce Houdesheldt, seconded by Pauline Roccucci, to remove items 7.6 and 7.7 for separate action and approve the remaining items as recommended. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

Bids / Purchases / Services

7.1. Wireless Network Upgrade - Contract Purchase Agreement Amendment

Memo from IT Manager Karl Grover and Chief Information Officer Hong Sae recommending the City Council adopt RESOLUTION NO. 21-416 APPROVING

A CONTRACT PURCHASE AGREEMENT AMENDMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND PRESIDIO NETWORKED SOLUTIONS GROUP, LLC, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE (3000902). Staff requests Council approval of a contract purchase agreement amendment with Presidio Networked Solutions Group, LLC. The City's new wireless network system needs additional resiliency to maintain Wi-Fi service levels for both public and staff. This implementation requires the original contract to be amended to reflect the increase in scope and cost. The contract cost will increase by $6,028.43, increasing the total contract amount to $117,478.30. Additionally, staff requests approval for a 10% contingency, not to exceed $11,747.83, to streamline the project should other items surface that increase costs. This will be funded through the Information Technology Replacement Fund budget.

CC #: 1729

File #: 0203-05

CONTACT: Karl Grover 916-774-5145 kgrover@roseville.ca.us

Resolutions

7.2. Cost Allocation Plan and Indirect Cost Rate Proposal - Professional Services Agreement

Memo from Budget Manager Scott Pettingell and Assistant City Manager/Chief Financial Officer Dennis Kauffman recommending the City Council adopt RESOLUTION NO. 21-412 APPROVING A PROFESSIONAL SERVICES AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND MGT OF AMERICA CONSULTING, LLC, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff requests Council approve a professional services agreement with MGT of America Consulting, LLC to develop the annual Cost Allocation Plan and Indirect Cost Rate Proposals for an initial term of three years and an annual not-to-exceed amount of $27,870, or $83,610 over the three-year term. The agreement also includes an option to extend the agreement for two additional years. There are adequate funds available in the Finance Department FY2021-22 operating budget in the General Fund for the first year of this agreement. Future year funding will be evaluated as part of the annual budget development process.

CC #: 1724

File #: 0200

CONTACT: Scott Pettingell 916-746-1306 spettingell@roseville.ca.us

7.3. Fiddyment Ranch - Phase 3 Village F-10 Phase 1 - Notice of Completion

Memo from Senior Construction Inspector Darin Crockett and Development Services Director Mike Isom recommending the City Council adopt RESOLUTION NO. 21-410 ACCEPTING THE PUBLIC WORK KNOWN AS Fiddyment Ranch-Phase 3 Village F-10 Phase 1 PROJECT, APPROVING THE "NOTICE OF COMPLETION", AND AUTHORIZING AND DIRECTING THE CITY ENGINEER TO EXECUTE SAID NOTICE ON BEHALF OF THE CITY OF ROSEVILLE, THEREFORE, AND ACCEPTING ALL DEDICATIONS

OFFERED ON THE RECORDED MAP OF THE SUBDIVISION. The Engineering Division has made final inspection of the project and has found the civil improvement work complete in accordance with the improvement plans and City specifications. This action has no impact to the City's General Fund. Construction costs were paid by the developer.

CC #: 1719

File #: 0400-04-09-1

CONTACT: Darin Crockett 916-751-9196 dcrockett@roseville.ca.us

7.4. West Side Tanks and Pump Station Operations Crew Facility (RFP #08-089) - Design-Build Construction Agreement

Memo from Assistant Engineer Rana Moore and Environmental Utilities Director Richard Plecker recommending the City Council adopt RESOLUTION NO. 21-420 APPROVING A DESIGN-BUILD CONSTRUCTION AGREEMENT, BY AND BETWEEN DIEDE CONSTRUCTION, INC. AND THE CITY OF ROSEVILLE, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff requests Council award a design-build construction agreement to Diede Construction, Inc., to provide design and construction services for the West Side Tanks and Pump Station Operations Crew Facility Project in the amount of $2,998,700 and authorization for the Environmental Utilities Director or his designee to approve and pay for contract change orders that could increase the contract amount by no more than ten percent (10%) or $299,870. Staff also requests approval of concept drawings and specifications. This project is funded by the Water Construction Fund. No additional funding is required at this time.

CC #: 1735

File #: 0203-06

CONTACT: Rana Moore 916-774-5552 rcmoore@roseville.ca.us

7.5. Roseville Transit System Management, Operations, and Call Center Services - Agreement Amendment

Memo from Transit Operations Analyst Ed Scofield and Public Works Director Jason Shykowski recommending the City Council adopt RESOLUTION NO. 21-415 APPROVING AMENDMENT NO. 2 TO AGREEMENT FOR CITY OF ROSEVILLE TRANSIT SYSTEM MANAGEMENT, OPERATIONS AND CALL CENTER SERVICES, BY AND BETWEEN THE CITY OF ROSEVILLE AND MV TRANSPORTATION, INC., AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff requests approval of a second amendment to the Agreement between the City and MV Transportation, Inc. for the operation of the Roseville Transit System and the South Placer County Transit Information Center. The costs for the two additional years in the amount of $9,517,518.31 was approved by the City Council at the June 16, 2021 meeting. This amendment increases the not-to-exceed amount of the agreement from $16,871,287.78 to $26,388,806.09 to include the two additional years. Funding for these two optional years will be provided through Federal Transit Administration funds, State Transportation Development (TDA) funds and fare revenue. The South Placer County Call Center is funded through the Consolidated Transportation Services

Agency (CTSA), with TDA revenues provided by the West Placer CTSA. General Fund resources are not used for either transit operations or the call center.

CC #: 1728

File #: 0721

CONTACT: Ed Scofield 916-869-9109 ecscofield@roseville.ca.us

7.6. Tower Theatre - Option Agreement

Memo from Economic Development Manager Wayne Wiley and City Manager Dominick Casey recommending the City Council adopt RESOLUTION NO. 21-423 APPROVING AN OPTION AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND UNIVERSITY DEVELOPMENT FOUNDATION, AND AUTHORIZING THE CITY MANAGER OR HIS DESIGNEE TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. Staff recommends Council approval of a new assignable option granting the University Development Foundation the exclusive right to purchase the Tower Theatre within an option period expiring on January 17, 2022 for a total amount of $1.00. The original grantor, Angelo K. Tsakopoulos, supports this proposal in association with the City's effort to attract a private university to establish a campus in the City and/or in the surrounding area. The liability and ongoing costs of owning and maintaining the Tower Theatre exceed the revenue generated from renting out the theatre to short term tenants. As such, selling the property will reduce the City's expenses.

CC #: 1739

File #: 0209

CONTACT: Wayne Wiley 916-774-5283 wwiley@roseville.ca.us

Item removed by City Attorney Michelle Sheidenberger to point out amendment to the resolution.

No public comment received.

Motion by Tracy Mendonsa, seconded by Pauline Roccucci, to adopt RESOLUTION NO. 21-423 APPROVING AN OPTION AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND UNIVERSITY DEVELOPMENT FOUNDATION, AND AUTHORIZING THE CITY MANAGER OR HIS DESIGNEE TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

7.7. Roseville Municipal Code Amendment to Sign Ordinance

Memo from Economic Development Project Manager Robert Cline and City Manager Dominick Casey recommending the City Council introduce for first reading an ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTION 17.17.035 OF CHAPTER 17.17 OF TITLE 17 OF THE ROSEVILLE MUNICIPAL CODE REGARDING SIGNS ON PUBLIC

PROPERTY. This action does not constitute approval of, or otherwise permit the construction or operation of digital billboards. Amending the Sign Ordinance to clarify that the City can construct and maintain freestanding digital billboard signs on City-owned property pursuant either to a relocation agreement or an agreement negotiated following one of the City's standard procurement processes alone will have no immediate fiscal impact. However, the future lease(s) of City properties to the selected outdoor advertising company will result in positive long-term revenue to the General Fund.

CC #: 1733

File #: 0324

CONTACT: Robert Cline 916-746-1172 racline@roseville.ca.us

Item removed by Councilmember Bruce Houdesheldt for clarification.

City Attorney Michelle Sheidenberger responded.

No public comment received.

Motion by Bruce Houdesheldt, seconded by Scott Alvord, to introduce for first reading ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTION 17.17.035 OF CHAPTER 17.17 OF TITLE 17 OF THE ROSEVILLE MUNICIPAL CODE REGARDING SIGNS ON PUBLIC PROPERTY. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

Ordinances (for introduction and adoption - appropriation/urgency measures)

7.8. License Plate Reading Cameras - Services Agreement and Budget Adjustment

Memo from Management Analyst Mark Peinado and Police Chief Troy Bergstrom recommending the City Council adopt RESOLUTION NO. 21-411 APPROVING A SERVICES AGREEMENT BETWEEN THE CITY OF ROSEVILLE AND FLOCK GROUP INC., AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE; and adopt ORDINANCE NO. 6397 AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff requests approval of a services agreement with Flock Group Inc., for the purchase of ten (10) new Flock License Plate Reading cameras. Staff also requests amending the FY2021-22 budget in the Traffic Safety Fund, in the amount of $52,500, to cover the cost of the existing cameras, the purchase of the new cameras, and the maintenance fees. There will be no fiscal impact on the City's General fund.

CC #: 1721

File #: 0323 & 0201-01

CONTACT: Mark Peinado 916-774-5021 mcpeinado@roseville.ca.us

7.9. Architectural and Consulting Services for the Wastewater Treatment Plant Buildings – Professional Design Services Agreement and Budget Adjustment

Memo from Environmental Utilities Process Engineer Todd Jordan and Environmental Utilities Director Richard Plecker recommending the City Council adopt RESOLUTION NO. 21-413 APPROVING A PROFESSIONAL DESIGN SERVICES AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND WILLIAMS + PADDON/ARCHITECTS + PLANNERS, INC., AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE; and adopt ORDINANCE NO. 6399 ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff requests Council approve a professional design services agreement with Williams + Paddon/ Architects + Planners, Inc., for architectural and consulting services for the Pleasant Grove Wastewater Treatment Plant Maintenance Building project and the Dry Creek Operations and Lab Building project with a total cost of $400,000. Staff is also requesting approval of a budget adjustment to move these projects from the Wastewater Rehabilitation Fund to the Wastewater Regional Rehabilitation Fund, delete their original revenue budgets, increase the budget for the Dry Creek Operations and Lab Building project by $400,000, and transfer $2,000,000 from the Wastewater Rehabilitation Fund to the Wastewater Regional Rehabilitation Fund to fund regional rehabilitation projects. This request has no impact on the General Fund.
CC #: 1725

File #: 0800-02 & 0201-01

CONTACT: Todd Jordan 916-746-1829 tjordan@roseville.ca.us

7.10. Light Detection and Ranging Equipment - Budget Adjustment

Memo from Management Analyst Mark Peinado and Police Chief Troy Bergstrom recommending the City Council adopt ORDINANCE NO. 6398 AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff requests amending the FY2021-22 budget in the amount of $15,560 for the purchase of eight (8) new Light Detection and Ranging (LIDAR) models which are used for detecting the speed of vehicles. The budget adjustment will increase the equipment budget in the Traffic Safety Fund by $15,560. The total one-time cost for (8) LIDAR Prolaser 4 models is $17,560. The Police Department will exchange old obsolete models for a $2,000 credit towards the purchase. There will be no fiscal impact on the City's General Fund.

CC #: 1723

File #: 0323 & 0201-01

CONTACT: Mark Peinado 916-774-5021 mcpeinado@roseville.ca.us

7.11. Maidu Park Bike Trail Reconstruction Project, Phase 2 - Budget Adjustment

Memo from Assistant Engineer Cathy Gosalvez and Public Works Director Jason

Shykowski recommending the City Council adopt ORDINANCE NO. 6400 AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff requests a budget adjustment of $280,547 which will bring the total project budget, including the previously completed phase 1 and the current phase 2 of the project, to $635,648. This project will remove and reconstruct the Maidu Park Bike Trail along McLaren Drive from Rocky Ridge to Thistle Down Drive. The project will be funded by local transportation funds. No General Fund resources will be used.

CC #: 1727

File #: 0721-05 & 0201-01

CONTACT: Cathy Gosalvez 916-746-1300 cgosalvez@roseville.ca.us

7.12. Sierra Vista Specific Plan Bike Trail Grading DF-1 & DF-2 - Reimbursement Agreement and Budget Adjustment

Memo from Alternative Transportation Analyst Alison Winter and Public Works Director Jason Shykowski recommending the City Council adopt RESOLUTION NO. 21-419 APPROVING A CITY/DEVELOPER REIMBURSEMENT AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND SV 218, LLC, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE; and adopt ORDINANCE NO. 6401 AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE. Staff requests Council approval of a reimbursement agreement with SV 218, LLC, for grading trail segments adjacent to DF-1 & DF-2 within the Sierra Vista Specific Plan (SVSP), and approving a budget adjustment in the amount of $42,260. Funding for the project is from the SVSP Bike Trail Fund. General Fund resources will not be used for this project.

CC #: 1734

File #: 0721-05 & 0201-01

CONTACT: Alison Winter 916-774-5365 awinter@roseville.ca.us

Reports / Requests

7.13. Out-of-State Travel Request - Public Works Department

Memo from Administrative Assistant Lainie Anderson and Public Works Director Jason Shykowski recommending the City Council approve an out-of-state travel request for a staff member to attend the Public Works Summit in San Antonio, Texas in November of 2021. There is no cost to the City as the Summit is covering all costs associated with this trip.

CC #: 1722

File #: 0600-02

CONTACT: Lainie Anderson 916-774-5331 landerson@roseville.ca.us

Ceremonial Documents

7.14. Proclamation - Cybersecurity Awareness Month October 2021

Proclaim October as "Cybersecurity Awareness Month" in Roseville and officially support the National Cybersecurity Awareness Month and the National Public Awareness Campaign "Stop. Think. Connect. ™" and call upon all employees, residents and visitors of Roseville to become educated about cybersecurity and put that knowledge into practice to keep our connected community safe from cyber threats.

CC #: 1730

File #: 0102-06

CONTACT: Blair Hutchison 916-774-5266 bmhutchison@roseville.ca.us

END OF CONSENT CALENDAR

8. RESOLUTIONS

8.1. California Arrearage Payment Program - Authorization to Participate

Memo from Utility Government Relations Administrator Amber Blixt and Electric Utility Director Michelle Bertolino recommending the City Council adopt RESOLUTION NO. 21-414 AUTHORIZING PARTICIPATION IN THE CALIFORNIA ARREARAGE PAYMENT PROGRAM. Staff requests Council approval to participate in the California Arrearage Payment Program (CAPP) and to accept and expend CAPP funds to assist customers with past due balances on electricity bills. Funds received from the State of California will be used to reduce or eliminate past due balances on customer electric utility accounts, thereby reducing the potential of bad debt incurred by the utility. Roseville Electric Utility estimates approximately $1.37 million in total arrears that could qualify for program participation.

CC #: 1726

File #: 0800-03

CONTACT: Amber Blixt 916-774-5693 aablixt@roseville.ca.us

Items 8.1, 8.2 and 8.3 heard concurrently.

Assistant Electric Utility Director Shawn Matchim, Utility Billing Manager Andrea Blomquist and Government Relations Supervisor Noelle Mattock made the presentation to the City Council.

No public comment received.

Motion by Bruce Houdesheldt, seconded by Pauline Roccucci, to adopt RESOLUTION NO. 21-414 AUTHORIZING PARTICIPATION IN THE CALIFORNIA ARREARAGE PAYMENT PROGRAM. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

8.2. California Low-Income Household Water Assistance Program - Authorization to Participate

Memo from Utility Government Relations Supervisor Noelle Mattock and Environmental Utilities Director Richard Plecker recommending the City Council adopt RESOLUTION NO. 21-418 AUTHORIZING PARTICIPATION IN THE CALIFORNIA LOW-INCOME HOUSEHOLD WATER ASSISTANCE PROGRAM. Staff requests Council approval to participate in the California Low-Income Household Water Assistance Program (LIHWAP) and to accept and expend Low-Income Household Water Assistance Program funds on behalf of the City. The State of California is funding this temporary LIHWAP Program with Federal COVID-19 relief funds and will require Roseville to execute agreements with the California Community Services and Development Department to receive funds on behalf of income-eligible water and wastewater customers to pay down their past-due bills. Participation in this program is expected to have a positive effect on the Water and Wastewater Operations Funds within the Environmental Utilities Department by providing income eligible water and wastewater customers access to up to $1,000 to pay off their past-due balances and avoid disconnection of services or the need for Roseville to turn the accounts over for collection.

CC #: 1732

File #: 0800-02

CONTACT: Noelle Mattock 916-774-5504 ncmattock@roseville.ca.us

Motion by Scott Alvord, seconded by Tracy Mendonsa, to adopt RESOLUTION NO. 21-418 AUTHORIZING PARTICIPATION IN THE CALIFORNIA LOW-INCOME HOUSEHOLD WATER ASSISTANCE PROGRAM. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

8.3. California Water and Wastewater Arrearage Payment Program - Authorization to Participate and to Accept and Expend Funds

Memo from Utility Government Relations Supervisor Noelle Mattock and Environmental Utilities Director Richard Plecker recommending the City Council adopt RESOLUTION NO. 21-417 AUTHORIZING PARTICIPATION IN THE CALIFORNIA WATER AND WASTEWATER ARREARAGE PAYMENT PROGRAM. Staff requests Council approve participation in the California Water and Wastewater Arrearage Payment Program and to accept and expend these funds on behalf of the City. The State of California is funding this temporary program with Federal COVID-19 relief funds and requires Roseville to apply to the State Water Resources Control Board on behalf of our water and wastewater residential and commercial customers with past-due balances accrued between March 4, 2020, and June 15, 2021. The funding Roseville receives will be applied to customer accounts to reduce or eliminate their past-due balances. Participation in this program is expected to have a positive impact on the Water and Wastewater Operations Funds within the Environmental Utilities Department by reducing the number of customer accounts with past due balances that result in disconnection of services due to non-payment or are turned over for collections.

CC #: 1731

File #: 0800-02

CONTACT: Noelle Mattock 916-774-5504 ncmattock@roseville.ca.us

Motion by Bruce Houdesheldt, seconded by Pauline Roccucci, to adopt RESOLUTION NO. 21-417 AUTHORIZING PARTICIPATION IN THE CALIFORNIA WATER AND WASTEWATER ARREARAGE PAYMENT PROGRAM. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

9. ORDINANCES

9.1. Proposed Amendments to Campaign Finance Ordinance

Memo from City Clerk Sonia Orozco and Assistant City Attorney Joseph Speaker recommending the City Council introduce for first reading an ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTIONS 2.60.065, 2.60.070, AND 2.60.090 OF CHAPTER 2.60 OF TITLE 2 OF THE ROSEVILLE MUNICIPAL CODE REGARDING CAMPAIGN FINANCE DISCLOSURE. Staff requests approval based on direction provided by City Council at the July 21, 2021 City Council meeting. The changes add new language to clarify a warning and opportunity to correct will be provided prior to any criminal enforcement action, apply contribution of dependent children to their parent/legal guardian, and require electronic submission of certain campaign finance and election forms. There is no fiscal impact associated with the proposed ordinance amendment, however a savings in staff time due to efficiencies in the electronic filing are likely to occur.

CC #: 1720

File #: 0502

CONTACT: Joseph Speaker 916-774-5325 jspeaker@roseville.ca.us
Sonia Orozco 916-774-5269 sorozco@roseville.ca.us

Assistant City Attorney Joe Speaker and City Clerk Sonia Orozco made the presentation to the City Council.

No public comment received.

Motion by Scott Alvord, seconded by Pauline Roccucci, to introduce for first reading ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTIONS 2.60.065, 2.60.070, AND 2.60.090 OF CHAPTER 2.60 OF TITLE 2 OF THE ROSEVILLE MUNICIPAL CODE REGARDING CAMPAIGN FINANCE DISCLOSURE. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

10. PUBLIC HEARING

10.1. Sierra Vista Specific Plan Parcels FD-2, FD-5, FD-9, FD-40, FD-63, FD-64 – General Plan Amendment, Specific Plan Amendment, and Development Agreement Amendment

Memo from Assistant Planner Sean Morales and Development Services Director Mike Isom recommending the City Council consider the Fifth Addendum to the Sierra Vista Specific Plan Environmental Impact Report; and adopt RESOLUTION NO. 21-421 AMENDING THE GENERAL PLAN TO CHANGE THE LAND USE DESIGNATIONS ON CERTAIN REAL PROPERTY IN THE CITY OF ROSEVILLE; and adopt RESOLUTION NO. 21-422 AMENDING THE SIERRA VISTA SPECIFIC PLAN; and adopt the five (5) findings of fact and introduce for first reading an ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE ADOPTING A FIFTH AMENDMENT OF THE DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF ROSEVILLE, SOLAIRE COMMUNITY BUILDERS AS ASSIGNEE OF WESTPARK SIERRA VISTA, LLC, AS ASSIGNEE OF WESTPARK FEDERICO, LLC, MOURIER INVESTMENTS, LLC, AND FEDERICO-TYLER FAMILY LIMITED PARTNERSHIP RELATIVE TO THE SIERRA VISTA SPECIFIC PLAN AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. The proposed project will facilitate the development of 294 single-family residential lots within the Sierra Vista Specific Plan (SVSP). The project entitlements include a General Plan Amendment to change the land use designation of Parcel FD-2 from Low Density Residential to Medium Density Residential, a Specific Plan Amendment to reflect the land use change and to transfer units among several large lot parcels within the SVSP, and a Development Agreement Amendment to reflect the land use changes and unit transfers. The project is not anticipated to result in any negative impacts to the City's General Fund. The project will generate construction jobs.

CC #: 1736

File #: 0400-04-12-1 & 0400-03 & 0400-04

CONTACT: Sean Morales 916-774-5282 smorales@roseville.ca.us

Planning Manager Greg Bitter introduced Assistant Planner Sean Morales.

Assistant Planner Sean Morales made the presentation to the City Council.

Marcus Lo Duca - representing Westpark Communities - Spoke in support of the item.

Kathleen Crawford - Inquired if any of the increased density housing will be designated for low income or affordable housing.

Planning Manager Greg Bitter responded.

Motion by Pauline Roccucci, seconded by Bruce Houdesheldt, to approve consideration of the Fifth Addendum to the Sierra Vista Specific Plan Environmental Impact Report; and adopt RESOLUTION NO. 21-421 AMENDING THE GENERAL PLAN TO CHANGE THE LAND USE

DESIGNATIONS ON CERTAIN REAL PROPERTY IN THE CITY OF ROSEVILLE; and adopt RESOLUTION NO. 21-422 AMENDING THE SIERRA VISTA SPECIFIC PLAN; and adopt the five (5) findings of fact and introduce for first reading an ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE ADOPTING A FIFTH AMENDMENT OF THE DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF ROSEVILLE, SOLAIRE COMMUNITY BUILDERS AS ASSIGNEE OF WESTPARK SIERRA VISTA, LLC, AS ASSIGNEE OF WESTPARK FEDERICO, LLC, MOURIER INVESTMENTS, LLC, AND FEDERICO-TYLER FAMILY LIMITED PARTNERSHIP RELATIVE TO THE SIERRA VISTA SPECIFIC PLAN AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE. The Motion Passed.

Roll call vote: Ayes: Alvord, Bernasconi, Houdesheldt, Mendonsa, Roccucci

11. REPORTS / PUBLIC COMMENTS

Operation School Bell Award - Assistant City Manager Dion Louthan announced City Manager Dominick Casey accepted the award given to the City by the National Assistance League.

Roseville Area Chamber of Commerce - Councilmember Scott Alvord spoke on challenge to increase Chamber membership.

Roseville Area Chamber of Commerce - Councilmember Bruce Houdesheldt spoke on CEO Wendy Gerig's retirement.

Roseville Water Authority 20th Anniversary - Councilmember Bruce Houdesheldt announced event.

Barton Road Water Treatment Plant 50th Anniversary - Councilmember Bruce Houdesheldt thanked current and former staff for their perseverance.

Roseville Police Activities League's Bacon and Brew Event - Councilmember Tracy Mendonsa spoke on fundraising event held at Vernon Street Town Square.

Northern California Power Agency Annual Conference - Councilmember Pauline Roccucci spoke on attendance at conference.

Harry Crabb, Jim Gray, and Central Park - Mayor Krista Bernasconi announced the park dedications.

Regional Taskforce on the Homeless - Mayor Krista Bernasconi spoke on attendance at event.

Washington Boulevard Construction - Mayor Krista Bernasconi thanked staff for outreach on closures and getting the word out.

Roseville High School Homecoming Parade - Mayor Krista Bernasconi spoke

on participation.

12. ADJOURNMENT

Mayor Krista Bernasconi adjourned the meeting at 7:19 p.m.

COUNCIL COMMUNICATION

CC #: 1759
File #: 0203-04

Title:	116 S. Grant Street Furniture - Contract Purchase Agreements
Contact:	Lori Hogan 916-774-5707 lhogan@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.2.

RECOMMENDATION TO COUNCIL

Staff recommends that the City Council adopt resolutions to approve contract purchase agreement (3001671) with Seats and Stations Consulting Corp and contract purchase agreement (3001670) with Vertex Office Solutions for 116 S. Grant Street office furniture purchases, and authorize the City Manager to execute the agreements on the City's behalf.

BACKGROUND

The City acquired the 116 S. Grant Street building in 2020 to support the future needs of Roseville Electric Utility's growing operations and customer programs. The building will provide the City's utility customers with a one-stop shop to pay their bills and learn about exciting new programs, emerging technologies, and rebates. The City has since moved in its first tenant, the US Postal Service, and undertaken an exhaustive planning, design, and construction effort to prepare the building for electric utility staff and customer engagement.

Outside of the Post Office, there is currently no furniture in the building. The City will be creating a piggyback contract utilizing the following contracts to furnish the Roseville Electric tenant improvements currently under construction. The furnishings include systems, office, training, meeting room, and break room furniture for the first and second floors.

Vertex Office Solutions CPA: **$357,049.83**
CMAS (California Multiple Award Schedules) Contract #4-18-71-0169A
TIPS (The Interlocal Purchasing System) Contract #200301

Seats and Stations Consulting Corp CPA: **$197,310.33**
CMAS (California Multiple Award Schedules) Contract #4-16-71-0013,
CMAS (California Multiple Award Schedules) Contract #4-11-71-0119A
OMNIA Partners Contract #R191806
NCPA (National Cooperative Purchasing Alliance) Contract #07-15
CMAS (California Multiple Award Schedules) Contract #4-71-0167B
TIPS (The Interlocal Purchasing System) Contract #200301.

FISCAL IMPACT

The total cost of these contracts is $554,360.16. Funding for this work is included in the Electric Fund FY2021-22 budget. The project has no fiscal impact to the General Fund.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) only applies to projects which have the potential to cause a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. (CEQA Guidelines §15061(b)(3)).

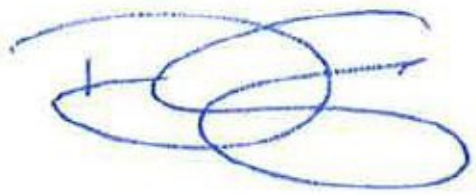
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal F - Invest in well-planned infrastructure and growth

Respectfully Submitted,

Lori Hogan, Project Coordinator

Jason Shykowski, Public Works Director



_____

Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution 21-435

CPA 3001670 Vertex

Resolution 21-436

CPA 3001671 SAS

RESOLUTION NO. 21-435

APPROVING A CONTRACT PURCHASE AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND VERTEX OFFICE SOLUTIONS, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE

WHEREAS, a contract purchase agreement (3001670), for furniture and installation services at 116 South Grant Street, by and between the City of Roseville and Vertex Office Solutions, has been reviewed by the City Council.

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Roseville that said contract purchase agreement is approved and that the City Manager is authorized to execute it on behalf of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville this____day of _____, 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

Contract Purchase Agreement 3001670

Supplier Details:

Company	Vertex Office Solutions
Contact	Ken Woodward
Address	4212 Roseville Road
	Suite F
	North Highlands, CA 95660

Submit your response to:

Company	City of Roseville
Contact	Tiffany Valdez
Address	Purchasing Division
	2075 Hilltop Circle
	Roseville, CA 95747
Phone	(916) 774-5708
Fax	(916) 774-5736
E-mail	TValdez@roseville.ca.us

This Contract Purchase Agreement is sent for your review and acceptance. Notify the Buyer via email of any needed changes to the company name, address, and contact information. The Buyer will update the agreement prior to you signing the document.

Return two (2) signed originals of the agreement to the Buyer noted on the agreement. Alterations or modifications to the agreement are not allowed. Upon receipt of all necessary documents, the City will sign the agreement and return a fully executed copy to you. Receipt of the signed copy will be your notice to proceed with the work in accordance with the terms and conditions of the agreement. Work must not begin until the contract has been fully executed.

The following guidelines must be followed for the signature block on the agreement:

Sole proprietorship - **By owner**

Partnership - **Any general partner**

Corporation - **Two options:**
(1) A signature from the President and the corporate seal; **OR**
(2) One signature from the Chairman of the Board, President, or any Vice President **AND** one signature from the Secretary, any Assistant Secretary, Chief Financial Officer, or any Treasurer or Assistant Treasurer of the corporation

*General Manager, Office Manager and/or Sales Manager are **not** corporate officer titles. The agreement will be rejected if not signed in accordance with these guidelines.

Insurance requirements:
The City's insurance requirements are referenced on Attachment A of the agreement. By signing the agreement, you are confirming that your company has the minimum insurance limits required.

CITY OF ROSEVILLE CALIFORNIA

Contract Purchase Agreement 3001670

Agreement	**3001670**
Agreement Date	**24-SEP-2021**
Revision	**0**
Agreement Amount	**357,049.83 USD**

Invoice To	**City of Roseville** **Accounts Payable** **311 Vernon St** **ROSEVILLE CA 95678**	Supplier	**Vertex Office Solutions** 4212 Roseville Road Suite F North Highlands, CA 95660
Phone:	(916) 774-5488	**Phone:**	()
Fax:	(916) 784-3796	**Fax:**	()
Email:	accountspayable@roseville.ca.us	**Email:**	ken@vertexoffice.com

Description of Labor, equipment and/or materials

SHALL PROVIDE THE FURNITURE AND INSTALLATION SERVICES AT 116 SOUTH GRANT STREET IN ACCORDANCE WITH THE ATTACHED VERTEX OFFICE SOLUTIONS PROPOSAL #8558-P DATED 9/22/21 UTILIZING CMAS CONTRACT #4-18-71-0169A AND TIPS CONTRACT #200301.

START DATE: EXECUTED AGREEMENT
END DATE: FINAL PAYMENT

Please contact Lori Hogan at 916-774-5702 or LHogan@roseville.ca.us for questions regarding this agreement.

Customer #	Supplier #	Payment Terms	Freight Terms	FOB	Shipping Method
	12658	**Net 30**	**Freight on Board at the destination**	**Destination**	**Best Method**

Start Date	End Date	Confirm To
		Tiffany Valdez Phone **1-916-774-5708**

Attention: Total Cost not to exceed the agreement amount without prior approval of the Purchasing office.

Contract Terms and Conditions

1. To the fullest extent allowed by law, Contractor shall defend, indemnify, and save and hold harmless the City, its officers, agents, employees and volunteers from any claims, suits or actions of every name, kind and description brought forth, or on account of, injuries to or death of any person (including but not limited to workers and the public), or damage to property, resulting from or arising out of Contractor's willful misconduct or negligent act or omission while engaged in the performance of obligations or exercise of rights created by this Agreement, except those matters arising from City's sole or active negligence or willful misconduct. The parties intend that this provision shall be broadly construed. Contractor's responsibility for such defense and indemnity obligations shall survive the termination or completion of this Agreement for the full period of time allowed by law. The defense and indemnity obligations of this Agreement are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained in this Agreement.
2. Contractor is an independent contractor, and shall not be considered an officer, agent or employee of the City.
3. Without the written consent of the City, this Agreement is not assignable by Contractor either in whole or in part.
4. Time is of the essence of this Agreement.
5. At any time during the term of this Agreement, the City has the right to terminate this Agreement, provided Contractor is given thirty (30) days written notice. City's termination shall be without further liability to City; however, Contractor shall be entitled to all costs reasonably incurred prior to the date of termination. Contractor acknowledges that City may terminate this Agreement should funds not be appropriated by its governing body to continue services under this Agreement.
6. This Agreement may only be amended or modified in writing. It is integrated and contains the complete understanding of the parties.
7. All equipment, supplies and services sold to the City of Roseville shall conform to the general safety orders of the State of California.
8. Unless notified to the contrary, in writing, the City assumes that the Contractor has accepted the work in accordance with the plans and specifications (if any) and agrees to do the work in compliance with this Agreement.
9. All prevailing wages and fair employment practices must be adhered to. For prevailing wage contracts over $25,000, copies of certified payroll must be submitted with invoices. Prevailing wage rates may be obtained from the State Department of Industrial Relations and/or the following website address: http://www.dir.ca.gov/dlsr/DPreWageDetermination.htm.
10. Contractor agrees to the below insurance requirements:
    a. Unless otherwise specified, the Contractor shall maintain the policies of insurance outlined in Attachment A, incorporated herein by this reference, in full force and effect during the term of this Agreement. The City of Roseville retains sole discretion in determining the types and proper levels of insurance coverage.
    b. Form. Contractor shall submit a certificate evidencing such coverage for the period covered by this Agreement in a form satisfactory to Risk Management and the City Attorney, prior to undertaking any work hereunder. Any insurance written on a claims made basis is subject to the approval of Risk Management and the City Attorney.
    c. Additional Insureds. Contractor shall also provide a separate endorsement or

section of the policy showing City, its officers, agents, employees, and volunteers as additional insureds for each type of coverage (except Workers' Compensation) and for ongoing and completed operations. Such insurance shall specifically cover the contractual liability of Contractor. The additional insured coverage under the Contractor's policy shall be primary and noncontributory, as evidenced by a separate endorsement or section of the policy, and shall not seek contribution from City's insurance or self-insurance. In addition, the additional insured coverage shall be at least as broad as the Insurance Services Office (ISO) CG 20 01 Endorsement. Any available insurance proceeds in excess of the specified minimum insurance coverage requirements and limits shall be available to the additional insureds. Furthermore, the requirements for coverage and limits shall be:

(1) the minimum coverage and limits specified in this Agreement; or
(2) the full coverage and maximum limits of any insurance proceeds available to the named insureds, whichever is greater.

d. Cancellation/Modification. Contractor shall provide ten (10) days written notice to City prior to cancellation or modification of any insurance required by this Agreement.

e. Umbrella/Excess Insurance. The limits of insurance required in this Agreement may be satisfied by a combination of primary and excess insurance. Any excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and noncontributory basis for the benefit of City (if agreed to in a written contract) before City's own insurance shall be called upon to protect it as a named insured.

f. Subcontractors. Contractor agrees to include in its contracts with all subcontractors the same requirements and provisions of this Agreement, including the indemnity and insurance requirements, to the extent they apply to the scope of the subcontractor's work. Furthermore, Contractor shall require its subcontractors to agree to be bound to Contractor and City in the same manner and to the same extent as Contractor is bound to City under this Agreement. Additionally, Contractor shall obligate its subcontractors to comply with these same provisions with respect to any tertiary subcontractor, regardless of tier. A copy of City's indemnity and insurance provisions will be furnished to the subcontractor or tertiary subcontractor upon request.

g. Self-Insured Retentions. All self-insured retentions (SIR) must be disclosed to Risk Management for approval and shall not reduce the limits of liability. Policies containing any SIR provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named insured or City. City reserves the right to obtain a full certified copy of any insurance policy and endorsements. The failure to exercise this right shall not constitute a waiver of such right.

h. Waiver of Subrogation. Contractor hereby agrees to waive subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss under a Workers Compensation, Commercial General Liability or Automobile Liability policy. All Workers Compensation, Commercial General Liability and Automobile Liability policies shall be endorsed with a waiver of subrogation in favor of City, its officers, agents, employees and volunteers for all work performed by Contractor, its employees, agents and subcontractors.

i. Liability/Remedies. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve Contractor of liability in excess of such coverage, nor shall it preclude City from taking such other actions as are available to it under any other provisions of this Agreement or law.

11. Contractor shall comply with all federal, state and local laws and ordinances, including but not limited to the City's storm water regulations, as may be applicable to the

performance of services under this Agreement. Failure to comply with local ordinances may result in monetary fines and cancellation of this Agreement. Refer to www.roseville.ca.us/stormwater for links to more information on the City's storm water regulations.

12. In the event that the terms of any attachment or exhibit conflict with any terms of this Agreement, the terms of this Agreement shall control.
13. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. In the event that any signature is delivered by facsimile transmission or by e-mail delivery of a ".pdf" format data file, such signature shall create a valid and binding obligation of the party executing (or on whose behalf such signature is executed) with the same force and effect as if such facsimile or ".pdf" signature page were an original thereof.
14. If either party commences any legal action against the other party arising out of this Agreement or the performance thereof, the prevailing party in such action shall be entitled to recover its reasonable litigation expenses, including but not limited to, court costs, expert witness fees, discovery expenses, and attorneys' fees. Any action arising out of this Agreement shall be brought in Placer County, California, regardless of where else venue may lie. This Agreement shall be governed by and construed in accordance with the laws of the State of California.
15. This Agreement shall be binding upon the heirs, successors, executors, administrators and assigns of the respective parties hereto.
16. If any of the provisions contained in this Agreement are for any reason held invalid or unenforceable, such holding shall not affect the remaining provisions or the validity and enforceability of the Agreement as a whole.
17. For purposes of this Agreement, the terms "Contractor," "Consultant," and "Supplier" are used interchangeably.
18. No contractor or subcontractor may work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. During the performance of this agreement, Contractor and its subcontractors shall have a continuing legal obligation to maintain current registration with the Department of Industrial Relations. Contractor is hereby notified that this project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.
19. Contractor must submit all claims as defined in and in accordance with the claim resolution process set forth in Section 9204 of the Public Contract Code. Each such claim must be sent to the City by registered mail or certified mail with return receipt requested and must contain reasonable documentation to support the claim. All claims must be received prior to acceptance of the work.
20. Contractor certifies that Contractor, its employees, directors, officers, agents, subcontractors, vendors, and volunteers are not presently debarred, excluded, suspended, declared ineligible, voluntarily excluded, or proposed for debarment, exclusion, suspension or ineligibility by any federal, state, or local department or agency.
21. This Agreement may be amended via change order, but only if such change order is made in writing, approved by the City, and signed by both parties.
22. CONTRACTOR agrees to defend and indemnify CITY if, despite the parties intent and practice, any venue, agency, or court with competent jurisdiction determines that CONTRACTOR and/or any of its agents, officers, employees, volunteers, independent contractors, or subcontractors, are characterized as employee(s) of CITY.

    CONTRACTOR and CITY agree that: (a) CONTRACTOR is free from the control and direction of CITY in connection with the performance of the work; (b) CONTRACTOR is providing services directly to CITY; (c) CONTRACTOR has and will maintain at all relevant times a business license; (d) CONTRACTOR maintains a business location that

is separate from CITY; (e) CONTRACTOR is customarily engaged in an independently established business of the same nature as that involved in the work performed hereunder; (f) CONTRACTOR actually contracts with other businesses to provide the same or similar services and maintains a clientele without restrictions from CITY; (g) CONTRACTOR advertises and holds itself out to the public as available to provide the same or similar services; (h) CONTRACTOR provides its own tools, vehicles, and equipment to perform the services; (i) CONTRACTOR has negotiated its own rates; (j) CONTRACTOR set its own hours and location of work in accomplishing CITY's on-call needs; and (k) CONTRACTOR has the right to control the manner and means of accomplishing the result desired and exercises its own expert independent judgement.

The supplier named hereon by the acceptance of this order agrees to the provisions of this document titled "Contract Purchase Agreement" and all accompanying terms, conditions, and attachments.

Roseville Business License No. 00841837

Contractor License No. 925200

DIR Registration No. 1000038689

Check mark the applicable company type below:

_____ **Corporation**

_____ **Limited Liability Company**

_____ **Partnership**

__X__ **Sole Proprietor**

City Reserves the right to withold any payments to contractor in the event of noncompliance with insurance requirements or if required by law.
Construction T&C
REV 3/2/21 JS

ATTACHMENT A
HUMAN RESOURCES/RISK MANAGEMENT DIVISION
INSURANCE REQUIREMENTS
AGREEMENT OVER FORMAL BID LIMIT OR INVOLVING HIGH RISK ACTIVITIES

General - Required Coverage/Documentation

- General Liability: $1 Million per occurrence /$2 Million aggregate
- Automobile Liability: $1 Million combined single limit
- Workers' Compensation: Statutory *Must provide a Waiver of subrogation
- Additional Insured Endorsement (AIE) - General Liability policy: CG 20 38 04 13 or an equivalent, blanket endorsement or section of the policy. Endorsement shall cover the City of Roseville, its officers, agents, employees and volunteers as additional insured.
- Policies must be primary and non-contributory
- A 30 day notice of cancellation must be provided
- List certificate holder as: The City of Roseville - Insurance Compliance, PO Box 100085-R1, Duluth, GA 30096

Additional Liability/Insurance Requirements if required by Agreement (and marked below):

Construction:X
General Liability:
$2 Million/occurrence
$4 Million aggregate

Design Professional:____
General Liability:
$2 Million/occurrence
$4 Million aggregate
Professional Liability:
$2 Million/occurrence

Professional Consultant:____
Professional Liability:
$1 Million/occurrence

IT Services:____
Professional Liability:
$1 Million/occurrence
No auto required

Hazardous Materials:____
Pollution Liability:
$1 Million/occurrence

Special Events/Caterers-Vendors:____
No auto required
No workers' comp required

Professional Counseling/ Psychological:____
Professional Liability:
$1 Million/occurrence
No auto required

Pyrotechnics:____
General Liability:
$5 Million/occurrence
$10 Million aggregate
Auto - $2 Million/occurrence

Chemical/Environmental:____
General Liability:
$3 Million/occurrence
$6 Million aggregate
Pollution – $2 Million/Occurrence
Auto - $2 Million/Occurrence

Insurance Submission Process

The City of Roseville Human Resources/Risk Management Department uses a service called EBIX to manage our insurance certificate tracking.

How It Works

- The vendor's contact information is entered into EBIX. EBIX will contact the vendor to request proof of insurance.
- The Vendor can forward the request to their Insurance Agent(s) if necessary.
- Vendor/Insurance Agent submits insurance to EBIX by email to roseville@ebix.com or by fax to (770) 325-5727. After faxing or emailing the certificate, please DO NOT send the certificate by mail to EBIX. Please do not mail, email or fax any certificates to the City of Roseville.
- Once submitted, EBIX reviews the insurance documentation. If there are deficiencies, EBIX will send a follow up letter or email requesting additional information.

Questions Regarding Insurance Submission: Contact EBIX at (951) 652-4239
Questions Regarding Insurance Requirements Contact Risk Management at (916) 774-5202

Asbestos-Containing Materials in City-Owned Buildings

California Health and Safety Code Section 25915 requires that all City of Roseville employees, contractors and lessees be notified annually of the presence of asbestos in City-owned buildings constructed prior to 1979. Please post this notice in an area(s) accessible to all employees, contractors and lessees. Contact Facility Maintenance & Operations at (916) 774-5740 for more information about Asbestos Containing Materials (ACMs) in specific City-owned buildings. For more information about asbestos refer to the OSHA website.

The City of Roseville is committed to maintaining a safe and healthy work environment. The City's Facility Maintenance & Operations staff conducts ongoing inspections to identify and safely manage previously installed asbestos-containing products. Renovation of City-owned buildings **MUST** be reviewed in advance by Facility Maintenance & Operations to ensure the City is in compliance with building codes, Americans with Disabilities Act and that no ACMs are disturbed without proper safeguards. Work that requires removal or repair of ACMs is restricted to trained and qualified persons only. **Facility Maintenance & Operations will need to approve the qualified contractors.**

Use the following measures to protect you and others from exposure to airborne asbestos:

- Presume all building materials contain asbestos until determined otherwise by Facility Maintenance & Operations.
- Do not install walls, closets, cabinets, ceilings.
- Do not remove, cut, drill, sand, grind or otherwise disturb any material in the buildings, including carpet and tile.
- Do not paint (this includes any walls, ceilings, floors and electrostatic painting of office furniture).
- Do not remove any items nailed or screwed to the walls (this includes pictures, cabinets, electrical, etc.).
- Do not go above ceilings, behind walls or into building spaces such as attics and crawlspaces unless these areas have been inspected and cleared by Facility Maintenance & Operations.
- Do not pull cable or wiring through above-ceiling spaces with asbestos.
- Do not install screws, pins, nails or hangers into asbestos ceiling or wall plaster.
- Be careful not to damage walls, ceilings or floors when moving furniture or equipment. It is recommended that Facility Maintenance & Operations be contacted prior to moving furniture or equipment.
- Do not brush, sweep or vacuum textured asbestos ceiling plaster or plaster debris.
- Immediately report any damage or deterioration of suspect building materials to Facility Maintenance & Operations or Risk Management.

It is important to note that the presence of asbestos does not mean you have been exposed. Exposure results when friable asbestos particles are inhaled or ingested. Asbestos becomes friable when material containing asbestos is drilled, sanded or disturbed by remodeling or demolition work or when the ACM has deteriorated. Intact, bonded, sealed or undisturbed asbestos does not pose a hazard.

Employees may review the asbestos survey reports, results of bulk sampling or air monitoring conducted in City-owned buildings. All asbestos data will be available by appointment with Facility Maintenance & Operations.

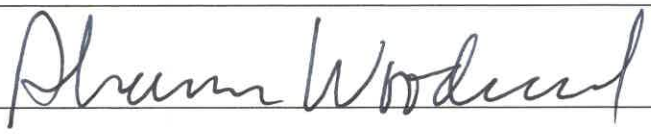
Facilities Built Pre 1979 That May Contain Asbestos	Year Built
Downtown Library - 225 Taylor Street 95678	1974
Carnegie Museum - 557 Lincoln Street 95678	1912
Tower Theatre - 415 Vernon Street 95678	1940
Fire Station #3 - 1300 Cirby Way 95661	1963
Old Corp Yard - 100 Old Corp Yard Road 95678	1940
Water Treatment Plant Operations Bldg.- 9595 Barton Road 95746	1965
Waste Water Treatment Plant Operations Bldg. - 1800 Booth Road 95747	1962
Royer Recreation Bldg. - 190 Park Drive 95678	1950
Fire Museum - 400 Lincoln Street 95678	1930
Diamond Oaks Golf - 349 Diamond Oaks Road 95678	1965
Johnson Pool, 4th & D Street	1950
330 Vernon Street	1940
107 Sutter Avenue	1962

Sign to acknowledge receipt of asbestos notification:

SIGNATURE	
COMPANY NAME	Vertex Office Solutions
DATE	9/28/21

Asbestos
Rev 01/16/19

Supplier	
Signature:	
Print Name:	Kenneth John Woodward
Title:	Owner

Supplier	
Signature:	
Print Name:	Shannon Marie Woodward
Title:	Owner

City of Roseville, A Municipal Corporation	
Signature:	
Print Name:	**Dominick Casey**
Title:	**City Manager**

VERTEX
OFFICE SOLUTIONS

Proposal

Northern California Warehouse:
4212 Roseville Road, Suite F
North Highlands, CA 95660
CA License # 925200

Southern California Warehouse:
575 N Batavia Street
Orange, CA 92868

Date	Proposal #
9/22/2021	8558-P

Bill To	Ship To
City of Roseville 311 Vernon st. Roseville, Ca. 95678 Lori Hogan	City of Roseville 116 S Grant Roseville, CA 95678

Cust. Order #	P.O. Number	Terms	Rep
		Net 30	KJW

Item	Description	Qty	Rate	Total
Materials	Friant Interra 8' X 8' Work Stations per plans. (22) Stations on 1st Floor (48) Stations on 2nd Floor NOTES: Pricing based on furniture drawings dated 9/13/21, terms based on CMAS contract. Friant and Associates CMAS Contract Number: 4-18-71-0169A Furniture.	1	161,281.95	161,281.95T
Materials	(68) Friant Dash 69H X 24W Storage Towers w/BBF and Open Front Shelf (Left and Right Handed per drawings). (70) Friant My Hite 3-Stage Height Adjustable Table Bases, 24"S C-Leg Straight. NOTES: Pricing based on furniture drawings dated 9/13/21, terms based on TIPS Contract. Friant and Associates TIPS Contract Number: 200301.	1	93,917.22	93,917.22T

Work to be performed during regular business hours unless otherwise noted. This Proposal is for Non-Union and/or Non-Prevailing Wage labor, unless otherwise noted above. Proposal is contingent on Vertex having clear access to entire work area and exclusive rights to freight elevator on independent service during delivery and removal of parts and/or debris. Stair-carry of items is not included in proposal unless otherwise noted. Vertex is not responsible for electrical connections from furniture to building. Additional work or down time due to building, site conditions, customer or other trades will be invoiced at time and materials. Punch list work or changes due to site conditions or layout changes is not included in proposal, unless otherwise noted above. Signature signifies contract acceptance, including but not limited to: any and all legal costs involved in the pursuit of payment for the above services rendered.

Subtotal	
Sales Tax (7.75%)	
Total	

A monthly late fee of 2% will be charged on any unpaid balance. Proposal good for 30 days.

Proposal Accepted By: _____ Date: _____

Print Name: _____

Phone (530) 392 -1645 ~ Fax (530) 878-1013
www.vertexoffice.com

VERTEX
OFFICE SOLUTIONS

Proposal

Northern California Warehouse:
4212 Roseville Road, Suite F
North Highlands, CA 95660
CA License # 925200

Southern California Warehouse:
575 N Batavia Street
Orange, CA 92868

Date	Proposal #
9/22/2021	8558-P

Bill To	Ship To
City of Roseville 311 Vernon st. Roseville, Ca. 95678 Lori Hogan	City of Roseville 116 S Grant Roseville, CA 95678

Cust. Order #	P.O. Number	Terms	Rep
		Net 30	KJW

Item	Description	Qty	Rate	Total
Materials	(95) Friant Interra Laminate Panel Tile 32"H X 24"W (16) Friant Interra Laminate Panel Tile 32"H X 30"W (16) Friant Interra Laminate Panel Tile 32"H X 42"W (110) Friant Interra Laminate Panel Tile 32"H X 48"W NOTES: Pricing based on dealer cost, plus 15% dealer markup, no government contract available.	1	30,872.58	30,872.58T
02 Site Work	Vertex to provide labor, trucks and equipment to complete the following work: -Complete work stations design. -Complete project management duties including construction meeting when applicable. -Receive, deliver and install (70) work stations, per plans. NOTES: All work to be completed during regular business hours; Prevailing Wage rates apply; All other terms and conditions below apply.	1	45,297.00	45,297.00T

Work to be performed during regular business hours unless otherwise noted. This Proposal is for Non-Union and/or Non-Prevailing Wage labor, unless otherwise noted above. Proposal is contingent on Vertex having clear access to entire work area and exclusive rights to freight elevator on independent service during delivery and removal of parts and/or debris. Stair-carry of items is not included in proposal unless otherwise noted. Vertex is not responsible for electrical connections from furniture to building. Additional work or down time due to building, site conditions, customer or other trades will be invoiced at time and materials. Punch list work or changes due to site conditions or layout changes is not included in proposal, unless otherwise noted above. Signature signifies contract acceptance, including but not limited to: any and all legal costs involved in the pursuit of payment for the above services rendered.

Subtotal	$331,368.75
Sales Tax (7.75%)	$25,681.08
Total	$357,049.83

A monthly late fee of 2% will be charged on any unpaid balance. Proposal is good for 30 days.

Proposal Accepted By: _____ Date: _____

Print Name: _____

Phone (530) 392 -1645 ~ Fax (530) 878-1013
www.vertexoffice.com

RESOLUTION NO. 21-436

APPROVING A CONTRACT PURCHASE AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND SEATS AND STATIONS CONSULTING CORP, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE

WHEREAS, a contract purchase agreement (3001671), for furniture and installation services at 116 South Grant Street, by and between the City of Roseville and Seats and Stations Consulting Corp, has been reviewed by the City Council.

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Roseville that said contract purchase agreement is approved and that the City Manager is authorized to execute it on behalf of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville this____day of _____, 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

Contract Purchase Agreement 3001671

Supplier Details:

Company	Seats and Stations Consulting Corp
Contact	Terry Passantino
Address	1430 Blue Oaks Blvd Ste 150
	Roseville, CA 95747

Submit your response to:

Company	City of Roseville
Contact	Tiffany Valdez
Address	Purchasing Division
	2075 Hilltop Circle
	Roseville, CA 95747
Phone	(916) 774-5708
Fax	(916) 774-5736
E-mail	TValdez@roseville.ca.us

This Contract Purchase Agreement is sent for your review and acceptance. Notify the Buyer via email of any needed changes to the company name, address, and contact information. The Buyer will update the agreement prior to you signing the document.

Return two (2) signed originals of the agreement to the Buyer noted on the agreement. Alterations or modifications to the agreement are not allowed. Upon receipt of all necessary documents, the City will sign the agreement and return a fully executed copy to you. Receipt of the signed copy will be your notice to proceed with the work in accordance with the terms and conditions of the agreement. Work must not begin until the contract has been fully executed.

The following guidelines must be followed for the signature block on the agreement:

Sole proprietorship - **By owner**

Partnership - **Any general partner**

Corporation - **Two options:**
(1) A signature from the President and the corporate seal; **OR**
(2) One signature from the Chairman of the Board, President, or any Vice President **AND** one signature from the Secretary, any Assistant Secretary, Chief Financial Officer, or any Treasurer or Assistant Treasurer of the corporation

*General Manager, Office Manager and/or Sales Manager are **not** corporate officer titles. The agreement will be rejected if not signed in accordance with these guidelines.

Insurance requirements:
The City's insurance requirements are referenced on Attachment A of the agreement. By signing the agreement, you are confirming that your company has the minimum insurance limits required.

CITY OF ROSEVILLE CALIFORNIA

Contract Purchase Agreement 3001671

Agreement	**3001671**
Agreement Date	**24-SEP-2021**
Revision	**0**
Agreement Amount	**197,310.33 USD**

Invoice To
City of Roseville
Accounts Payable
311 Vernon St
ROSEVILLE CA 95678
Phone: (916) 774-5488
Fax: (916) 784-3796
Email: accountspayable@roseville.ca.us

Supplier
Seats and Stations Consulting Corp
1430 Blue Oaks Blvd Ste 150

Roseville, CA 95747
Phone: (916) 786-8005
Fax: (916) 783-8006
Email: terry@seatsandstations.com

Description of Labor, equipment and/or materials

SHALL PROVIDE THE FURNITURE AND INSTALLATION SERVICES AT 116 SOUTH GRANT STREET IN ACCORDANCE WITH THE ATTACHED SEATS AND STATIONS QUOTE #SAS211670A DATED 9/24/21 UTILIZING CMAS CONTRACT #4-16-71-0013G, CMAS CONTRACT #CMAS #4-11-71-0119A, OMNIA CONTRACT #R191806, NCPA CONTRACT #07-15, CMAS #4-19-71-0167B AND TIPS CONTRACT #200301.

START DATE: EXECUTED AGREEMENT
END DATE: FINAL PAYMENT

Please contact Lori Hogan at 916-774-5702 or LHogan@roseville.ca.us for questions regarding this agreement.

Customer #	Supplier #	Payment Terms	Freight Terms	FOB	Shipping Method
	12277	**Net 30**	**Freight on Board at the destination**	**Destination**	**Best Method**

Start Date	End Date	Confirm To
		Tiffany Valdez Phone **1-916-774-5708**

Attention: Total Cost not to exceed the agreement amount without prior approval of the Purchasing office.

Contract Terms and Conditions

1. To the fullest extent allowed by law, Contractor shall defend, indemnify, and save and hold harmless the City, its officers, agents, employees and volunteers from any claims, suits or actions of every name, kind and description brought forth, or on account of, injuries to or death of any person (including but not limited to workers and the public), or damage to property, resulting from or arising out of Contractor's willful misconduct or negligent act or omission while engaged in the performance of obligations or exercise of rights created by this Agreement, except those matters arising from City's sole or active negligence or willful misconduct. The parties intend that this provision shall be broadly construed. Contractor's responsibility for such defense and indemnity obligations shall survive the termination or completion of this Agreement for the full period of time allowed by law. The defense and indemnity obligations of this Agreement are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained in this Agreement.
2. Contractor is an independent contractor, and shall not be considered an officer, agent or employee of the City.
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4. Time is of the essence of this Agreement.
5. At any time during the term of this Agreement, the City has the right to terminate this Agreement, provided Contractor is given thirty (30) days written notice. City's termination shall be without further liability to City; however, Contractor shall be entitled to all costs reasonably incurred prior to the date of termination. Contractor acknowledges that City may terminate this Agreement should funds not be appropriated by its governing body to continue services under this Agreement.
6. This Agreement may only be amended or modified in writing. It is integrated and contains the complete understanding of the parties.
7. All equipment, supplies and services sold to the City of Roseville shall conform to the general safety orders of the State of California.
8. Unless notified to the contrary, in writing, the City assumes that the Contractor has accepted the work in accordance with the plans and specifications (if any) and agrees to do the work in compliance with this Agreement.
9. All prevailing wages and fair employment practices must be adhered to. For prevailing wage contracts over $25,000, copies of certified payroll must be submitted with invoices. Prevailing wage rates may be obtained from the State Department of Industrial Relations and/or the following website address: http://www.dir.ca.gov/dlsr/DPreWageDetermination.htm.
10. Contractor agrees to the below insurance requirements:
    a. Unless otherwise specified, the Contractor shall maintain the policies of insurance outlined in Attachment A, incorporated herein by this reference, in full force and effect during the term of this Agreement. The City of Roseville retains sole discretion in determining the types and proper levels of insurance coverage.
    b. Form. Contractor shall submit a certificate evidencing such coverage for the period covered by this Agreement in a form satisfactory to Risk Management and the City Attorney, prior to undertaking any work hereunder. Any insurance written on a claims made basis is subject to the approval of Risk Management and the City Attorney.
    c. Additional Insureds. Contractor shall also provide a separate endorsement or

section of the policy showing City, its officers, agents, employees, and volunteers as additional insureds for each type of coverage (except Workers' Compensation) and for ongoing and completed operations. Such insurance shall specifically cover the contractual liability of Contractor. The additional insured coverage under the Contractor's policy shall be primary and noncontributory, as evidenced by a separate endorsement or section of the policy, and shall not seek contribution from City's insurance or self-insurance. In addition, the additional insured coverage shall be at least as broad as the Insurance Services Office (ISO) CG 20 01 Endorsement. Any available insurance proceeds in excess of the specified minimum insurance coverage requirements and limits shall be available to the additional insureds. Furthermore, the requirements for coverage and limits shall be:

(1) the minimum coverage and limits specified in this Agreement; or
(2) the full coverage and maximum limits of any insurance proceeds available to the named insureds, whichever is greater.

d. Cancellation/Modification. Contractor shall provide ten (10) days written notice to City prior to cancellation or modification of any insurance required by this Agreement.

e. Umbrella/Excess Insurance. The limits of insurance required in this Agreement may be satisfied by a combination of primary and excess insurance. Any excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and noncontributory basis for the benefit of City (if agreed to in a written contract) before City's own insurance shall be called upon to protect it as a named insured.

f. Subcontractors. Contractor agrees to include in its contracts with all subcontractors the same requirements and provisions of this Agreement, including the indemnity and insurance requirements, to the extent they apply to the scope of the subcontractor's work. Furthermore, Contractor shall require its subcontractors to agree to be bound to Contractor and City in the same manner and to the same extent as Contractor is bound to City under this Agreement. Additionally, Contractor shall obligate its subcontractors to comply with these same provisions with respect to any tertiary subcontractor, regardless of tier. A copy of City's indemnity and insurance provisions will be furnished to the subcontractor or tertiary subcontractor upon request.

g. Self-Insured Retentions. All self-insured retentions (SIR) must be disclosed to Risk Management for approval and shall not reduce the limits of liability. Policies containing any SIR provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named insured or City. City reserves the right to obtain a full certified copy of any insurance policy and endorsements. The failure to exercise this right shall not constitute a waiver of such right.

h. Waiver of Subrogation. Contractor hereby agrees to waive subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss under a Workers Compensation, Commercial General Liability or Automobile Liability policy. All Workers Compensation, Commercial General Liability and Automobile Liability policies shall be endorsed with a waiver of subrogation in favor of City, its officers, agents, employees and volunteers for all work performed by Contractor, its employees, agents and subcontractors.

i. Liability/Remedies. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve Contractor of liability in excess of such coverage, nor shall it preclude City from taking such other actions as are available to it under any other provisions of this Agreement or law.

11. Contractor shall comply with all federal, state and local laws and ordinances, including but not limited to the City's storm water regulations, as may be applicable to the

performance of services under this Agreement. Failure to comply with local ordinances may result in monetary fines and cancellation of this Agreement. Refer to www.roseville.ca.us/stormwater for links to more information on the City's storm water regulations.

12. In the event that the terms of any attachment or exhibit conflict with any terms of this Agreement, the terms of this Agreement shall control.
13. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. In the event that any signature is delivered by facsimile transmission or by e-mail delivery of a ".pdf" format data file, such signature shall create a valid and binding obligation of the party executing (or on whose behalf such signature is executed) with the same force and effect as if such facsimile or ".pdf" signature page were an original thereof.
14. If either party commences any legal action against the other party arising out of this Agreement or the performance thereof, the prevailing party in such action shall be entitled to recover its reasonable litigation expenses, including but not limited to, court costs, expert witness fees, discovery expenses, and attorneys' fees. Any action arising out of this Agreement shall be brought in Placer County, California, regardless of where else venue may lie. This Agreement shall be governed by and construed in accordance with the laws of the State of California.
15. This Agreement shall be binding upon the heirs, successors, executors, administrators and assigns of the respective parties hereto.
16. If any of the provisions contained in this Agreement are for any reason held invalid or unenforceable, such holding shall not affect the remaining provisions or the validity and enforceability of the Agreement as a whole.
17. For purposes of this Agreement, the terms "Contractor," "Consultant," and "Supplier" are used interchangeably.
18. No contractor or subcontractor may work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. During the performance of this agreement, Contractor and its subcontractors shall have a continuing legal obligation to maintain current registration with the Department of Industrial Relations. Contractor is hereby notified that this project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.
19. Contractor must submit all claims as defined in and in accordance with the claim resolution process set forth in Section 9204 of the Public Contract Code. Each such claim must be sent to the City by registered mail or certified mail with return receipt requested and must contain reasonable documentation to support the claim. All claims must be received prior to acceptance of the work.
20. Contractor certifies that Contractor, its employees, directors, officers, agents, subcontractors, vendors, and volunteers are not presently debarred, excluded, suspended, declared ineligible, voluntarily excluded, or proposed for debarment, exclusion, suspension or ineligibility by any federal, state, or local department or agency.
21. This Agreement may be amended via change order, but only if such change order is made in writing, approved by the City, and signed by both parties.
22. CONTRACTOR agrees to defend and indemnify CITY if, despite the parties intent and practice, any venue, agency, or court with competent jurisdiction determines that CONTRACTOR and/or any of its agents, officers, employees, volunteers, independent contractors, or subcontractors, are characterized as employee(s) of CITY.

    CONTRACTOR and CITY agree that: (a) CONTRACTOR is free from the control and direction of CITY in connection with the performance of the work; (b) CONTRACTOR is providing services directly to CITY; (c) CONTRACTOR has and will maintain at all relevant times a business license; (d) CONTRACTOR maintains a business location that

is separate from CITY; (e) CONTRACTOR is customarily engaged in an independently established business of the same nature as that involved in the work performed hereunder; (f) CONTRACTOR actually contracts with other businesses to provide the same or similar services and maintains a clientele without restrictions from CITY; (g) CONTRACTOR advertises and holds itself out to the public as available to provide the same or similar services; (h) CONTRACTOR provides its own tools, vehicles, and equipment to perform the services; (i) CONTRACTOR has negotiated its own rates; (j) CONTRACTOR set its own hours and location of work in accomplishing CITY's on-call needs; and (k) CONTRACTOR has the right to control the manner and means of accomplishing the result desired and exercises its own expert independent judgement.

The supplier named hereon by the acceptance of this order agrees to the provisions of this document titled "Contract Purchase Agreement" and all accompanying terms, conditions, and attachments.

Roseville Business License No. 00811591

Contractor License No. SLT DESIGN 984421

DIR Registration No. SAS 1000013126 SLT 1000024696

Check mark the applicable company type below:

__X__ **Corporation**

_____ **Limited Liability Company**

_____ **Partnership**

_____ **Sole Proprietor**

City Reserves the right to withold any payments to contractor in the event of noncompliance with insurance requirements or if required by law.
Construction T&C
REV 3/2/21 JS

ATTACHMENT A
HUMAN RESOURCES/RISK MANAGEMENT DIVISION
INSURANCE REQUIREMENTS
AGREEMENT OVER FORMAL BID LIMIT OR INVOLVING HIGH RISK ACTIVITIES

General - Required Coverage/Documentation

- General Liability: $1 Million per occurrence /$2 Million aggregate
- Automobile Liability: $1 Million combined single limit
- Workers' Compensation: Statutory *Must provide a Waiver of subrogation
- Additional Insured Endorsement (AIE) - General Liability policy: CG 20 38 04 13 or an equivalent, blanket endorsement or section of the policy. Endorsement shall cover the City of Roseville, its officers, agents, employees and volunteers as additional insured.
- Policies must be primary and non-contributory
- A 30 day notice of cancellation must be provided
- List certificate holder as: The City of Roseville - Insurance Compliance, PO Box 100085-R1, Duluth, GA 30096

Additional Liability/Insurance Requirements if required by Agreement (and marked below):

Construction:X
General Liability:
$2 Million/occurrence
$4 Million aggregate

Design Professional:____
General Liability:
$2 Million/occurrence
$4 Million aggregate
Professional Liability:
$2 Million/occurrence

Professional Consultant:____
Professional Liability:
$1 Million/occurrence

IT Services:____
Professional Liability:
$1 Million/occurrence
No auto required

Hazardous Materials:____
Pollution Liability:
$1 Million/occurrence

Special Events/Caterers-Vendors:____
No auto required
No workers' comp required

Professional Counseling/ Psychological:____
Professional Liability:
$1 Million/occurrence
No auto required

Pyrotechnics:____
General Liability:
$5 Million/occurrence
$10 Million aggregate
Auto - $2 Million/occurrence

Chemical/Environmental:____
General Liability:
$3 Million/occurrence
$6 Million aggregate
Pollution – $2 Million/Occurrence
Auto - $2 Million/Occurrence

Insurance Submission Process

The City of Roseville Human Resources/Risk Management Department uses a service called EBIX to manage our insurance certificate tracking.

How It Works

- The vendor's contact information is entered into EBIX. EBIX will contact the vendor to request proof of insurance.
- The Vendor can forward the request to their Insurance Agent(s) if necessary.
- Vendor/Insurance Agent submits insurance to EBIX by email to roseville@ebix.com or by fax to (770) 325-5727. After faxing or emailing the certificate, please DO NOT send the certificate by mail to EBIX. Please do not mail, email or fax any certificates to the City of Roseville.
- Once submitted, EBIX reviews the insurance documentation. If there are deficiencies, EBIX will send a follow up letter or email requesting additional information.

Questions Regarding Insurance Submission: Contact EBIX at (951) 652-4239
Questions Regarding Insurance Requirements Contact Risk Management at (916) 774-5202

Asbestos-Containing Materials in City-Owned Buildings

California Health and Safety Code Section 25915 requires that all City of Roseville employees, contractors and lessees be notified annually of the presence of asbestos in City-owned buildings constructed prior to 1979. Please post this notice in an area(s) accessible to all employees, contractors and lessees. Contact Facility Maintenance & Operations at (916) 774-5740 for more information about Asbestos Containing Materials (ACMs) in specific City-owned buildings. For more information about asbestos refer to the OSHA website.

The City of Roseville is committed to maintaining a safe and healthy work environment. The City's Facility Maintenance & Operations staff conducts ongoing inspections to identify and safely manage previously installed asbestos-containing products. Renovation of City-owned buildings **MUST** be reviewed in advance by Facility Maintenance & Operations to ensure the City is in compliance with building codes, Americans with Disabilities Act and that no ACMs are disturbed without proper safeguards. Work that requires removal or repair of ACMs is restricted to trained and qualified persons only. **Facility Maintenance & Operations will need to approve the qualified contractors**.

Use the following measures to protect you and others from exposure to airborne asbestos:

- Presume all building materials contain asbestos until determined otherwise by Facility Maintenance & Operations.
- Do not install walls, closets, cabinets, ceilings.
- Do not remove, cut, drill, sand, grind or otherwise disturb any material in the buildings, including carpet and tile.
- Do not paint (this includes any walls, ceilings, floors and electrostatic painting of office furniture).
- Do not remove any items nailed or screwed to the walls (this includes pictures, cabinets, electrical, etc.).
- Do not go above ceilings, behind walls or into building spaces such as attics and crawlspaces unless these areas have been inspected and cleared by Facility Maintenance & Operations.
- Do not pull cable or wiring through above-ceiling spaces with asbestos.
- Do not install screws, pins, nails or hangers into asbestos ceiling or wall plaster.
- Be careful not to damage walls, ceilings or floors when moving furniture or equipment. It is recommended that Facility Maintenance & Operations be contacted prior to moving furniture or equipment.
- Do not brush, sweep or vacuum textured asbestos ceiling plaster or plaster debris.
- Immediately report any damage or deterioration of suspect building materials to Facility Maintenance & Operations or Risk Management.

It is important to note that the presence of asbestos does not mean you have been exposed. Exposure results when friable asbestos particles are inhaled or ingested. Asbestos becomes friable when material containing asbestos is drilled, sanded or disturbed by remodeling or demolition work or when the ACM has deteriorated. Intact, bonded, sealed or undisturbed asbestos does not pose a hazard.

Employees may review the asbestos survey reports, results of bulk sampling or air monitoring conducted in City-owned buildings. All asbestos data will be available by appointment with Facility Maintenance & Operations.

Facilities Built Pre 1979 That May Contain Asbestos	Year Built
Downtown Library - 225 Taylor Street 95678	1974
Carnegie Museum - 557 Lincoln Street 95678	1912
Tower Theatre - 415 Vernon Street 95678	1940
Fire Station #3 - 1300 Cirby Way 95661	1963
Old Corp Yard - 100 Old Corp Yard Road 95678	1940
Water Treatment Plant Operations Bldg.- 9595 Barton Road 95746	1965
Waste Water Treatment Plant Operations Bldg. - 1800 Booth Road 95747	1962
Royer Recreation Bldg. - 190 Park Drive 95678	1950
Fire Museum - 400 Lincoln Street 95678	1930
Diamond Oaks Golf - 349 Diamond Oaks Road 95678	1965
Johnson Pool, 4th & D Street	1950
330 Vernon Street	1940
107 Sutter Avenue	1962

Sign to acknowledge receipt of asbestos notification:

SIGNATURE	Dennis Moreno
COMPANY NAME	Seats and Stairs Consulting Corp.
DATE	on 9/29/2021

Asbestos
Rev 01/16/19

Supplier	
Signature:	Dennie Moreno
Print Name:	Dennie Moreno
Title:	President / Principal / Treasurer

Supplier	
Signature:	Rebecca Roman
Print Name:	Rebecca Roman
Title:	CEO / Principal

City of Roseville, A Municipal Corporation	
Signature:	
Print Name:	**Dominick Casey**
Title:	**City Manager**

Seats and Stations
1430 Blue Oaks Blvd
Suite 150
Roseville, CA 95747
PH: 916 786 8005
FX: 916 783 8006

QUOTATION & CONTRACT

DATE	QUOTE #	PURCHASE ORDER
09/24/21	SAS211670A	

TERMS	SALES REPRESENTATIVE
0% Dep. / Bal. Due Upon Receipt	Terry Passantino

BILL TO:	FINAL LOCATION:
City of Roseville 311 VERNON ST ROSEVILLE, CA 95678-2649	116 South Grant St City of Roseville 116 South Grant St Roseville, CA 95678-2648

ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
1	**Kimball** **CMAS 4-16-71-0013G**			
2	74K275828CFYL 462 497 DOCK,TABLE BASE,Y,BLADE,PAINT 462 = CINDER 497 = POLISHED ALUMINUM -- ITEM LIST PRICE: $1,093.00 -- DISCOUNT OFF LIST: 61.75% -- TAG/LOCATION: 1st Flr: Collab Area	1.00	$ 418.07	$ 418.07
3	K44TMBHBU ARCE OMEG_61161 MELORA,TASK,BLACK MESH HALF BACK,UPHOLSTERED SEAT ARCE = ARCCOM GRADE E OMEG_61161 = OMEGA FOG -- ITEM LIST PRICE: $857.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Collab Area	6.00	$ 342.80	$ 2,056.80
4	74K3072RTL P X STD AD AD DOCK,TABLE TOP,RECTANGULAR,LAMINATE 30X72 P = 1/8" MOLDED VIN X = NO GROMMET STD = STANDARD GROUP 1 AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $480.00 -- DISCOUNT OFF LIST: 61.75% -- TAG/LOCATION: 1st Flr: Collab Area	1.00	$ 183.60	$ 183.60
5	K60TLR1819L STD NW X Y462 VILLA,18DIAM,TABLE,ROUND,LAM TOP,LAMINATE CHASSIS STD = STANDARD GROUP 1 NW = TUSCAN X = NO GROMMET Y462 = Y METAL,CINDER -- ITEM LIST PRICE: $1,245.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Main Lobby	1.00	$ 498.00	$ 498.00

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
6	K58CT ARCB STD NW BEO,SIDE,LADDER BACK ARCB = ARCCOM GRADE B STD = STANDARD GROUP 1 NW = TUSCAN -- ITEM LIST PRICE: $1,052.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Main Lobby	3.00	$ 420.80	$ 1,262.40
7	53K3653BCOSSFL AD PRIORITY,36WX53H,BOOKCASE,FRSTDG,OPEN,STRAIGHT,4 SHELF,LAM AD = ALMOND -- ITEM LIST PRICE: $870.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Private Office	2.00	$ 348.00	$ 696.00
8	FSBFM2418LL 89_462 KSB AD AD FOOTPRINT,24DX18W,STORAGE,BOX/FILE MOBILE,LAMINATE TOP,LAM 89_462 = STUDIO,CINDER KSB = SPECIFY CORE SEPARATELY AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $1,541.00 -- DISCOUNT OFF LIST: 69.5% -- TAG/LOCATION: 1st Flr: Private Office	2.00	$ 470.01	$ 940.02
9	53K2448RHALL P AD AD 462 AD PRIORITY,24DX48W,RETURN,HGT ADJ,TFL P = 1/8" MOLDED VIN AD = ALMOND AD = ALMOND 462 = CINDER AD = ALMOND -- ITEM LIST PRICE: $2,704.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Private Office	2.00	$ 1,081.60	$ 2,163.20
10	53K3072DBHALL P X AD AD 462 AD PRIORITY,30DX72W,DESK,BREAKFRONT,HEIGHT ADJUSTABLE,TFL P = 1/8" MOLDED VIN X = NO GROMMET AD = ALMOND AD = ALMOND 462 = CINDER AD = ALMOND -- ITEM LIST PRICE: $3,855.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Private Office	2.00	$ 1,542.00	$ 3,084.00

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
11	KSCD006 LOCK CORE,BLACK CORE WITH BLACK HINGED KEY,KEY 006 -- ITEM LIST PRICE: $28.00 -- DISCOUNT OFF LIST: 69.5% -- TAG/LOCATION: 1st Flr: Private Offices	1.00	$ 8.54	$ 8.54
12	KSCD007 LOCK CORE,BLACK CORE WITH BLACK HINGED KEY,KEY 007 -- ITEM LIST PRICE: $28.00 -- DISCOUNT OFF LIST: 69.5% -- TAG/LOCATION: 1st Flr: Private Offices	1.00	$ 8.54	$ 8.54
13	99KFFB PERKS,FILE BAR,FOR UDSF LATERAL FILE,FRONT TO BACK,QTY 2 -- ITEM LIST PRICE: $27.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Storage	15.00	$ 10.80	$ 162.00
14	KSCD020 LOCK CORE,BLACK CORE WITH BLACK HINGED KEY,KEY 020 -- ITEM LIST PRICE: $28.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Storage	5.00	$ 11.20	$ 56.00
15	FNDACW FUNDAMENTAL,COUNTER WEIGHT -- ITEM LIST PRICE: $214.00 -- DISCOUNT OFF LIST: 63.5% -- TAG/LOCATION: 1st Flr: Storage	5.00	$ 78.11	$ 390.55
16	FND18363 E KSB STD 462 FUNDAMENTAL,18DX36W,LATERAL FILE,THREE HIGH E = EXTENDED KSB = SPECIFY CORE SEPARATELY,BLACK STD = STANDARD GROUP 1,NON-METALLIC 462 = CINDER -- ITEM LIST PRICE: $1,270.00 -- DISCOUNT OFF LIST: 63.5% -- TAG/LOCATION: 1st Flr: Storage	5.00	$ 463.55	$ 2,317.75
17	SS2496WSSL1 P STD AD AD 0000000684 18.1250 0000000683 90.1250 FOOTPRINT,24DX96W,SURFACE,1 3/16T,STR,LAM,SINGLE RIM PF P = 1/8" MOLDED VIN STD = STANDARD GROUP 1 AD = ALMOND AD = ALMOND 0000000684 = SPECIAL DEPTH,9-23 13/16 18.1250 = 18 1/8 0000000683 = SPCL WIDTH,89 15/16-95 13/16 90.1250 = 90 1/8	2.00	$ 251.93	$ 503.86

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
	-- ITEM LIST PRICE: $826.00 -- DISCOUNT OFF LIST: 69.5% -- TAG/LOCATION: 1st Flr: Storage			
18	72K2747LCOLL AD AD X STOW,27WX47H,LECTERN,OPEN,TFL AD = ALMOND AD = ALMOND X = NO GROMMET -- ITEM LIST PRICE: $3,267.00 -- DISCOUNT OFF LIST: 64.61% -- TAG/LOCATION: 1st Flr: Training Room	2.00	$ 1,156.19	$ 2,312.38
19	K76CMUC2 ARCB FLIP,NESTING,UPHOLSTERED SEAT,CHROME FRAME,MOBLE,ARM,QTY 2 ARCB = ARCCOM GRADE BQTY: CARTON OF 2 -- ITEM LIST PRICE: $1,433.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Training Room	1.00	$ 573.20	$ 573.20
20	K76CMUC4 ARCB FLIP,NESTING,UPHOLSTERED SEAT,CHROME FRAME,MOBLE,ARM,QTY 4 ARCB = ARCCOM GRADE BQTY: CARTON OF 4 -- ITEM LIST PRICE: $2,668.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Training Room	14.00	$ 1,067.20	$ 14,940.80
21	KCEI2IF2 ELECTRICAL,INTERLINK IQ,POWER IN-FEED -- ITEM LIST PRICE: $443.00 -- DISCOUNT OFF LIST: 64.61% -- TAG/LOCATION: 1st Flr:Training Room	12.00	$ 156.78	$ 1,881.36
22	KCEI2PHPDUS2PC ELEC,INTERLINK IQ,MDR POWER/USB CENTER,POWDER COAT,SILVER -- ITEM LIST PRICE: $565.00 -- DISCOUNT OFF LIST: 64.61% -- TAG/LOCATION: 1st Flr:Training Room	29.00	$ 199.95	$ 5,798.55
23	75K2GL DOCK,GANGING LATCH,BLACK SET OF 2 -- ITEM LIST PRICE: $73.00 -- DISCOUNT OFF LIST: 64.62% -- TAG/LOCATION: 1st Flr:Training Room	29.00	$ 25.83	$ 749.07
24	74K0218VCMP 462 DOCK,VERTICAL CABLE MANAGER,PAINT 462 = CINDER -- ITEM LIST PRICE: $88.00 -- DISCOUNT OFF LIST: 64.61% -- TAG/LOCATION: 1st Flr:Training Room	12.00	$ 31.14	$ 373.68

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
25	75K60WT 462 DOCK,WIRE TROUGH, PAINT,462 CINDER 462 = CINDER -- ITEM LIST PRICE: $91.00 -- DISCOUNT OFF LIST: 64.62% -- TAG/LOCATION: 1st Flr:Training Room	29.00	$ 32.20	$ 933.80
26	75K206028CFFTM 462 462 C45 DOCK,TABLE BASE,T,KONFIGUR,FLIP NEST,PAINT 462 = CINDER 462 = CINDER C45 = BLACK CASTER -- ITEM LIST PRICE: $892.00 -- DISCOUNT OFF LIST: 64.61% -- TAG/LOCATION: 1st Flr:Training Room	29.00	$ 315.68	$ 9,154.72
27	75K2460RTL P C4C_CUTOUT STD AD AD DOCK,TRAINING TABLE,RECTANGULAR,LAMINATE P = 1/8" MOLDED VIN C4C_CUTOUT = C4,4X8,CENTER,CUTOUT ONLY STD = STANDARD GROUP 1 AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $398.00 -- DISCOUNT OFF LIST: 64.61% -- TAG/LOCATION: 1st Flr:Training Room	29.00	$ 140.85	$ 4,084.65
28	74K2728RDBP 462 462 DOCK,ROUND DISC BASE,PLATINUM 462 = CINDER 462 = CINDER -- ITEM LIST PRICE: $757.00 -- DISCOUNT OFF LIST: 61.75% -- TAG/LOCATION: 2nd Flr: Breakroom	1.00	$ 289.55	$ 289.55
29	74K2728RDBP 462 462 DOCK,ROUND DISC BASE,PLATINUM 462 = CINDER 462 = CINDER -- ITEM LIST PRICE: $757.00 -- DISCOUNT OFF LIST: 61.75% -- TAG/LOCATION: 2nd Flr: Breakroom	5.00	$ 289.55	$ 1,447.75
30	K44MSPAG 462 BK ARCE OMEG_61161 MELORA,SIDE,MESH BACK,ARMS,UPHOLSTERED SEAT,GLIDES 462 = BLACK FRAME BK = BLACK MESH ARCE = ARCCOM GRADE E OMEG_61161 = OMEGA FOG -- ITEM LIST PRICE: $847.00	12.00	$ 338.80	$ 4,065.60

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
	-- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Breakroom			
31	74K3636SQL P X STD 440 440 DOCK,MEETING TABLE,SQUARE,LAMINATE P = 1/8" MOLDED VIN X = NO GROMMET STD = STANDARD GROUP 1 440 = CLOUD 440 = CLOUD -- ITEM LIST PRICE: $470.00 -- DISCOUNT OFF LIST: 61.75% -- TAG/LOCATION: 2nd Flr: Breakroom	1.00	$ 179.78	$ 179.78
32	74K3636SQL P X STD AD AD DOCK,MEETING TABLE,SQUARE,LAMINATE P = 1/8" MOLDED VIN X = NO GROMMET STD = STANDARD GROUP 1 AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $470.00 -- DISCOUNT OFF LIST: 61.75% -- TAG/LOCATION: 2nd Flr: Breakroom	5.00	$ 179.78	$ 898.90
33	K58VT125R ARCE OMEG_61161 ARCE OMEG_61161 ARCE OMEG_61161 STD AD STD AD BEO,1 ST,CO,P3W,LAMTBL,R ARCE = ARCCOM GRADE E OMEG_61161 = OMEGA FOG ARCE = ARCCOM GRADE E OMEG_61161 = OMEGA FOG ARCE = ARCCOM GRADE E OMEG_61161 = OMEGA FOG STD = STANDARD GROUP 1 AD = ALMOND STD = STANDARD GROUP 1 AD = ALMOND -- ITEM LIST PRICE: $3,176.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Lactation	1.00	$ 1,270.40	$ 1,270.40
34	KSCD008 LOCK CORE,BLACK CORE WITH BLACK HINGED KEY,KEY 008 -- ITEM LIST PRICE: $28.00 -- DISCOUNT OFF LIST: 69.5% -- TAG/LOCATION: 2nd Flr: Private Offices	1.00	$ 8.54	$ 8.54
35	KSCD009 LOCK CORE,BLACK CORE WITH BLACK HINGED KEY,KEY 009 -- ITEM LIST PRICE: $28.00 -- DISCOUNT OFF LIST: 69.5%	1.00	$ 8.54	$ 8.54

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
	-- TAG/LOCATION: 2nd Flr: Private Offices			
36	KCCB001 CSGDS,LOCK CORE-BLK,BLK HNGD KEY,KEY 001 -- ITEM LIST PRICE: $28.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	3.00	$ 11.20	$ 33.60
37	KCCB002 CSGDS,LOCK CORE-BLK,BLK HNGD KEY,KEY 002 -- ITEM LIST PRICE: $28.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	3.00	$ 11.20	$ 33.60
38	KCCB005 CSGDS,LOCK CORE-BLK,BLK HNGD KEY,KEY 005 -- ITEM LIST PRICE: $28.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	3.00	$ 11.20	$ 33.60
39	53KE2430LFM2L 89_462 KS AD AD PRIORITY,24DX30W,UNDERSURFACE PED,2 DRAWER,LATERAL FILE,LAM 89_462 = STUDIO,CINDER KS = SPECIFY CORE SEPARATELY AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $1,017.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	5.00	$ 406.80	$ 2,034.00
40	FSBFM2418LL 89_462 KSB AD AD FOOTPRINT,24DX18W,STORAGE,BOX/FILE MOBILE,LAMINATE TOP,LAM 89_462 = STUDIO,CINDER KSB = SPECIFY CORE SEPARATELY AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $1,541.00 -- DISCOUNT OFF LIST: 69.5% -- TAG/LOCATION: 2nd Flr: Private Offices	2.00	$ 470.01	$ 940.02
41	53K2472WSSLL M P X AD AD PRIORITY,24DX72W,SURFACE,RECTANGLE,TFL M = MAIN P = 1/8" MOLDED VIN X = NO GROMMET AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $367.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	5.00	$ 146.80	$ 734.00

Seats and Stations
1430 Blue Oaks Blvd
Suite 150
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QUOTATION & CONTRACT		
DATE	QUOTE #	PURCHASE ORDER
09/24/21	SAS211670A	

TERMS	SALES REPRESENTATIVE
0% Dep. / Bal. Due Upon Receipt	Terry Passantino

ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
42	53K2448RHALL P AD AD 462 AD PRIORITY,24DX48W,RETURN,HGT ADJ,TFL P = 1/8" MOLDED VIN AD = ALMOND AD = ALMOND 462 = CINDER AD = ALMOND -- ITEM LIST PRICE: $2,704.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	7.00	$ 1,081.60	$ 7,571.20
43	53K1567VWHRL 89_462 KS AD AD PRIORITY,15WX67H,VERTICAL STORAGE,WARDROBE/SHELF,RIGHT,LAM 89_462 = STUDIO,CINDER KS = SPECIFY CORE SEPARATELY AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $1,460.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	2.00	$ 584.00	$ 1,168.00
44	53KE2415PUBBFL 89_462 KS AD AD PRIORITY,PEDESTAL,UNDERSURFACE,BBF,LAMINATE 89_462 = STUDIO,CINDER KS = SPECIFY CORE SEPARATELY AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $853.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	5.00	$ 341.20	$ 1,706.00
45	53K3072DBHALL P X AD AD 462 AD PRIORITY,30DX72W,DESK,BREAKFRONT,HEIGHT ADJUSTABLE,TFL P = 1/8" MOLDED VIN X = NO GROMMET AD = ALMOND AD = ALMOND 462 = CINDER AD = ALMOND -- ITEM LIST PRICE: $3,855.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	7.00	$ 1,542.00	$ 10,794.00
46	53K2428STL AD PRIORITY,24DX28H,END PANEL,T-LEG,LAMINATE AD = ALMOND -- ITEM LIST PRICE: $387.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	3.00	$ 154.80	$ 464.40

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
47	53K4325MPTL AD PRIORITY,43WX25H,MODESTY PANEL,TECHNOLOGY,LAM AD = ALMOND -- ITEM LIST PRICE: $595.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	6.00	$ 238.00	$ 1,428.00
48	53K7221WPTBN B 25310 PRIORITY,72WX21H,WALL PANEL,TACKBOARD,FABRIC B = GRADE B RAILROADED 25310 = SAVILE WORSTED -- ITEM LIST PRICE: $562.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	3.00	$ 224.80	$ 674.40
49	74K36RDLL P X AD AD DOCK,36DIA,MEETING TABLE,ROUND,TFL P = 1/8" MOLDED VIN X = NO GROMMET AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $392.00 -- DISCOUNT OFF LIST: 61.75% -- TAG/LOCATION: 2nd Flr: Private Offices	6.00	$ 149.94	$ 899.64
50	53K1567VWHLL 89_462 KS AD AD PRIORITY,15WX67H,VERTICAL STORAGE,WARDROBE/SHELF,LEFT,LAM 89_462 = STUDIO,CINDER KS = SPECIFY CORE SEPARATELY AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $1,460.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	3.00	$ 584.00	$ 1,752.00
51	KCCB003 CSGDS,LOCK CORE-BLK,BLK HNGD KEY,KEY 003 -- ITEM LIST PRICE: $28.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	3.00	$ 11.20	$ 33.60
52	KCCB004 CSGDS,LOCK CORE-BLK,BLK HNGD KEY,KEY 004 -- ITEM LIST PRICE: $28.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Private Offices	3.00	$ 11.20	$ 33.60
53	74K2228RDBP 462 462 DOCK,22DIAX28H,ROUND DISC BASE,PAINT 462 = CINDER 462 = CINDER -- ITEM LIST PRICE: $594.00	6.00	$ 227.21	$ 1,363.26

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
	-- DISCOUNT OFF LIST: 61.75% -- TAG/LOCATION: 2nd Flr: Private Offices			
54	KSCD001 LOCK CORE,BLACK CORE WITH BLACK HINGED KEY,KEY 001 -- ITEM LIST PRICE: $28.00 -- DISCOUNT OFF LIST: 63.5% -- TAG/LOCATION: 2nd Flr: Storage	4.00	$ 10.22	$ 40.88
55	FND18362SC KSB STD 462 FUNDAMENTAL,18DX36W,STOR CAB,TWO HIGH,HINGE DR,NO SHELVES KSB = SPECIFY CORE SEPARATELY,BLACK STD = STANDARD GROUP 1,NON-METALLIC 462 = CINDER -- ITEM LIST PRICE: $1,045.00 -- DISCOUNT OFF LIST: 63.5% -- TAG/LOCATION: 2nd Flr: Storage	2.00	$ 381.43	$ 762.86
56	FND18365SC KSB STD 462 FUNDAMENTAL,18DX36W,STOR CAB,FIVE HIGH,HINGE DR,NO SHELVES KSB = SPECIFY CORE SEPARATELY,BLACK STD = STANDARD GROUP 1,NON-METALLIC 462 = CINDER -- ITEM LIST PRICE: $1,234.00 -- DISCOUNT OFF LIST: 63.5% -- TAG/LOCATION: 2nd Flr: Storage	2.00	$ 450.41	$ 900.82
57	SS1872LFTL P STD AD AD UNIVERSAL,18DX72W,SURFACE,1 3/16T,LATERAL FILE,LAMINATE P = 1/8" MOLDED VIN STD = STANDARD GROUP 1 AD = ALMOND AD = ALMOND -- ITEM LIST PRICE: $705.00 -- DISCOUNT OFF LIST: 63.5% -- TAG/LOCATION: 2nd Flr: Storage	1.00	$ 257.33	$ 257.33
58	FND1836LFSHP STD 462 FUNDAMENTAL,18DX36W,STORAGE,OVERFILE SHELF,PAINTED STD = STANDARD GROUP 1,NON-METALLIC 462 = CINDER -- ITEM LIST PRICE: $97.00 -- DISCOUNT OFF LIST: 63.51% -- TAG/LOCATION: 2nd Flr: Storage	10.00	$ 35.40	$ 354.00
			Subtotal:	$ 97,733.41

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
59	**National Office Furniture** **CMAS #4-11-71-0119A**			
60	N71T2525ENL AD 462 STD FARRAH,25DX25W,END TABLE,LAMINATE AD = ALMOND 462 = CINDER STD = STANDARD GLIDE -- ITEM LIST PRICE: $1,507.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Waiting Room	2.00	$ 602.80	$ 1,205.60
61	N71M1M 7 71002 462 STD FARRAH,LOUNGE,GUEST STATIC,ARMLESS 7 = GRADE 7 71002 = BRISA CAMBRIDGE BLUE 462 = CINDER STD = STANDARD GLIDE -- ITEM LIST PRICE: $2,423.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 1st Flr: Waiting Room	4.00	$ 969.20	$ 3,876.80
62	N28MU83L ARCB 497 STD WHIRL,UPH BACK,CONF ARM,SYNCHRO 3 LOCK ARCB = ARCCOM GRADE B 497 = POLISHED ALUMINUM STD = HARD DUAL WHEEL,BLACK -- ITEM LIST PRICE: $1,434.00 -- DISCOUNT OFF LIST: 60% -- TAG/LOCATION: 2nd Flr: Conference Rooms	16.00	$ 573.60	$ 9,177.60
			Subtotal:	$ 14,260.00
63	**JSI** **OMNIA #R191806**			
64	NAT4848-30RDXB MBK E1 WLH N Native Round Table with X Base- 48d x 48w x 29 3/8h MBK = Matte Black E1 = Reverse Bevel Edge WLH = Walnut Heights N = None -- ITEM LIST PRICE: $2,565.00 -- DISCOUNT OFF LIST: 53% -- TAG/LOCATION: Native_V.5.21,1st Flr: Conference Room	1.00	$ 1,205.55	$ 1,205.55
65	NAT4284-30TTLB MBK C1 M E1 WLH	2.00	$ 1,973.53	$ 3,947.06

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
	Native Rectangular Table with Open Loop Base- 42d x 84w x 29 3/8h MBK = Matte Black C1 = 1 Cut Out M = (1) Mini - 14" cut out for Mini Oasis or Storage E1 = Reverse Bevel Edge WLH = Walnut Heights -- ITEM LIST PRICE: $4,199.00 -- DISCOUNT OFF LIST: 53% -- TAG/LOCATION: Native_V.5.21,2nd Flr: Conference Rooms			
66	NAT60168-30TTPB MBK WLH E1 WLH C3 MOM Native Rectangular Table with Panel Base- 60d x 168w x 29 3/8h MBK = Matte Black WLH = Walnut Heights E1 = Reverse Bevel Edge WLH = Walnut Heights C3 = 3 Cut Outs MOM = (2) Minis - 13" cut out for Mini Oasis & (1) 29" for Oasis or Storage -- ITEM LIST PRICE: $9,679.00 -- DISCOUNT OFF LIST: 53% -- TAG/LOCATION: Native_V.5.21,2nd Flr: Conference Rooms	1.00	$ 4,549.13	$ 4,549.13
67	EC37 MBK Native Oasis Mini Power Unit- 9d x 14 3/8w x 4 3/4h MBK = Matte Black -- ITEM LIST PRICE: $1,255.00 -- DISCOUNT OFF LIST: 53% -- TAG/LOCATION: Native_V.5.21,2nd Flr: Conference Rooms	4.00	$ 589.85	$ 2,359.40
68	EC38 MBK Native Oasis Power Unit- 9d x 29 3/8w x 4 3/4h MBK = Matte Black -- ITEM LIST PRICE: $2,119.00 -- DISCOUNT OFF LIST: 53% -- TAG/LOCATION: Native_V.5.21,2nd Flr: Conference Rooms	1.00	$ 995.93	$ 995.93
69	NAT2090-36SCUR WLH WLH MBK Native Buffet Credenza with Utility Drawer- 20d x 90w x 36h WLH = Walnut Heights WLH = Walnut Heights MBK = Matte Black -- ITEM LIST PRICE: $4,390.00 -- DISCOUNT OFF LIST: 53% -- TAG/LOCATION: Native_V.5.21,2nd Flr: Conference Rooms	1.00	$ 2,063.30	$ 2,063.30
70	SURCHARGE SURCHARGE	1.00	$ 302.41	$ 302.41
			Subtotal:	$ 15,422.78

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
71	**9to5 Seating** **NCPA #07-15**			
72	3760-Z1-A47-UP PF BA12P C6 GRADE-F (FXXX) Mila - Upholstered Back and Seat, Weight Balanced Control, Fixed Aluminum Arm with Gray Soft Touch Armpad PF = Polished Frame BA12P = BA12P 27" Mid-Profile Aluminum Base - Polished C6 = 60mm Hoodless Chrome Accented Casters GRADE-F = Fabric Grade F (FXXX) = *** Input Supplier, Pattern, and Color Choice Here*** TOR = ARCCOM, OMEGA, FOG #AC-61161-2 -- ITEM LIST PRICE: $1,300.00 -- DISCOUNT OFF LIST: 58% -- TAG/LOCATION: 1st Flr: Conference Room	4.00	$ 546.00	$ 2,184.00
73	3760-Z1-A47-UP PF BA12P C6 GRADE-F (FXXX) Mila - Upholstered Back and Seat, Weight Balanced Control, Fixed Aluminum Arm with Gray Soft Touch Armpad PF = Polished Frame BA12P = BA12P 27" Mid-Profile Aluminum Base - Polished C6 = 60mm Hoodless Chrome Accented Casters GRADE-F = Fabric Grade F (FXXX) = *** Input Supplier, Pattern, and Color Choice Here*** TOR = ARCCOM, OMEGA, FOG #AC-61161-2 -- ITEM LIST PRICE: $1,300.00 -- DISCOUNT OFF LIST: 58% -- TAG/LOCATION: 2nd Flr: Conference Room	12.00	$ 546.00	$ 6,552.00
			Subtotal:	**$ 8,736.00**
74	**Workrite** **TIPS #200301**			
75	JIBE-2SDASE-CCG -B Jibe Dual Articulating Arm - Desk Base -B = Black -- ITEM LIST PRICE: $420.00 -- DISCOUNT OFF LIST: 55.13% -- TAG/LOCATION: 1st Flr: Private Office	2.00	$ 188.46	$ 376.92
76	JIBE-2SDASE-CCG -B Jibe Dual Articulating Arm - Desk Base -B = Black -- ITEM LIST PRICE: $420.00	8.00	$ 188.46	$ 1,507.68

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09/24/21	SAS211670A	

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE
	-- DISCOUNT OFF LIST: 55.13% -- TAG/LOCATION: 2nd Flr: Private Offices			
			Subtotal:	$ 1,884.60
77	**Claridge Products** **CMAS #4-19-71-0167B**			
78	MGMI-34 B-WHT Magnetic Glass Board with Invisi-mount 36"H x 48"W B-WHT = Brilliant White -- ITEM LIST PRICE: $997.00 -- DISCOUNT OFF LIST: 66.7% -- TAG/LOCATION: 1st Flr: Private Office	2.00	$ 332.00	$ 664.00
79	MGMI-34 B-WHT Magnetic Glass Board with Invisi-mount 36"H x 48"W B-WHT = Brilliant White -- ITEM LIST PRICE: $997.00 -- DISCOUNT OFF LIST: 66.7% -- TAG/LOCATION: 2nd Flr: Private Offices	7.00	$ 332.00	$ 2,324.00
			Subtotal:	$ 2,988.00
80	**ERG International** **TIPS 200301**			
81	8748 GR6 ~ ~ SF BM Bryant - 4 Leg GR6 = Grade 6 ~ = No Selection ~ = No Selection SF = Standard Powder Coat Finish BM = black matteArcCom Sherlock 2 Granite-27 #AC-63140 -- ITEM LIST PRICE: $1,511.00 -- DISCOUNT OFF LIST: 51% -- TAG/LOCATION: 1st Flr: Private Office	2.00	$ 740.39	$ 1,480.78
82	8748 GR6 ~ ~ SF BM Bryant - 4 Leg GR6 = Grade 6ArcCom Sherlock 2 Granite-27 #AC-63140 ~ = No Selection ~ = No Selection SF = Standard Powder Coat Finish BM = black matte	14.00	$ 740.39	$ 10,365.46

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	-- ITEM LIST PRICE: $1,511.00 -- DISCOUNT OFF LIST: 51% -- TAG/LOCATION: 2nd Flr: Private Office			
			Subtotal:	$ 11,846.24
83	Assemble Labor to attach, assemble, connect, construct panel systems or components. Labor to attach one panel to another to form a workstation or cubicles. Labor to construct or fabricate the individual panels, components or accessories. Freestanding desks, credenzas, lateral files, bookcases, worktables, returns, convergents, corner units, storage towers, chairs, footrests and other assembly required furnishings and fixtures. All work to be completed during normal business hours with non union labor. Room to be free and clear. Contract of sub contractors for electrical and data needs to be completed by others. Hourly Rate for Receive, Deliver and Install: $75 *Taxable*	1.00	$ 21,321.00	$ 21,321.00
84	Installation Receive, Deliver and Install during normal business hours with non-union installers. Area to be free and clear. Customer to coordinate electrical and data subcontractors. Any additional requirements during installation not previously discussed will result in additional costs associated with parts and labor. *Non Taxable*	1.00	$ 2,369.00	$ 2,369.00
85	PM Services EL Project Management 24 Hours at $72 per hour *Taxable	1.00	$ 1,728.00	$ 1,728.00
86	Int. Design AC Design Services Technical Installation Drawings, Product Specification and Finish Selection. 40 hours at $125 per hour *Taxable	1.00	$ 5,000.00	$ 5,000.00

NOTES:

Any questions please contact Terry

ORDERS MAY BE SUBJECT TO A TARIFF, CHARGES WILL BE ADDED TO FINAL INVOICE IF APPLICABLE

Credit Card 4% fee applies

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ITEM #	DESCRIPTION	QTY	UNIT PRICE	EXT. PRICE

SEATS AND STATIONS IS PLEASED TO QUOTE THE FOLLOWING ITEMS FOR YOUR APPROVAL. BASED ON ANY CURRENT FEDERALLY MANDATED TARIFFS, ALL IMPORT TAXES WILL BE PASSED ON. THE MERCHANDISE WILL BE ORDERED UPON RECEIPT OF THIS SIGNED CONTRACT AND DEPOSIT. THIS OFFER WILL EXPIRE 30 DAYS FROM THE QUOTATION DATE. THIS QUOTATION, WHEN ACCEPTED IS A CONTRACT BINDING ON BOTH PARTIES AND IS NOT SUBJECT TO CHANGE OR CANCELLATION EXCEPT BY WRITTEN CONSENT BY BOTH PARTIES

x Date 09/24/2021

Terry Passantino

SEATS AND STATIONS

x Date

Title

City of Roseville

SUB TOTAL	$183,289.03
FREIGHT	$0.00
SERVICE	$0.00
LABOR ASSEMBLY	$0.00
LABOR INSTALLATION	$0.00
SALES TAX (7.75%)	$14,021.30
TOTAL	$197,310.33
DEPOSIT REQUESTED (NON-REFUNDABLE)	$0.00
BALANCE	$197,310.33

COUNCIL COMMUNICATION

CC #: 1751
File #: 0203-01

Title:	Vehicle Purchases & Public Safety Vehicle Parts and Services - Contract Purchase Agreement
Contact:	Brian Craighead 916-774-5731 bcraighead@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.3.

RECOMMENDATION TO COUNCIL

RFQ 10-3307
Staff recommends Council approve a purchase order to Napa Valley Ford Lincoln Mercury, Inc. dba Napa Ford Lincoln for eighteen Ford Police Interceptor Utility Hybrids utilizing RFQ 10-3307 as replacements for Fleet ID 15-142, 15-047, 16-005, 16-011, 16-012, 16-019, 16-021, 16-030, 16-039, 16-040, 16-071, 16-082, 16-084, 16-086, 16-093, 16-095, 16-096 and 16-097 approved in the FY2021-22 Fleet Replacement budget. The total cost including sales tax is $785,797.

Placer County
Staff recommends City Council adopt a resolution to approve a contract purchase agreement with Stommel, Inc. dba LEHR to provide public safety vehicle parts and services to up-fit new police, fire and public safety vehicles utilizing Placer County's contract# SCN104242, and authorize the City Manager to execute the agreement.

BACKGROUND

RFQ 10-3307
The Police Department is purchasing eighteen Ford Police Interceptor Utility Hybrids as replacements for Fleet ID 15-142, 15-047, 16-005, 16-011, 16-012, 16-019, 16-021, 16-030, 16-039, 16-040, 16-071, 16-082, 16-084, 16-086, 16-093, 16-095, 16-096 and 16-097. These vehicles will be driven by police officers and used as patrol vehicles to respond to calls for service, emergencies, perform proactive enforcement, and follow up on investigations.

RFQ 10-3307 included an option to purchase one additional Interceptor, and the City selected this option so price will be higher than the total bid price. In addition, some Ford factory options were not selected.

A formal bid was issued with the following vendor responses:

Vendor Unit Price (with all potential options)

Napa Ford Lincoln $777,077.31
Napa, CA

Tracy Ford $781,418.60
Tracy, CA

Downtown Ford Sales $819,043.00
Sacramento, CA

Future Ford $820,809.44
Roseville, CA

Caldwell Country Chevrolet $822,587.16
Caldwell, TX

Placer County
The Public Works Fleet Services division is purchasing new police, fire, and public safety vehicles that require up-fitting before being placed into service. The Placer County contract# SCN104242 for public safety vehicle parts and services was competitively bid in 2019 with a five-year contract period and one-year renewals. The bid is currently in the second year of the contract.

The equipment needed for each vehicle includes but is not limited to light bars, sirens, push bumpers, gun locks, flashing lights, decals, partitions, center consoles, computer stands, wiring, and mounting brackets.

Vehicle replacements are based on the Fleet Scoring System, which considers factors such as age, mileage, reliability, prior maintenance and repair costs, and current condition. Below are the vehicle replacement scores. A score of 23 or more indicates the vehicle is eligible for replacement.

Vehicle ID	Replacement Score	Vehicle Condition
15-142	26	Meets City replacement criteria
15-047	29	Meets City replacement criteria
16-005	24	Meets City replacement criteria
16-011	24	Meets City replacement criteria
16-012	24	Meets City replacement criteria
16-019	24	Meets City replacement criteria
16-021	23	Meets City replacement criteria
16-030	23	Meets City replacement criteria
16-039	24	Meets City replacement criteria
16-040	23	Meets City replacement criteria
16-071	23	Meets City replacement criteria
16-082	24	Meets City replacement criteria
16-084	25	Meets City replacement criteria
16-086	25	Meets City replacement criteria
16-093	23	Meets City replacement criteria
16-095	23	Meets City replacement criteria
16-096	24	Meets City replacement criteria
16-097	26	Meets City replacement criteria

FISCAL IMPACT

RFQ 10-3307
The total cost of eighteen Ford Police Interceptor Utility Hybrids, including options and sales tax, is $785,797. Funding is included in the FY2021-22 Fleet Replacement budget.

Placer County
The total cost for public safety parts and services will not exceed $400,000. Funding is included in the FY2021-22 Fleet Replacement budget.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. The purchase of vehicles and service meets the above criteria and is not subject to CEQA. No additional environmental review is required.

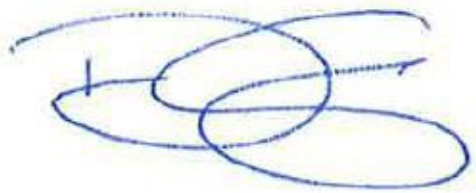
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal E – Deliver exceptional city services

Respectfully Submitted,

Brian Craighead, Fleet Manager

Jason Shykowski, Public Works Director



_____
Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution 21-429

LEHR CPA

RESOLUTION NO. 21-429

APPROVING A CONTRACT PURCHASE AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND STOMMEL INC. DBA LEHR, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE

WHEREAS, a contract purchase agreement (3001675), for the parts and installation services to up-fit police, fire and public safety vehicles on an as-needed basis, by and between the City of Roseville and Stommel Inc. dba Lehr, has been reviewed by the City Council.

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Roseville that said contract purchase agreement is approved and that the City Manager is authorized to execute it on behalf of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville this____day of _____, 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

Contract Purchase Agreement 3001675

Supplier Details:

Company	Stommel Inc dba Lehr
Contact	Steve Adair
Address	4707 Northgate Blvd
	Sacramento, CA 95834

Submit your response to:

Company	City of Roseville
Contact	Tiffany Valdez
Address	Purchasing Division
	2075 Hilltop Circle
	Roseville, CA 95747
Phone	(916) 774-5708
Fax	(916) 774-5736
E-mail	TValdez@roseville.ca.us

This Contract Purchase Agreement is sent for your review and acceptance. Notify the Buyer via email of any needed changes to the company name, address, and contact information. The Buyer will update the agreement prior to you signing the document.

Return two (2) signed originals of the agreement to the Buyer noted on the agreement. Alterations or modifications to the agreement are not allowed. Upon receipt of all necessary documents, the City will sign the agreement and return a fully executed copy to you. Receipt of the signed copy will be your notice to proceed with the work in accordance with the terms and conditions of the agreement. Work must not begin until the contract has been fully executed.

The following guidelines must be followed for the signature block on the agreement:

Sole proprietorship - **By owner**

Partnership - **Any general partner**

Corporation - **Two options:**
(1) A signature from the President and the corporate seal; **OR**
(2) One signature from the Chairman of the Board, President, or any Vice President **AND** one signature from the Secretary, any Assistant Secretary, Chief Financial Officer, or any Treasurer or Assistant Treasurer of the corporation

*General Manager, Office Manager and/or Sales Manager are **not** corporate officer titles. The agreement will be rejected if not signed in accordance with these guidelines.

Insurance requirements:
The City's insurance requirements are referenced on Attachment A of the agreement. By signing the agreement, you are confirming that your company has the minimum insurance limits required.

CITY OF ROSEVILLE CALIFORNIA

Contract Purchase Agreement 3001675

Agreement	**3001675**
Agreement Date	**28-SEP-2021**
Revision	**0**
Agreement Amount	**400,000.00 USD**

Invoice To
City of Roseville
Accounts Payable
311 Vernon St
ROSEVILLE CA 95678
Phone: (916) 774-5488
Fax: (916) 784-3796
Email: accountspayable@roseville.ca.us

Supplier
Stommel Inc dba Lehr
4707 Northgate Blvd

Sacramento, CA 95834
Phone: ()
Fax: ()
Email: steve@lehrauto.com

Description of Labor, equipment and/or materials

Shall provide the parts and installation services to up fit Police K9 units, patrol units and public safety vehicles on an as-needed basis for the City of Roseville's Fleet Services Division utilizing Placer County Contract #SCN104242.

START DATE: EXECUTED AGREEMENT
END DATE: 9/30/22

Please contact Peter Brevik at 916-746-1754 for questions regarding this agreement.

**Total cost listed is an approximation only. The City does not guarantee whatsoever the actual value of this agreement.

Customer #	Supplier #	Payment Terms	Freight Terms	FOB	Shipping Method
	10020	**Net 30**	**Freight on Board at the destination**	**Destination**	**Best Method**

Start Date	End Date	Confirm To
		Tiffany Valdez Phone **1-916-774-5708**

Attention: Total Cost not to exceed the agreement amount without prior approval of the Purchasing office.

Contract Terms and Conditions

1. To the fullest extent allowed by law, Contractor shall defend, indemnify, and save and hold harmless City, its officers, agents, employees and volunteers from any claims, suits or actions of every name, kind and description brought forth, or on account of, injuries to or death of any person (including but not limited to workers and the public), or damage to property, resulting from or arising out of Contractor's willful misconduct or negligent act or omission while engaged in the performance of obligations or exercise of rights created by this Agreement, except those matters arising from City's sole negligence or willful misconduct. The parties intend that this provision shall be broadly construed. Contractor's responsibility for such defense and indemnity obligations shall survive the termination or completion of this Agreement for the full period of time allowed by law. The defense and indemnity obligations of this Agreement are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained in this Agreement.
2. Contractor is an independent contractor, and shall not be considered an officer, agent or employee of the City.
3. Without the written consent of the City, this Agreement is not assignable by Contractor either in whole or in part.
4. Time is of the essence of this Agreement.
5. At any time during the term of this Agreement, the City has the right to terminate this Agreement, provided Contractor is given thirty (30) days written notice. City's termination shall be without further liability to City; however, Contractor shall be entitled to all costs reasonably incurred prior to the date of termination. Contractor acknowledges that City may terminate this Agreement should funds not be appropriated by its governing body to continue services under this Agreement.
6. This Agreement may only be amended or modified in writing. It is integrated and contains the complete understanding of the parties.
7. All equipment, supplies and services sold to the City of Roseville shall conform to the general safety orders of the State of California.
8. Unless notified to the contrary, in writing, the City assumes that the Contractor has accepted the work in accordance with the plans and specifications (if any) and agrees to do the work in compliance with this Agreement.
9. All fair employment practices must be adhered to. In addition, if the project referenced on this service agreement is a Public Works project, all prevailing wage laws must be complied with. For prevailing wage contracts over $25,000, copies of certified payroll must be submitted with invoices. Prevailing wage rates may be obtained from the State Department of Industrial Relations and/or the following website address: http://www.dir.ca.gov/dlsr/DPreWageDetermination.htm.
10. Contractor agrees to the below insurance requirements:
    a. Unless otherwise specified, the Contractor shall maintain the policies of insurance outlined in Attachment A, incorporated herein by this reference, in full force and effect during the term of this Agreement. The City of Roseville retains sole discretion in determining the types and proper levels of insurance coverage.
    b. Form. Contractor shall submit a certificate evidencing such coverage for the period covered by this Agreement in a form satisfactory to Risk Management and the City Attorney, prior to undertaking any work hereunder. Any insurance written on a claims made basis is subject to the approval of Risk Management and the City Attorney.
    c. Additional Insureds. Contractor shall also provide a separate endorsement or

section of the policy showing City, its officers, agents, employees, and volunteers as additional insureds for each type of coverage, except for Workers' Compensation. Such insurance shall specifically cover the contractual liability of Contractor. The additional insured coverage under the Contractor's policy shall be primary and noncontributory, as evidenced by a separate endorsement or section of the policy, and shall not seek contribution from City's insurance or self-insurance. In addition, the additional insured coverage shall be at least as broad as the Insurance Services Office (ISO) CG 20 01 Endorsement. Any available insurance proceeds in excess of the specified minimum insurance coverage requirements and limits shall be available to the additional insureds. Furthermore, the requirements for coverage and limits shall be:
(1) the minimum coverage and limits specified in this Agreement; or
(2) the full coverage and maximum limits of any insurance proceeds available to the named insureds, whichever is greater.

d. Cancellation/Modification. Contractor shall provide ten (10) days written notice to City prior to cancellation or modification of any insurance required by this Agreement.

e. Umbrella/Excess Insurance. The limits of insurance required in this Agreement may be satisfied by a combination of primary and excess insurance. Any excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and noncontributory basis for the benefit of City (if agreed to in a written contract) before City's own insurance shall be called upon to protect it as a named insured.

f. Subcontractors. Contractor agrees to include in its contracts with all subcontractors the same requirements and provisions of this Agreement, including the indemnity and insurance requirements, to the extent they apply to the scope of the subcontractor's work. Furthermore, Contractor shall require its subcontractors to agree to be bound to Contractor and City in the same manner and to the same extent as Contractor is bound to City under this Agreement. Additionally, Contractor shall obligate its subcontractors to comply with these same provisions with respect to any tertiary subcontractor, regardless of tier. A copy of City's indemnity and insurance provisions will be furnished to the subcontractor or tertiary subcontractor upon request.

g. Self-Insured Retentions. All self-insured retentions (SIR) must be disclosed to Risk Management for approval and shall not reduce the limits of liability. Policies containing any SIR provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named insured or City. City reserves the right to obtain a full certified copy of any insurance policy and endorsements. The failure to exercise this right shall not constitute a waiver of such right.

h. Waiver of Subrogation. Contractor hereby agrees to waive subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss under a Workers Compensation, Commercial General Liability or Automobile Liability policy. All Workers Compensation, Commercial General Liability and Automobile Liability policies shall be endorsed with a waiver of subrogation in favor of City, its officers, agents, employees and volunteers for all work performed by Contractor, its employees, agents and subcontractors.

i. Liability/Remedies. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve Contractor of liability in excess of such coverage, nor shall it preclude City from taking such other actions as are available to it under any other provisions of this Agreement or law.

11. Contractor shall comply with all federal, state and local laws and ordinances, including but not limited to the City's storm water regulations, as may be applicable to the performance of services under this Agreement. Failure to comply with local ordinances

may result in monetary fines and cancellation of this Agreement. Refer to www.roseville.ca.us/stormwater for links to more information on the City's storm water regulations.

12. In the event that the terms of any attachment or exhibit conflict with any terms of this Agreement, the terms of this Agreement shall control.
13. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. In the event that any signature is delivered by facsimile transmission or by e-mail delivery of a ".pdf" format data file, such signature shall create a valid and binding obligation of the party executing (or on whose behalf such signature is executed) with the same force and effect as if such facsimile or ".pdf" signature page were an original hereof.
14. If either party commences any legal action against the other party arising out of this Agreement or the performance thereof, the prevailing party in such action shall be entitled to recover its reasonable litigation expenses, including but not limited to, court costs, expert witness fees, discovery expenses, and attorneys' fees. Any action arising out of this Agreement shall be brought in Placer County, California, regardless of where else venue may lie. This Agreement shall be governed by and construed in accordance with the laws of the State of California.
15. This Agreement shall be binding upon the heirs, successors, executors, administrators and assigns of the respective parties hereto.
16. If any of the provisions contained in this Agreement are for any reason held invalid or unenforceable, such holding shall not affect the remaining provisions or the validity and enforceability of the Agreement as a whole.
17. For purposes of this Agreement, the terms "Contractor," "Consultant," and "Supplier" are used interchangeably.
18. If the project referenced on this agreement is a Public Works project, then the following shall apply: No contractor or subcontractor may work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. During the performance of this agreement, Contractor and its subcontractors shall have a continuing legal obligation to maintain current registration with the Department of Industrial Relations. Contractor is hereby notified that this project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.
19. If the project referenced on this agreement is a Public Works project, then the following shall apply: Contractor must submit all claims as defined in and in accordance with the claim resolution process set forth in Section 9204 of the Public Contract Code. Each such claim must be sent to the City by registered mail or certified mail with return receipt requested and must contain reasonable documentation to support the claim. All claims must be received prior to acceptance of the work.
20. Contractor certifies that Contractor, its employees, directors, officers, agents, subcontractors, vendors, and volunteers are not presently debarred, excluded, suspended, declared ineligible, voluntarily excluded, or proposed for debarment, exclusion, suspension or ineligibility by any federal, state, or local department or agency.
21. This Agreement may be amended via change order, but only if such change order is made in writing, approved by the City, and signed by both parties.
22. CONTRACTOR agrees to defend and indemnify CITY if, despite the parties intent and practice, any venue, agency, or court with competent jurisdiction determines that CONTRACTOR and/or any of its agents, officers, employees, volunteers, independent contractors, or subcontractors, are characterized as employee(s) of CITY.

    CONTRACTOR and CITY agree that: (a) CONTRACTOR is free from the control and direction of CITY in connection with the performance of the work; (b) CONTRACTOR is providing services directly to CITY; (c) CONTRACTOR has and will maintain at all

relevant times a business license; (d) CONTRACTOR maintains a business location that is separate from CITY; (e) CONTRACTOR is customarily engaged in an independently established business of the same nature as that involved in the work performed hereunder; (f) CONTRACTOR actually contracts with other businesses to provide the same or similar services and maintains a clientele without restrictions from CITY; (g) CONTRACTOR advertises and holds itself out to the public as available to provide the same or similar services; (h) CONTRACTOR provides its own tools, vehicles, and equipment to perform the services; (i) CONTRACTOR has negotiated its own rates; (j) CONTRACTOR set its own hours and location of work in accomplishing CITY's on-call needs; and (k) CONTRACTOR has the right to control the manner and means of accomplishing the result desired and exercises its own expert independent judgement.

The supplier named hereon by the acceptance of this order agrees to the provisions of this document titled "Contract Purchase Agreement" and all accompanying terms, conditions, and attachments.

Roseville Business License No. _____

Contractor License No. _____

DIR Registration No. _____

Check mark the applicable company type below:

X **Corporation**

_____ **Limited Liability Company**

_____ **Partnership**

_____ **Sole Proprietor**

City Reserves the right to withold any payments to contractor in the event of noncompliance with insurance requirements or if required by law.
General T&C
REV 3/2/21 JS

ATTACHMENT A
HUMAN RESOURCES/RISK MANAGEMENT DIVISION
INSURANCE REQUIREMENTS
AGREEMENT UNDER FORMAL BID LIMIT

General - Required Coverage:

- General Liability: $1 Million per occurrence /$2 Million aggregate
- Automobile Liability: $1 Million combined single limit
- Workers' Compensation: Statutory *Must provide a Waiver of subrogation
- Additional Insured Endorsement (AiE) - General Liability policy: CG 20 38 04 13 or an equivalent, blanket endorsement or section of the policy. Endorsement shall cover the City of Roseville, its officers, agents, employees and volunteers as additional insured.
- Policies must be primary and non-contributory
- A 30 day notice of cancellation must be provided

Additional Liability/Insurance Requirements if required by Agreement (and marked below):

Construction:____
General Liability:
$2 Million/occurrence
$4 Million aggregate

Design Professional:____
General Liability:
$2 Million/occurrence
$4 Million aggregate
Professional Liability:
$2 Million/occurrence

Professional Consultant:____
Professional Liability:
$1 Million/occurrence

IT Services:____
Professional Liability:
$1 Million/occurrence
No auto required

Special Events/Caterers-Vendors:____
No auto required
No workers' comp required

Professional Counseling/ Psychological:____
Professional Liability:
$1 Million/occurrence
No auto required

Insurance Verification
By signing the agreement included with this document, you are confirming that your company has the minimum insurance limits required above.

A copy of your insurance certificate is not required at this time. The City may request proof of insurance at any time.

Questions Regarding Insurance Requirements Contact Risk Management at (916) 774-5202

Supplier	
Signature:	
Print Name:	Jim Stommel
Title:	President

Supplier	
Signature:	
Print Name:	Jim Stommel
Title:	Secretary

City of Roseville, A Municipal Corporation	
Signature:	
Print Name:	Dominick Casey
Title:	City Manager

COUNCIL COMMUNICATION

CC #: 1754
File #: 0800-03

Title:	South Feather Water and Power Authority – Power Purchase Agreement
Contact:	Brian Schinstock 916-746-1658 bschinstock@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.4.

RECOMMENDATION TO COUNCIL

Staff recommends the City Council adopt a Resolution authorizing the City Manager to execute the 10-year Third Phase Agreement between Northern California Power Agency (NCPA) and City of Roseville (Roseville) for Roseville to participate in NCPA's Power Purchase Agreement with South Feather Water and Power Authority.

BACKGROUND

Northern California Power Agency (NCPA) solicited, on behalf of members like Roseville, a Renewable Request for Proposal (RFP) for renewable, carbon-free, and energy storage resources to comply with the California Renewable Energy Resources Act and other applicable requirements. Roseville Staff has been following and evaluating all proposals to strengthen the City's power supply to ensure adequate energy, capacity, and environmental attributes are met cost-effectively. South Feather Water and Power Authority (SFWPA) Project meet all the requirements.

SFWPA owns and operates four existing hydroelectric generating plants located east of Oroville, CA that are operating under FERC licenses; the Forbestown Powerhouse (37.5 MW), the Kelly Ridge Powerhouse (11.0 MW), the Sly Creek Powerhouse (13.0 MW), and the Woodleaf Powerhouse (60 MW).

SFWPA has agreed to sell to NCPA, and NCPA has agreed to purchase from SFWPA, acting on behalf of Roseville and other members certain energy, capacity rights, and associated environmental attributes supplied from the SFWPA project. Roseville's share will be no less than 16.46% (20 MW), and may have an option to elect to take more should some NCPA members not be able to meet NCPA Agreement timelines. Roseville's expected share of SFWPA will meet about 6% of Roseville's annual overall energy need. The energy is expected to be 20% renewable, and the remaining 80% carbon-free electricity.

The term is for 10-years and will automatically extend another 10 years (to December 31, 2041) if SFWPA does not elect to terminate prior to December 31, 2031. During the term, NCPA will

schedule and dispatch the SFWPA Project, and SFWPA will own, operate and maintain the SFWPA Project.

FISCAL IMPACT

The Agreement has fixed and variable components that average $54.80/MWh or $4,000,000 a year for a 20 MW share. Funds are available in the Fiscal Year 2021-22 Electric budget, and ongoing funds will be requested in future year budgets. The value of the energy, capacity, and environmental attributes is considered at market value. In addition, the Agreement locks in a fixed cost for energy delivered and reduces exposure to market fluctuations.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378.

The Third Phase Agreement meets the above criteria and is not subject to CEQA. No additional environmental review is required.

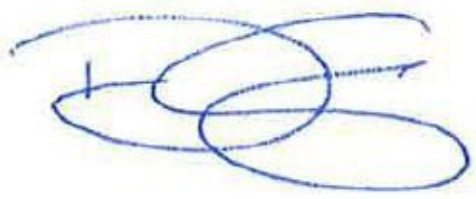
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal A - Remain fiscally responsible in a changing world

Respectfully Submitted,

Brian Schinstock, Electric Resource Planner

Michelle Bertolino, Electric Utility Director



_____
Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution 21-432

Third Phase Agreement - Roseville and NCPA

RESOLUTION NO. 21-432

RESOLUTION OF THE CITY OF ROSEVILLE
APPROVING THE THIRD PHASE AGREEMENT FOR POWER PURCHASE
AGREEMENT WITH SOUTH FEATHER WATER AND POWER AGENCY

WHEREAS, the City of Roseville has adopted or is adopting policies that are designed to increase the amount of energy that they provide to their retail customers from eligible renewable energy resources and carbon free resources to comply with the California Renewable Energy Resources Act and other applicable requirements; and

WHEREAS, South Feather Power and Water Agency (SFWPA) owns and operates four existing hydroelectric generating plants operating under FERC licenses: the Forbestown Powerhouse (37.5 MW), the Kelly Ridge Powerhouse (11.0 MW), the Sly Creek Powerhouse (13.0 MW) and the Woodleaf Powerhouse (60.0 MW) (the Facility or as otherwise referred to as the South Feather Power Project) that qualify as either eligible renewable energy resources or carbon free resources; and

WHEREAS, SFWPA has agreed to sell to the Northern California Power Agency (NCPA), and NCPA has agreed to purchase from SFWPA, acting on behalf of the City of Roseville and other participating NCPA members, certain energy, capacity rights and associated environmental attributes supplied from the South Feather Power Project pursuant to the terms and conditions set forth in the Power Purchase Agreement between South Feather Water and Power Agency and Northern California Power Agency (PPA); and

WHEREAS, the term of the PPA includes the Initial Delivery Term that will begin on the Initial Delivery Date, and will continue uninterrupted through December 31, 2031, and at the end of the Initial Delivery Term, if SFWPA does not elect to terminate the PPA, the term of the PPA will automatically extend for an additional 10 year period (the Extended Delivery Term); and

WHEREAS, during the term of the PPA, NCPA will schedule and dispatch the South Feather Power Project, and SFWPA will own, operate and maintain the South Feather Power Project; and

WHERAS, to enable NCPA to enter into the PPA on behalf of the City of Roseville and the other participating NCPA members (individually referred to as a “Participant”, and collectively referred to as the “Participants”), pursuant to the terms and conditions of the Amended and Restated Facilities Agreement, the Third Phase Agreement for Power Purchase Agreement with South Feather Water and Power Agency (Third Phase Agreement) provides all means necessary for NCPA to fulfill obligations incurred on behalf of NCPA and the Participants pursuant to the PPA, and to enable and obligate the Participants to take delivery of and pay for such electric capacity and energy and to pay NCPA for all costs it incurs for undertaking the foregoing activities; and

WHEREAS, the Third Phase Agreement specifies the rights and obligations of NCPA and the Participants regarding governance and administration of the PPA, and obligates each Participant to pay for its Project Participation Percentage share of all Project Costs,

Administrative Services Costs, scheduling coordination costs, and all other costs related to the PPA; and

WHEREAS, upon full execution of the Third Phase Agreement, NCPA will be authorized to enter into the PPA on behalf of the Participants, and such PPA shall be deemed a NCPA Project by the NCPA Commission pursuant to the Amended and Restated Facilities Agreement; and

WHEREAS, SFWPA has agreed to sell to NCPA, and NCPA has agreed to purchase from SFWPA, certain energy, capacity rights and associated environmental attributes produced by the South Feather Power Project for the purchase price set forth in Appendix A of the PPA; and

WHEREAS, NCPA proposes to enter into the PPA to acquire certain energy, capacity rights and environmental attributes produced by the South Feather Power Project on behalf of the Participants. This activity would not result in a physical change to the existing facilities and therefore, would not result in a direct or reasonably foreseeable indirect change to the physical environment. Thus, this activity is not a "project" for purposes of Section 21065 of the California Environmental Quality Act.

NOW, THEREFORE, BE IT RESOLVED, that the City Council of the City of Roseville has reviewed the Third Phase Agreement and hereby approves this Resolution authorizing the City Manager of the City of Roseville to execute the Third Phase Agreement for Power Purchase Agreement with South Feather Water and Power Agency, including the additional authority to make any non-substantive modifications to the Third Phase Agreement as recommended and approved by the Roseville City Attorney.

PASSED AND ADOPTED by the Council of the City of Roseville this____day of _____, 20_, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

THIRD PHASE AGREEMENT

FOR

POWER PURCHASE AGREEMENT

WITH

SOUTH FEATHER WATER AND POWER AGENCY

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This THIRD PHASE AGREEMENT ("this Agreement") is dated as of _____, 20__ by and among the Northern California Power Agency, a joint powers agency of the State of California ("NCPA"), and the signatories to this Agreement other than NCPA ("Participants"). NCPA and the Participants are referred to herein individually as a "Party" and collectively as the "Parties".

RECITALS

A. NCPA has heretofore been duly established as a public agency pursuant to the Joint Exercise of Powers Act of the Government Code of the State of California and, among other things, is authorized to acquire, construct, finance, and operate buildings, works, facilities, and improvements for the generation and transmission of electric capacity and energy for resale.

B. Each of the Participants is a signatory to the Joint Powers Agreement which created NCPA and therefore is a Member.

C. Each of the Participants to this Agreement have executed the Amended and Restated Facilities Agreement, dated October 1, 2014, which establishes the framework under which Project Agreements are created for the development, design, financing, construction, and operation of specific NCPA Projects.

D. The Participants desire NCPA to enter into a Power Purchase Agreement ("PPA") with South Feather Water and Power Agency ("SFWPA" or "Seller"), to purchase

electric capacity and energy produced by the Project for the benefit of the Participants' customers.

E. Each Participant is authorized by its Constitutive Documents to obtain electric capacity and energy for its present or future requirements, through contracts with NCPA or otherwise.

F. To enable NCPA to enter into the PPA on behalf of the Participants, pursuant to the terms and conditions of the Amended and Restated Facilities Agreement, NCPA and the Participants wish to enter into this Agreement to provide all means necessary for NCPA to fulfill obligations incurred on behalf of NCPA and the Participants pursuant to the PPA, and to enable and obligate the Participants to take delivery of and pay for such electric capacity and energy and to pay NCPA for all costs it incurs for undertaking the foregoing activities.

G. Upon full execution of this Agreement, NCPA will enter into the PPA on behalf of the Participants, and such PPA shall be deemed a NCPA Project by the Commission.

H. Each of the Parties intends to observe the provisions of this Agreement in good faith and shall cooperate with all other Parties in order to achieve the full benefits of joint action.

I. The Parties desire to equitably allocate costs of NCPA's provision of services under this Agreement among the Participants.

J. The Participants further desire, insofar as possible, to insulate other Members who are not Participants, from risks inherent in the services and transactions undertaken on behalf of the Participants pursuant to this Agreement.

NOW, THEREFORE, the Parties agree as follows:

Section 1. Definitions.

1.1 Definitions. Whenever used in this Agreement (including the Recitals hereto), the following terms shall have the following respective meanings, provided, capitalized terms used in this Agreement (including the Recitals hereto) that are not defined in Section 1 of this Agreement shall have the meaning indicated in Section 1 of the Power Management and Administrative Services Agreement, dated October 1, 2014:

1.1.1 "Administrative Services Costs" means that portion of the NCPA administrative, general and occupancy costs and expenses, including those costs and expenses associated with the operations, direction and supervision of the general affairs and activities of NCPA, general management, treasury operations, accounting, budgeting, payroll, human resources, information technology, facilities management, salaries and wages (including retirement benefits) of employees, facility operation and maintenance costs, taxes and payments in lieu of taxes (if any), insurance premiums, fees for legal, engineering, financial and other services, power management services, general settlement and billing services and general risk management costs, that are charged directly or apportioned to the provision of services under this Agreement.

Administrative Services Costs as separately defined herein and used in the context of this Agreement is different and distinct from the term Administrative Services Costs as defined in Section 1 of the Power Management and Administrative Services Agreement.

1.1.2 "Agreement" means this Third Phase Agreement, including all Exhibits attached hereto.

1.1.3 "CAISO" means the California Independent System Operator Corporation, or its functional successor.

1.1.4 "CAISO Tariff" means the duly authorized tariff, rules, protocols and other requirements of the ISO, as amended from time to time.

1.1.5 "Capacity Attributes" means any and all current or future defined characteristics consistent with the operational limitations of the Project, certificates, tags, credits, ancillary service attributes, or accounting constructs, howsoever entitled, including Resource Adequacy Benefits, Flexible Capacity Benefits, and any tracking or accounting associated with the foregoing, intended to value any aspect of the capacity of the Project to produce Energy or ancillary services, attributed to or associated with the Project.

1.1.6 "Constitutive Documents" means, with respect to NCPA, the Joint Powers Agreement and any resolutions or bylaws adopted thereunder with respect to the governance of NCPA, and with respect to each Participant, the California

Government Code and other statutory provisions applicable to such Participant, any applicable agreements, charters, contracts, or other documents concerning the formation, operation or decision making of such Participant, including, if applicable, its city charter, and any codes, ordinances, bylaws, and resolutions adopted by such Participant's governing body.

1.1.7 "Defaulting Participant" has the meaning set forth in Section 7.2.

1.1.8 "Energy" means electric energy expressed in units of kWh or MWh.

1.1.9 "Environmental Attributes" means any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to the generation from the Project, as the case may be, and its displacement of conventional energy generation. Environmental Attributes include: (i) any avoided emissions of pollutants to the air, soil or water such as sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO) and other pollutants; (ii) any avoided emissions of carbon dioxide (CO2), methane (CH4) and other greenhouse gases that have been determined by the United Nations Intergovernmental Panel on Climate Change to contribute to the actual or potential threat of altering the Earth's climate by trapping heat in the atmosphere; and (iii) the reporting rights to these avoided emissions such as, but not limited to, a REC.

Environmental Attributes do not include: (i) any Energy, capacity, reliability, or other power attributes from the Project; (ii) production tax credits associated with the construction or operation of the Project, and other financial incentives in the form of credits, reductions, or allowances associated with the Project that are applicable to a state or federal income taxation obligation (iii) fuel-related subsidies or "tipping fees" that may be paid to Seller to accept certain fuels, or local subsidies received by Seller or the owners of the site for the destruction of particular pre-existing pollutants or the promotion of local environmental benefits; or (iv) emission reduction credits encumbered or used by the Project for compliance with local, state, or federal operating and/or air quality permits.

1.1.10 "Event of Default" has the meaning set forth in Section 7.2.

1.1.11 "Flexible Capacity" has the meaning set forth in the CAISO Tariff.

1.1.12 "Flexible Capacity Benefits" means the rights and privileges attached to any generating resource that satisfy any entity's Flexible Capacity requirement.

1.1.13 "General Operating Reserve" means the NCPA General Operating Reserve created through resolution of the Commission, as the same may be amended from time to time.

1.1.14 "KWh" means kilowatt hour.

1.1.15 "MW" means megawatt.

1.1.16 "MWh" means megawatt hour.

1.1.17 "NCPA" has the meaning set forth in the recitals hereto.

1.1.18 "Participant" has the meaning set forth in the recitals of this Agreement.

1.1.19 "Power Management and Administrative Services Agreement" means the NCPA Power Management and Administrative Services Agreement, dated as of October 1, 2014 between NCPA and the Members who are signatories to that agreement by which NCPA provides Power Management and Administrative Services.

1.1.20 "Product" means Energy, Capacity Attributes, Environmental Attributes and ancillary products, services or attributes similar to the foregoing that are delivered to the Participants pursuant to the PPA.

1.1.21 "Project" or "PPA" means the Power Purchase Agreement, dated as of _____, 20__ between NCPA and Seller, under which NCPA, on behalf of the Participants, purchases Product from the South Feather Power Project located in Butte County, California, consisting of four existing hydroelectric generating plants under FERC licenses: the Forbestown Powerhouse, the Kelly Ridge Powerhouse, the Sly Creek Powerhouse, and the Woodleaf Powerhouse. Upon final execution of the PPA, the Project shall be deemed a NCPA Project in accordance with the Amended and Restated Facilities Agreement. The PPA has been attached to this Agreement as Exhibit B.

1.1.22 "Project Costs" means all costs charged to and paid by NCPA pursuant to the PPA.

1.1.23 "Party" or "Parties" has the meaning set forth in the preamble hereto; provided that "Third Parties" are entities that are not Party to this Agreement.

1.1.24 "REC" or "Renewable Energy Certificate" means a certificate of renewable energy generation from units that register in the WREGIS system, or other commonly accepted renewable energy generation tracking system or program, which can be used to verify compliance with state and provincial requirements such as RPS.

1.1.25 "Resource Adequacy" means the procurement obligation of load serving entities, including the Participants, as such obligations are described in CPUC Decisions D.04-10-035 and D.05-10-042, and subsequent CPUC decisions addressing Resource Adequacy issues, as those obligations may be altered from time to time in the CPUC Resource Adequacy Rulemakings (R.) 04-04-003 and (R.) 05-12-013 or by any successor proceeding, and all other Resource Adequacy obligations established by any other entity, including the CAISO.

1.1.26 "Resource Adequacy Benefits" means the rights and privileges attached to any generating resource that satisfy any entity's Resource Adequacy obligations.

1.1.27 "Revenue" means , with respect to each Participant, all income, rents, rates, fees, charges, and other moneys derived by the Participant from the

ownership or operation of its Electric System, including, without limiting the generality of the foregoing: (a) all income, rents, rates, fees, charges or other moneys derived from the sale, furnishing and supplying of electric capacity and energy and other services, facilities, and commodities sold, furnished, or supplied through the facilities of its Electric System; (b) the earnings on and income derived from the investment of such income, rents, rates, fees, charges or other moneys to the extent that the use of such earnings and income is limited by or pursuant to law to its Electric System; (c) the proceeds derived by the Participant directly or indirectly from the sale, lease or other disposition of all or a part of the Electric System; and (d) the proceeds derived by Participant directly or indirectly from the consignment and sale of freely allocated greenhouse gas compliance instruments into periodic auctions administered by the State of California under the California Cap-and-Trade Program, provided that such proceeds are a permitted use of auction proceeds, but the term Revenues shall not include (i) customers' deposits or any other deposits subject to refund until such deposits have become the property of the Participant or (ii) contributions from customers for the payment of costs of construction of facilities to serve them.

1.1.28 "RPS" or "Renewable Portfolio Standard Program" means the State of California Renewable Portfolio Standard Program, as codified at California Public Utilities Code Section 399.11, *et seq.*

1.1.29 "Scheduling Protocols" means the applicable provisions of the Amended and Restated Scheduling Coordination Program Agreement, and any other contractual or other arrangements between NCPA and the Participants concerning the scheduling, delivery and metering of the PPA.

1.1.30 "Security Deposit" means the account established by NCPA and funded by the Participants in accordance with Section 5, the funds of which are available for use by NCPA in accordance with the terms and conditions hereof.

1.1.31 "Seller" means South Feather Water and Power Agency, as set forth in recital D of this Agreement, or as otherwise set forth in the PPA.

1.1.32 "Term" has the meaning set forth in Section 10.

1.1.33 "Third Party" means an entity (including a Member) that is not Party to this Agreement

1.1.34 "WREGIS" means Western Renewable Energy Generation Information System, or its functional successor.

1.2 Rules of Interpretation. As used in this Agreement (including the Recitals hereto), unless in any such case the context requires otherwise: The terms "herein," "hereto," "herewith" and "hereof" are references to this Agreement taken as a whole and not to any particular provision; the term "include," "includes" or "including" shall mean "including, for example and without limitation;" and references to a "Section," "subsection," "clause," "Appendix", "Schedule", or "Exhibit" shall mean a Section,

subsection, clause, Appendix, Schedule or Exhibit of this Agreement, as the case may be. All references to a given agreement, instrument, tariff or other document, or law, regulation or ordinance shall be a reference to that agreement, instrument, tariff or other document, or law, regulation or ordinance as such now exists and as may be amended from time to time, or its successor. A reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having a separate legal personality and includes its successors and permitted assigns. A reference to a "day" shall mean a Calendar Day unless otherwise specified. The singular shall include the plural and the masculine shall include the feminine, and *vice versa*.

Section 2. **Purpose.** The purpose of this Agreement is to: (i) set forth the terms and conditions under which NCPA shall enter into the PPA on behalf of the Participants, (ii) authorize NCPA, acting on behalf of the Participants, to engage in all activities related to that basic purpose, and (iii) specify the rights and obligations of NCPA and the Participants with respect to the PPA.

Section 3. **Sale and Purchase of Product.** By executing this Agreement, each Participant acknowledges and agrees to be bound by the terms and conditions of the Agreement, and that the Agreement is written as a "take-or-pay" agreement. Any Product delivered to NCPA under the PPA shall be delivered to each Participant in proportion to such Participant's Project Participation Percentage as set forth in Exhibit A, and each

Participant shall accept and pay for its respective percentage of such Product. To the extent a Participant is unable to accept such deliveries in full, NCPA shall dispose of such surplus in its sole discretion, in such a manner to attempt to maximize Participant value and that Participant shall reimburse to NCPA any costs incurred by NCPA in doing so. Notwithstanding the above, NCPA may allocate Product procured through the PPA among the Participants in such percentages as NCPA may, in its reasonable discretion, determine are necessary, desirable, or appropriate, in order to accommodate Participant transfer rights pursuant to Section 9.

3.1 Scheduling. Product delivered from Seller shall be scheduled for and to the Participants in accordance with Scheduling Protocols, and the terms and conditions of the PPA.

Section 4. Billing and Payments

4.1 Participant Payment Obligations. Each Participant agrees to pay to NCPA each month its respective portion of the Project Costs, Administrative Services Costs, scheduling coordination costs, and all other costs for services provided in accordance with this Agreement and the Amended and Restated Facilities Agreement. In addition to the aforementioned monthly payment obligations, each Participant is obligated to fund: (i) any and all required Security Deposits calculated in accordance with Section 5, and (ii) any working capital requirements for the Project maintained by NCPA as determined, collected and set forth in the Annual Budget.

4.2 Invoices. NCPA will issue an invoice to each Participant for its share of Project Costs, Administrative Services Costs, scheduling coordination costs, and all other costs for services provided in accordance with this Agreement and the Amended and Restated Facilities Agreement. Such invoice may be either the All Resources Bill or separate special invoice, as determined by NCPA. At NCPA's discretion, invoices may be issued to Participants using electronic media or physical distribution.

4.3 Payment of Invoices. All invoices delivered by NCPA (including the All Resources Bill) are due and payable thirty (30) Calendar Days after the date thereof; provided, however, that any amount due on a day other than a Business Day may be paid on the following Business Day.

4.4 Late Payments. Any amount due and not paid by a Participant in accordance with Section 4.3 shall be considered late and bear interest computed on a daily basis until paid at the lesser of (i) the per annum prime rate (or reference rate) of the Bank of America NT&SA then in effect, plus two percent (2%) or (ii) the maximum rate permitted by law.

4.5 Billing Disputes. A Participant may dispute the accuracy of any invoice issued by NCPA under this Agreement by submitting a written dispute to NCPA, within thirty (30) Calendar Days after the date of such invoice; nonetheless the Participant shall pay the full amount billed when due. If a Participant does not timely question or dispute the accuracy of any invoice in writing, then the invoice shall be deemed to be correct. Upon review of a submitted dispute, if an invoice is determined by NCPA to be incorrect,

then NCPA shall issue a corrected invoice and refund any amounts that may be due to the Participant. If NCPA and the Participant fail to agree on the accuracy of an invoice within thirty (30) Calendar Days after the Participant has disputed it, then the General Manager shall promptly submit the dispute to the Commission for resolution. If the Commission and the Participant fail to agree on the accuracy of a disputed invoice within sixty (60) Calendar Days after its submission to the Commission, then the dispute may then be resolved under the mediation and arbitration procedures set forth in Section 12 of this Agreement; provided, however, that prior to resorting to either mediation or arbitration proceedings, the full amount of the disputed invoice must be paid by the Participant.

4.6 Billing/Settlement Data and Examination of Books and Records.

4.6.1 Settlement Data. NCPA shall make billing and settlement data available to the Participants in the All Resources Bill, or other invoice, or upon request. NCPA may also, at its sole discretion, make billing and settlement support information available to Participants using electronic media (e.g. electronic data portal). Procedures and formats for the provision of such electronic data submission may be established by the Commission from time to time. Without limiting the generality of the foregoing, NCPA may, in its reasonable discretion, require the Participants to execute a non-disclosure agreement prior to providing access to the NCPA electronic data portal.

4.6.2 Examination of Books and Records. Any Participant to this Agreement shall have the right to examine the books and records created and maintained by NCPA pursuant to this Agreement at any reasonable, mutually agreed upon time.

Section 5. Security Deposit Administration

5.1 Security Deposit Requirements. Each Participant agrees that any funds deposited at NCPA to satisfy Participant's Security Deposit requirements pursuant to this Agreement shall be irrevocably committed and held by NCPA in the General Operating Reserve, and that such funds may be used by NCPA in accordance with Section 5.1.3. Each Participant's Security Deposit will be accounted separately from and in addition to any other security accounts or deposits maintained pursuant to any other agreement between NCPA and the Participant, or any other such security account or deposits required of Members. In connection with fulfilling the Security Deposit requirements of this Agreement, Participant may elect to use its uncommitted funds held in the General Operating Reserve to satisfy in whole or in part its Security Deposit required under Section 5. If Participant chooses to satisfy in whole or in part its security requirements using its uncommitted funds held in the General Operating Reserve, then Participant is required to execute and deliver to NCPA an Irrevocable Letter of Direction, directing NCPA to utilize Participant's uncommitted General Operating Reserve funds for such

purposes, and the designated funds will thereafter be irrevocably committed and held by NCPA to satisfy the requirements of this Agreement.

5.1.1 Initial Amounts. Each Participant shall insure that sufficient Security Deposit funds have been deposited with and are held by NCPA equal to the highest three (3) months of estimated Project Costs, as estimated by NCPA. Such Security Deposit requirement may be satisfied by Participant in whole or part either in cash, through irrevocable commitment of its uncommitted funds held in the General Operating Reserve in accordance with Section 5.1, or through a clean, irrevocable letter of credit satisfactory to NCPA's General Manager.

5.1.2 Subsequent Deposits. Periodically, and at least quarterly, NCPA shall review and revise its estimate of Project Costs for which Participant shall be obligated to pay under this Agreement. Following such review, NCPA shall determine whether each Participant has a sufficient Security Deposit balance at NCPA. To the extent that any Participant's Security Deposit balance is greater than one hundred and ten percent (110%) of the amount required herein, NCPA shall credit such amount as soon as practicable to the Participant's next following All Resources Bill, or by separate special invoice. To the extent that any Participant's Security Deposit balance is less than ninety percent (90%) of the amount required herein, NCPA shall add such amount as soon as practicable to such Participant's next All Resources Bill, or as necessary, to a special invoice to be paid by Participant upon receipt. Credits or additions shall not be

made to Participants who satisfy these Security Deposit requirements in whole through the use of a letter of credit; provided, that the amount of the letter of credit shall be adjusted, as required from time to time, in a like manner to assure an amount equal to the highest three (3) months of estimated Project Costs is available to NCPA.

5.1.3 Use of Security Deposit Funds. NCPA may use any and all Security Deposit funds held by NCPA (or utilize a letter of credit provided in lieu thereof) to pay any costs it incurs hereunder, including making payments to Seller, without regard to any individual Participant's Security Deposit balance or proportionate share of Project Costs, and irrespective of whether NCPA has issued an All Resources Bill or special invoice for such costs to the Participants or whether a Participant has made timely payments of All Resources Bills or special invoices. Should Participant have satisfied its Security Deposit requirements in whole or part through a letter of credit, NCPA may draw on such letter of credit to satisfy Participant's obligations hereunder at NCPA's sole discretion. Notwithstanding the foregoing, if any Participant fails to pay any costs incurred by NCPA pursuant to this Agreement, NCPA shall first use that non-paying Participant's Security Deposit and shall not use any other Participants' Security Deposit until such non-paying Participant's Security Deposit has been exhausted.

5.1.4 Accounting. If Security Deposit funds or a letter of credit are used by NCPA to pay any costs it incurs hereunder as described in Section 5.1.3, then NCPA

will maintain a detailed accounting of each Participant's shares of funds withdrawn, and upon the collection of all or a part of such withdrawn funds, NCPA will credit back to each non-defaulting Participant the funds collected in proportion to such non-defaulting Participant's share of funds initially withdrawn.

5.1.5 Emergency Additions. In the event that funds are withdrawn pursuant to Section 5.1.3, or if the Security Deposit held by NCPA is otherwise insufficient to allow for NCPA to pay any invoice, demand, request for further assurances by Seller, or claims, NCPA shall notify all Participants of the deficiency. In conjunction with such notice, NCPA shall send a special or emergency assessment invoice to the Participant or Participants that caused or are otherwise responsible for the deficiency. Each Participant of such an invoice shall pay to NCPA such assessment when and if assessed by NCPA within two (2) Business Days of the invoice date of the assessment, or shall consent to and direct NCPA to draw on any existing letter of credit Participant has established for such purposes. In the event that the Participant or Participants that caused or are otherwise responsible for the deficiency cannot, does not or will not pay to NCPA the special or emergency assessment within two (2) Business Days after the invoice date, NCPA shall immediately submit a special or emergency invoice to all remaining Participants, and such remaining Participants shall pay to NCPA such assessment within two (2) Business Days after the invoice date of

the assessment, or shall consent to and direct NCPA to draw on any existing letter of credit that Participant has established for such purposes.

5.1.6 Security Deposit Interest. NCPA shall maintain a detailed accounting of each Participant's Security Deposits, and withdrawals of such funds, held by NCPA. Security Deposits held by NCPA shall be invested by NCPA in accordance with the General Operating Reserve policies and investment policies adopted by the NCPA Commission. Interest earned on the Security Deposit funds shall be proportionately credited to the Participants in accordance with their weighted average balances held therein. Any Security Deposit losses caused by early termination of investments shall be allocated among the Participants in accordance with the General Operating Reserve provisions and guidelines approved by the Commission, as the same may be amended from time to time; provided, however, to the extent that either the General Operating Reserve provisions and guidelines do not apply or the Security Deposit is not adequate to cover the losses, then such losses shall be allocated among the Participants in accordance with their proportionate Security Deposit balances.

5.1.7 Return of Funds. Upon termination or a permitted withdrawal of a Participant in accordance with this Agreement, the affected Participant may apply to NCPA for the return of their share of Security Deposit funds ninety (90) days after the effective date of such termination or withdrawal. However, NCPA shall, in its sole but

reasonable discretion, as determined by the NCPA General Manager, estimate the then outstanding liabilities of the Participant, including any estimated contingent liabilities and shall retain all such funds, if any, until all such liabilities have been fully paid or otherwise satisfied in full. After all such liabilities have been satisfied in full, as determined by NCPA's General Manager, any remaining balance of the Participant's share of the Security Deposit will be refunded to the Participant within sixty (60) days thereafter.

Section 6. **Cooperation and Further Assurances.** Each of the Parties agree to provide such information, execute and deliver any instruments and documents and to take such other actions as may be necessary or reasonably requested by any other Party which are consistent with the provisions of this Agreement and which do not involve the assumption of obligations other than those provided for in this Agreement, in order to give full effect to this Agreement and to carry out the intent of this Agreement. The Parties agree to cooperate and act in good faith in connection with obtaining any credit support required in order to satisfy the requirements of this Agreement.

Section 7. **Participant Covenants and Defaults**

7.1 Each Participant covenants and agrees: (i) to make payments to NCPA, from its Electric System Revenues, of its obligations under this Agreement as an operating expense of its Electric System; (ii) to fix the rates and charges for services provided by its Electric System, so that it will at all times have sufficient Revenues to meet the obligations

of this Agreement, including the payment obligations; (iii) to make all such payments due NCPA under this Agreement whether or not there is an interruption in, interference with, or reduction or suspension of services provided under this Agreement, such payments not being subject to any reduction, whether by offset or otherwise, and regardless of whether any reasonable dispute exists; and (iv) to operate its Electric System, and the business in connection therewith, in accordance with Good Utility Practices.

7.2 Events of Default. An Event of Default under this Agreement shall exist upon the occurrence of any one or more of the following by a Participant (the "Defaulting Participant"):

(i) the failure of any Participant to make any payment in full to NCPA when due;

(ii) the failure of a Participant to perform any covenant or obligation of this Agreement where such failure is not cured within thirty (30) Calendar Days following receipt of a notice from NCPA demanding cure; provided, that this subsection shall not apply to any failure to make payments specified by subsection 7.2 (i));

(iii) if any representation or warranty of a Participant material to the services provided hereunder shall prove to have been incorrect in any material respect when made and the Participant does not cure the facts underlying such incorrect representation or warranty so that the representation or warranty becomes true and correct within thirty (30) Calendar Days after the date of receipt of notice from NCPA demanding cure; or

(iv) if a Participant is in default or in breach of any of its covenants or obligations under any other agreement with NCPA and such default or breach is not cured within the time periods specified in such agreement.

7.3 Uncontrollable Forces. A Party shall not be considered to be in default in respect of any obligation hereunder if prevented from fulfilling such obligation by reason of Uncontrollable Forces; provided, that in order to be relieved of an Event of Default due to Uncontrollable Forces, a Party affected by an Uncontrollable Force shall:

(i) first provide oral notice to the General Manager using telephone communication within two (2) Business Days after the onset of the Uncontrollable Force, and provide subsequent written notice to the General Manager and all other Parties within ten (10) Business Days after the onset of the Uncontrollable Force, describing its nature and extent, the obligations which the Party is unable to fulfill, the anticipated duration of the Uncontrollable Force, and the actions which the Party will undertake so as to remove such disability and be able to fulfill its obligations hereunder; and

(ii) use due diligence to place itself in a position to fulfill its obligations hereunder and if unable to fulfill any obligation by reason of an Uncontrollable Force such Party shall exercise due diligence to remove such disability with reasonable dispatch; provided, that nothing in this subsection shall require a Party to settle or compromise a labor dispute.

7.4 Cure of an Event of Default. An Event of Default shall be deemed cured only if such default shall be remedied or cured within the time periods specified in Section 7.2 above, as may be applicable, provided, however, upon request of the Defaulting Participant the Commission may waive the default at its sole discretion, where such waiver shall not be unreasonably withheld.

7.5 Remedies in the Event of Uncured Default. Upon the occurrence of an Event of Default which is not cured within the time limits specified in Section 7.2, without limiting other rights or remedies available under this Agreement, at law or in equity, and without constituting or resulting in a waiver, release or estoppel of any right, action or cause of action NCPA may have against the Defaulting Participant, NCPA may take any or all of the following actions:

(i) suspend the provision of services under this Agreement to such Defaulting Participant; or

(ii) demand that the Defaulting Participant provide further assurances to guarantee the correction of the default, including the collection of a surcharge or increase in electric rates, or such other actions as may be necessary to produce necessary Revenues to correct the default.

7.6 Effect of Suspension.

7.6.1 Generally. The suspension of this Agreement will not terminate, waive, or otherwise discharge any ongoing or undischarged liabilities, credits or

obligations arising from this Agreement until such liabilities, credits or obligations are satisfied in full.

7.6.2 Suspension. If performance of all or any portion of this Agreement is suspended by NCPA with respect to a Participant in accordance with subsection 7.5(i), then such Participant shall pay any and all costs incurred by NCPA as a result of such suspension including reasonable attorney's fees, the fees and expenses of other experts, including auditors and accountants, or other reasonable and necessary costs associated with such suspension and any portion of the Project Costs, scheduling and dispatch costs, and Administrative Services Costs that were not recovered from such Participant as a result of such suspension.

Section 8. Administration of Agreement

8.1 Commission. The Commission is responsible for the administration of this Agreement. Each Participant shall be represented by its Commissioner or their designated alternate Commissioner ("Alternate") pursuant to the Joint Powers Agreement. Each Commissioner shall have authority to act for the Participant represented with respect to matters pertaining to this Agreement.

8.2 Forum. Whenever any action anticipated by this Agreement is required to be jointly taken by the Participants, such action shall be taken at regular or special meetings of the NCPA Commission.

8.3 Quorum. For purposes of acting upon matters that relate to administration of this Agreement, a quorum of the Participants shall consist of those Commissioners, or their designated Alternate, representing a numerical majority of the Participants.

8.4 Voting. Each Participant shall have the right to cast one vote with respect to matters pertaining to this Agreement. A unanimous vote of all Participants shall be required for action regarding: (i) any transfer of rights to a Third Party as described in Section 9 of this Agreement; and (ii) for matters related to any of the following actions as provided for in the PPA: (a) exercising any early termination provisions as set forth in Section 2.4 of the PPA, and (b) exercising any assignment rights as set forth in Section 12.7 of the PPA. For all other matters pertaining to this Agreement, a majority vote of the Participants shall be required for action.

Section 9. Transfer of Rights by Participants

9.1 A Participant has the right to make transfers, sales, assignments and exchanges (collectively "transfers(s)") of any portion of its Project Participation Percentage and rights thereto, subject to the approval provisions in Section 8.4 of this Agreement, provided that the transferee satisfies all applicable criterion in the PPA. If a Participant desires to transfer a portion or its entire share of the Project for a specific time interval, or permanently, then NCPA will, if requested by such Participant, use its best efforts to transfer that portion of the Participant's share of the Project.

9.2 Before a Participant may transfer an excess Project share pursuant to Section 9.1 to any person or entity other than a Participant, it shall give all other Participants the right to purchase the share on the same terms and conditions. Before a Participant may transfer an excess Project share pursuant to section 9.1 to any person or entity other than a Member, it shall give all Members the right to purchase the share on the same terms and conditions. Such right shall be exercised within thirty (30) days of receipt of notice of said right.

No transfer shall relieve a Participant of any of its obligations under this Agreement except to the extent that NCPA receives payment of these obligations from a transferee.

Section 10. **Term and Termination.** This Agreement shall become effective when it has been duly executed by all Participants, and delivered to and executed by NCPA (the "Effective Date"). NCPA shall notify all Participants in writing of the Effective Date. The Term of this Agreement shall be coterminous with the PPA, and shall commence on the Effective Date, and shall continue through the term of the PPA.

Section 11. **Withdrawal of Participants.** No Participant may withdraw from this Agreement except as otherwise provided for herein.

Section 12. **Settlement of Disputes and Arbitration.** The Parties agree to make best efforts to settle all disputes among themselves connected with this Agreement as a matter of normal business under this Agreement. The procedures set forth in Section 10 of the

Power Management and Administrative Services Agreement shall apply to all disputes that cannot be settled by the Participants themselves; provided, that the provisions of Section 4.5 shall first apply to all disputes involving invoices prepared by NCPA.

Section 13. Miscellaneous

13.1 Confidentiality. The Parties will keep confidential all confidential or trade secret information made available to them in connection with this Agreement, to the extent possible, consistent with applicable laws, including the California Public Records Act. Confidential or trade secret information shall be marked or expressly identified as such.

If a Party ("Receiving Party") receives a request from a Third Party for access to, or inspection, disclosure or copying of, any other Party's (the "Supplying Party") confidential data or information, which the Receiving Party has possession of ("Disclosure Request"), then the Receiving Party shall provide notice and a copy of the Disclosure Request to the Supplying Party within three (3) Business Days after receipt of the Disclosure Request. Within three (3) Business Days after receipt of such notice, the Supplying Party shall provide notice to the Receiving Party either:

(i) that the Supplying Party believes there are reasonable legal grounds for denying or objecting to the Disclosure Request, and the Supplying Party requests the Receiving Party to deny or object to the Disclosure Request with respect to identified confidential information. In such case, the Receiving Party shall deny the Disclosure Request and the Supplying Party shall defend the denial of the Disclosure Request at its

sole cost, and it shall indemnify the Receiving Party for all costs associated with denying or objecting to the Disclosure Request. Such indemnification by the Supplying Party of the Receiving Party shall include all of the Receiving Party's costs reasonably incurred with respect to denial of or objection to the Disclosure Request, including but not limited to costs, penalties, and the Receiving Party's attorney's fees; or

(ii) that the Receiving Party may grant the Disclosure Request without any liability by the Receiving Party to the Supplying Party.

13.2 Indemnification and Hold Harmless. Subject to the provisions of Section 13.4, each Participant agrees to indemnify, defend and hold harmless NCPA and its Members, including their respective governing boards, officials, officers, agents, and employees, from and against any and all claims, suits, losses, costs, damages, expenses and liability of any kind or nature, including reasonable attorneys' fees and the costs of litigation, including experts, to the extent caused by any acts, omissions, breach of contract, negligence (active or passive), gross negligence, recklessness, or willful misconduct of that Participant, its governing officials, officers, employees, subcontractors or agents, to the maximum extent permitted by law.

13.3 Several Liabilities. No Participant shall, in the first instance, be liable under this Agreement for the obligations of any other Participant or for the obligations of NCPA incurred on behalf of other Participants. Each Participant shall be solely responsible and liable for performance of its obligations under this Agreement, except as otherwise

provided for herein. The obligation of each Participant under this Agreement is, in the first instance, a several obligation and not a joint obligation with those of the other Participants.

Notwithstanding the foregoing, the Participants acknowledge that any debts or obligations incurred by NCPA under this Agreement on behalf of any of them shall be borne solely by such Participants in proportion to their respective Project Participation Percentages, and not by non-Participant Members of NCPA, pursuant to Article IV, Section 3(b) of the Joint Powers Agreement.

In the event that a Participant should fail to pay its share of the debts or obligations incurred by NCPA as required by this Agreement, the remaining Participants shall, in proportion to their Project Participation Percentages, pay such unpaid amounts and shall be reimbursed by the Participant failing to make such payments.

13.4 No Consequential Damages. FOR ANY BREACH OF ANY PROVISION OF THIS AGREEMENT FOR WHICH AN EXPRESS REMEDY OR MEASURE OF DAMAGES IS PROVIDED IN THIS AGREEMENT, THE LIABILITY OF THE DEFAULTING PARTY SHALL BE LIMITED AS SET FORTH IN SUCH PROVISION, AND ALL OTHER DAMAGES OR REMEDIES ARE HEREBY WAIVED. IF NO REMEDY OR MEASURE OF DAMAGE IS EXPRESSLY PROVIDED, THE LIABILITY OF THE DEFAULTING PARTY SHALL BE LIMITED TO ACTUAL DAMAGES ONLY AND ALL OTHER DAMAGES AND REMEDIES ARE HEREBY WAIVED. IN NO EVENT SHALL NCPA OR ANY

PARTICIPANT OR THEIR RESPECTIVE SUCCESSORS, ASSIGNS, REPRESENTATIVES, DIRECTORS, OFFICERS, AGENTS, OR EMPLOYEES BE LIABLE FOR ANY LOST PROFITS, CONSEQUENTIAL, SPECIAL, EXEMPLARY, INDIRECT, PUNITIVE, OR INCIDENTAL LOSSES OR DAMAGES, INCLUDING LOSS OF USE, LOSS OF GOODWILL, LOST REVENUES, LOSS OF PROFIT OR LOSS OF CONTRACTS EVEN IF SUCH PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND NCPA AND EACH PARTICIPANT EACH HEREBY WAIVES SUCH CLAIMS AND RELEASES EACH OTHER AND EACH OF SUCH PERSONS FROM ANY SUCH LIABILITY.

The Parties acknowledge that California Civil Code section 1542 provides that: "A general release does not extend to claims which the creditor does not know or suspect to exist in his or her favor at the time of executing the release, which if known by him or her must have materially affected his or her settlement with the debtor." The Parties waive the provisions of section 1542, or other similar provisions of law, and intend that the waiver and release provided by this Section of this Agreement shall be fully enforceable despite its reference to future or unknown claims.

13.5 Waiver. No waiver of the performance by a Party of any obligation under this Agreement with respect to any default or any other matter arising in connection with this Agreement shall be effective unless given by the Commission or the governing body of a Participant, as applicable. Any such waiver by the Commission in any particular

instance shall not be deemed a waiver with respect to any subsequent performance, default or matter.

13.6 Amendments. Except where this Agreement specifically provides otherwise, this Agreement may be amended only by written instrument executed by the Parties with the same formality as this Agreement.

13.7 Assignment of Agreement.

13.7.1 Binding Upon Successors. This Agreement shall inure to the benefit of and shall be binding upon the respective successors and assignees of the Parties to this Agreement.

13.7.2 No Assignment. Neither this Agreement, nor any interest herein, shall be transferred or assigned by a Party hereto except with the consent in writing of the other Parties hereto, which consent shall not be unreasonably withheld.

13.8 Severability. In the event that any of the terms, covenants or conditions of this Agreement or the application of any such term, covenant or condition, shall be held invalid as to any person or circumstance by any court having jurisdiction, all other terms, covenants or conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect unless the court holds that such provisions are not severable from all other provisions of this Agreement.

13.9 Governing Law. This Agreement shall be interpreted, governed by, and construed under the laws of the State of California.

13.10 Headings. All indices, titles, subject headings, section titles and similar items are provided for the purpose of convenience and are not intended to be inclusive, definitive, or affect the meaning of the contents of this Agreement or the scope thereof.

13.11 Notices. Any notice, demand or request required or authorized by this Agreement to be given to any Party shall be in writing, and shall either be personally delivered to a Participant's Commissioner or Alternate, and to the General Manager, or shall be transmitted to the Participant and the General Manager at the addresses shown on the signature pages hereof. The designation of such addresses may be changed at any time by written notice given to the General Manager who shall thereupon give written notice of such change to each Participant. All such notices shall be deemed delivered when personally delivered, two (2) Business Days after deposit in the United States mail first class postage prepaid, or on the first Business Day following delivery through electronic communication.

13.12 Warranty of Authority. Each Party represents and warrants that it has been duly authorized by all requisite approval and action to execute and deliver this Agreement and that this Agreement is a binding, legal, and valid agreement enforceable in accordance with its terms. Upon execution of this Agreement, each Participant shall deliver to NCPA a resolution of the governing body of such Participant evidencing approval of and authority to enter into this Agreement.

13.13 Counterparts. This Agreement may be executed in any number of counterparts, and each executed counterpart shall have the same force and effect as an original instrument and as if all the signatories to all of the counterparts had signed the same instrument. Any signature page of this Agreement may be detached from any counterpart of this Agreement without impairing the legal effect of any signatures thereon, and may be attached to another counterpart of this Agreement identical in form hereto but having attached to it one or more signature pages.

13.14 Venue. In the event that a Party brings any action under this Agreement, the Parties agree that trial of such action shall be vested exclusively in the state courts of California in the County of Placer or in the United States District Court for the Eastern District of California.

13.15 Attorneys' Fees. If a Party to this Agreement brings any action, including an action for declaratory relief, to enforce or interpret the provisions of this Agreement, then each Party shall bear its own fees and costs, including attorneys' fees, associated with the action.

13.16 Counsel Representation. Pursuant to the provisions of California Civil Code Section 1717 (a), each of the Parties were represented by counsel in the negotiation and execution of this Agreement and no one Party is the author of this Agreement or any of its subparts. Those terms of this Agreement which dictate the responsibility for bearing any attorney's fees incurred in arbitration, litigation or settlement in a manner inconsistent

with the provisions of Section 13.2 were intentionally so drafted by the Parties, and any ambiguities in this Agreement shall not be interpreted for or against a Party by reason of that Party being the author of the provision.

13.17 No Third Party Beneficiaries. Nothing contained in this Agreement is intended by the Parties, nor shall any provision of this Agreement be deemed or construed by the Parties, by any third person or any Third Parties, to be for the benefit of any Third Party, nor shall any Third Party have any right to enforce any provision of this Agreement or be entitled to damages for any breach by the Parties of any of the provisions of this Agreement.

IN WITNESS WHEREOF, NCPA and each Participant have, by the signature of its duly authorized representative shown below, executed and delivered a counterpart of this Agreement.

NORTHERN CALIFORNIA POWER AGENCY 651 Commerce Drive Roseville, CA 95678	CITY OF HEALDSBURG 401 Grove Street Healdsburg, CA 95448
_____	_____
By:_____	By:_____
Title: _____	Title: _____
Date:_____	Date:_____
Approved as to form:	Approved as to form:
_____	_____
By:_____	By:_____
Its: General Counsel	Its: City Attorney
Date: _____	Date:_____
Attestation (if applicable):	Attestation (if applicable):
_____	_____
By:_____	By:_____
Its:_____	Its:_____
Date: _____	Date: _____

CITY OF LODI
221 W. Pine Street
Lodi, CA 95240

_____

By:_____
Title: _____
Date: _____

Approved as to form:

_____

By:_____
Its: City Attorney
Date: _____

Attestation (if applicable)

_____

By:_____
Its:_____
Date: _____

CITY OF LOMPOC
100 Civic Center Plaza
Lompoc, CA 93436

_____

By:_____
Title: _____
Date: _____

Approved as to form:

_____

By: _____
Its: City Attorney
Date: _____

Attestation (if applicable)

_____

By:_____
Its:_____
Date: _____

CITY OF OAKLAND, acting
by and through its
Board of Port Commissioners
530 Water Street
Oakland, CA 94607

_____

By:_____
Title: _____
Date: _____

Approved as to form:

_____

By: _____
Its: Port General Counsel _____
Date: _____

Attestation (if applicable)

_____

By:_____
Its:_____
Date: _____

CITY OF ROSEVILLE
311 Vernon Street
Roseville, CA 95678

_____

By:_____
Title: _____
Date: _____

Approved as to form:

_____

By: _____
Its: City Attorney _____
Date: _____

Attestation (if applicable)

_____

By:_____
Its:_____
Date: _____

CITY OF SANTA CLARA
1500 Warburton Avenue
Santa Clara, CA 95050

_____

By:_____
Title: _____
Date: _____

Approved as to form:

_____

By: _____
Its: City Attorney
Date: _____

Attestation (if applicable)

_____

By:_____
Its:_____
Date: _____

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT
300 Lakeside Drive, 16th Floor
Oakland, CA 94612

_____

By:_____
Title: _____
Date: _____

Approved as to form:

_____

By: _____
Its: City Attorney
Date: _____

Attestation (if applicable)

_____

By:_____
Its:_____
Date: _____

CITY OF UKIAH
300 Seminary Avenue
Ukiah, CA 95482

_____
By:_____
Title: _____
Date: _____

Approved as to form:

_____
By: _____
Its: City Attorney_____
Date: _____

Attestation (if applicable)

_____
By:_____
Its:_____
Date:_____

EXHIBIT A

PROJECT PARTICIPATION PERCENTAGES

Concurrent to the Effective Date of this Agreement, the Project Participation Percentages contained in this Exhibit A may be updated in the event that one or more of the Members shown in the preliminary list of Participants do not become a Participant. In the event that one or more of the Members shown in the preliminary list of Participants do not become a Participant, the Project Participation Percentage for that Member will be reallocated to the City of Roseville and the City of Santa Clara in equal shares. NCPA shall notify all Participants of the final Project Participation Percentages in writing concurrent with the Effective Date of this Agreement, and if necessary NCPA shall provide an updated Exhibit A to the Participants showing the final Project Participation Percentages.

Preliminary List of Participants

City of Healdsburg	**2.0 MW, or 1.65%**
City of Lodi	**10.0 MW, or 8.23%**
City of Lompoc	**2.5 MW, or 2.06%**
City of Roseville	**20.0 MW, 16.46%**
City of Santa Clara	**78.0 MW, 64.2%**
City of Ukiah	**2.0 MW, 1.65%**
Port of Oakland	**3.0 MW, or 2.47%**
San Francisco Bay Area Rapid Transit District	**4.0 MW, or 3.29%**

Final List of Participants

EXHIBIT B

PPA

The Power Purchase Agreement between South Feather Water and Power Agency and Northern California Power Agency has been attached to this Agreement as Exhibit B.

POWER PURCHASE AGREEMENT

BETWEEN

SOUTH FEATHER WATER AND POWER AGENCY

AND

NORTHERN CALIFORNIA POWER AGENCY

Dated as of [_____], 20[__]

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POWER PURCHASE AGREEMENT
BETWEEN
NORTHERN CALIFORNIA POWER AGENCY
AND
SOUTH FEATHER WATER AND POWER AGENCY

THIS POWER PURCHASE AGREEMENT (this "***Agreement***"), dated as of this [____] day of [_____], 20[__], is being entered into by and between the NORTHERN CALIFORNIA POWER AGENCY ("***Buyer***"), a joint powers agency and a public entity organized under the laws of the State of California and created under the provisions of the California Joint Exercise of Powers Act found in Chapter 5 of Division 7 of Title 1 of the Government Code of the State of California, beginning at California Government Code Section 6500, et. seq., ("***Act***") and the "Amended and Restated Northern California Power Agency Joint Powers Agreement" entered into pursuant to the provisions of the Act among Buyer and Buyer's members, dated as of January 1, 2008, and SOUTH FEATHER WATER AND POWER AGENCY, an irrigation district formed under the Irrigation District Act (Division 11 of the California Water Code) of the State of California ("***Seller***"). Each of Buyer and Seller is referred to individually in this Agreement as a "***Party***" and together as the "***Parties.***"

RECITALS

WHEREAS, Buyer's members have adopted or are adopting policies that are designed to increase the amount of energy that they provide to their retail customers from eligible renewable energy resources and carbon free resources to comply with the California Renewable Energy Resources Act and other applicable requirements; and

WHEREAS, Seller owns and operates four existing hydroelectric generating plants operating under a FERC license (FERC Project No. 2088): the Forbestown Powerhouse (37.5 MW), the Kelly Ridge Powerhouse (11.0 MW), the Sly Creek Powerhouse (13.0) MW and the Woodleaf Powerhouse (60.0 MW) (the "Facility or as otherwise referred to as the South Feather Power Project"); and

WHEREAS, the Seller's license for the South Feather Power Project was issued for a period ending March 31, 2009; on March 26, 2007, Seller filed an Application for a New License pursuant to the Federal Power Act and FERC's regulations thereunder; and Seller currently operates the South Feather Power Project under an annual license issued from year-to-year under the terms and conditions of the prior license until a new license is issued, or the project is otherwise disposed of as provided in the Federal Power Act; and

WHEREAS, the Kelly Ridge Powerhouse and Sly Creek Powerhouse ("the Renewable Facilities") are eligible renewable energy resource certified by the CEC; and

WHEREAS, Buyer is interested in purchasing Products from the Facilities; and

WHEREAS, Seller has agreed to sell to Buyer, and Buyer has agreed to purchase from Seller, certain energy, capacity rights and associated environmental attributes for the purchase price set forth in Appendix A; and

WHEREAS, the Parties desire to set forth the terms and conditions pursuant to which such sales and purchases shall be made.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing Recitals, which are incorporated herein, the mutual covenants and agreements herein set forth, and other good and valuable consideration, the sufficiency of which is hereby acknowledged, the Parties agree as follows:

ARTICLE I
DEFINITIONS AND INTERPRETATION

Section 1.1 Definitions.

The following terms in this Agreement and the appendices hereto shall have the following meanings when used with initial capitalized letters:

"**Act**" has the meaning set forth in the preamble of this Agreement.

"**Affiliate**" means, as to any Person, any other Person that, directly or indirectly, is in control of, is controlled by or is under common control with such Person or, as is appropriate given the context, is a director or officer of such Person or of an Affiliate of such Person. As used in this Agreement, "control" shall mean the possession, directly or indirectly, of the power to direct or cause the direction of management, policies or activities of a Person, whether through ownership of voting securities, by contract or otherwise.

"**Agreement"** has the meaning set forth in the preamble of this Agreement, and includes the Appendices attached hereto.

"**Agreement Term**" has the meaning set forth in Section 2.2(a).

"**Annual True-Up Credit**" has the meaning set forth in Appendix A.

"**ASME**" means American Society of Mechanical Engineers.

"**Assumed Daily Deliveries**" has the meaning set forth in Section 11.3(c).

"**ASTM**" means American Society for Testing and Materials.

"**Authorized Auditors**" means representatives of Buyer or Buyer's Authorized Representative who are authorized to conduct audits on behalf of Buyer.

"**Authorized Representative**" means, with respect to each Party, the Person designated as such Party's authorized representative pursuant to Section 12.1.

"**Available Generating Capacity**" means the Contract Capacity less the amount of capacity that is not available due to an outage.

"**Availability Incentive Payment**" has the meaning set forth in the CAISO Tariff.

"**Availability Standard**" has the meaning set forth in the CAISO Tariff.

"**AWS**" means American Welding Society.

"**Bankruptcy**" means any case, action or proceeding under any bankruptcy, reorganization, debt arrangement, insolvency or receivership law or any dissolution or liquidation proceeding commenced by or against a Person and, if such case, action or proceeding is not commenced by such Person, such case, action or proceeding shall be consented to or acquiesced in by such Person or shall result in an order for relief or shall remain undismissed for ninety (90) days.

"**Base Output**" has the meaning set forth in Appendix A.

"**Base Output Compensation**" has the meaning set forth in Appendix A.

"**Base Output Monthly Payment**" has the meaning set forth in Appendix A.

"**Brown Act**" has the meaning set forth in Section 12.21(b).

"**Business Day**" means any day that is not a Saturday, a Sunday, or a day on which commercial banks are authorized or required to be closed in Los Angeles, California or New York, New York.

"**Buyer**" has the meaning set forth in the preamble of this Agreement.

"Buyer Curtailment" has the meaning set forth in Section 6.5(b).

"**Buyer Indemnitee**" has the meaning set forth in Section 12.19(a).

"**Cal-OSHA**" means the California Occupational Safety & Health Administration.

"**CAISO**" means the California Independent System Operator.

"**CAISO Costs**" means (i) all current and future costs, expenses, fees, charges, credits and other amounts assessed by the CAISO to Seller or to Buyer in connection with the Facilities and (ii) any and all costs, expenses, fees, charges and other amounts incurred in connection with performing Scheduling services, settlement services and serving as the Scheduling Coordinator.

"CAISO Master File" has the meaning set forth in the CAISO Tariff.

"**CAISO Tariff**" means the CAISO FERC Electric Tariff, Fifth Replacement Volume, including the rules, protocols, procedures and standards attached thereto and any replacement thereof or successor thereto in effect.

"**CAMD**" means the Clean Air Markets Division of the EPA and any other state, regional or federal or intergovernmental entity or Person that is given authorization or jurisdiction or both over a program involving the registration, validation, certification or transferability of Environmental Attributes.

"**Capacity Rights**" means the rights, whether in existence as of the Effective Date or arising thereafter during the Agreement Term, to capacity, Resource Adequacy Attributes, Local Capacity Requirement Attributes, flexible capacity attributes, operating reserves, regulation services, and other associated attributes or reserves, or any of the foregoing as may in the future be defined by the CAISO, or any other balancing authority, reliability entity or Governmental Authority, associated with the electric generating capability of the Facilities, including the right to resell such rights.

"**CEC**" means California's State Energy Resources Conservation and Development Commission, also known as the California Energy Commission.

"**CEC Certified**" means that the CEC has certified that the Facility is an eligible renewable energy resource in accordance with RPS Law.

"**CEC Performance Standard**" means, at any time, the applicable greenhouse gas emissions performance standard in effect at such time for electric generation facilities that are owned or operated (or both) by local publicly owned electric utilities, or for which a local publicly owned electric utility has entered into a contractual agreement for the purchase of power from such facilities, as established by the CEC or other Governmental Authority having jurisdiction over Buyer.

"**CEQA**" means the California Environmental Quality Act, California Public Resources Code §§ 21000, et seq.

"**Change in Law**" means a material change to any WREGIS standards, rules, or requirements, or a change to any federal, state, local or other law (including any environmental law, EPS Law or RPS Law), resolution, standard, code, rule, ordinance, directive, regulation, order, judgment, decree, ruling, determination, permit, certificate, authorization, or approval of a Governmental Authority, including the adoption of any new law, resolution, standard, code, rule, ordinance, directive, regulation, order, judgment, decree, ruling, determination, permit, certificate, authorization, or approval.

"**Compliance Showings**" means the applicable load serving entities compliance with the resource adequacy requirements of its applicable regulatory authority for an applicable Showing Month.

"**Conditional Use Permit**" means the conditional use permits for the Facility.

"**Confidential Information**" has the meaning set forth in Section 12.21(a).

"**Contract Capacity**" means the amount of installed Facility capacity set forth in Appendix B.

"**Contract Price**" means, for any period of time, the Contract Price set forth in Appendix A.

"**Contract Year**" means (a) with respect to the first (1st) Contract Year, the period beginning on the Initial Delivery Date and extending through December 31 of the calendar year in which the Initial Delivery Date occurs, (b) with respect to the second (2nd) through the twentieth (20th) Contract Years, the applicable calendar year, and (c) with respect to the twenty first (21st) Contract Year, the period beginning on January 1 of the applicable calendar year and extending through the day before the anniversary of the Initial Delivery Date.

"**Costs**" has the meaning set forth in Section 11.3(f)(iii).

"**CPRA**" has the meaning set forth in Section 12.21(b).

"**Curtailment Period**" means a period of time during the Delivery Term during which the generation of Facility Energy is required to be curtailed or reduced (in whole or part) as a result of an order, direction, alert, request, notice, instruction or directive from a Transmission Provider, the CAISO, WECC, NERC, or any other reliability entity due to (a) a System Emergency, (b) system improvements, curtailments, or scheduled and unscheduled repairs or maintenance at or downstream from the Point of Delivery, (c) an event of Force Majeure at or downstream from the Point of Delivery, (d) over-generation or any other reason adversely affecting the normal function and operation of the CAISO grid or a Transmission Provider's system, as may from time to time be identified by the CAISO, the Transmission Provider, WECC, NERC, or any other reliability entity. For the avoidance of doubt, the term "Curtailment Period" shall not include curtailments directed by CAISO for economic reasons as described in Section 6.5(b) or any curtailment by Buyer pursuant to Section 6.5(b).

"**Day-Ahead Market**" has the meaning set forth in the CAISO Tariff.

"**Deemed Generated Energy**" has the meaning set forth in Section 6.5(c).

"**Default**" has the meaning set forth in Section 11.1.

"**Defaulting Party**" has the meaning set forth in Section 11.1.

"**Delivery Term**" has the meaning set forth in Section 2.2(b).

"**Dispute**" has the meaning set forth in Section 12.3(a).

"**Dispute Notice**" has the meaning set forth in Section 12.3(a).

"**Early Termination Date**" has the meaning set forth in Section 11.3(a).

"**EEI**" means Edison Electric Institute.

"**Effective Date**" means the date on which Buyer and Seller have both executed this Agreement.

"**Electric Metering Devices**" means all meters, metering equipment, and data processing equipment used to measure, record, or transmit data relating to the Facility Energy. Electric Metering Devices include the metering current transformers and the metering voltage transformers.

"**Energy**" means electrical energy.

"**Environmental Attribute Reporting Rights"** means all rights to report ownership of the Environmental Attributes to any Person, including under Section 1605(b) of the Energy Policy Act of 1992, as amended from time to time or any successor statute, or any other current or future international, federal, state or local law, regulation or bill, or otherwise.

"**Environmental Attributes**" means RECs, and any and all other current or future credits, benefits, emissions reductions, offsets or allowances, howsoever entitled, named, registered, created, measured, allocated or validated (A) that are at any time recognized or deemed of value (or both) by Buyer, applicable law, or any voluntary or mandatory program of any other Governmental Authority or other Person and (B) that are attributable to (i) generation by the Facility during the Delivery Term or Replacement Energy required to be delivered by Seller to Buyer during the Delivery Term and (ii) the emissions or other environmental characteristics of such generation or such Replacement Energy or its displacement of conventional or other types of Energy generation. Environmental Attributes include any of the aforementioned arising out of legislation or regulation concerned with oxides of nitrogen, sulfur, carbon, or any other greenhouse gas or chemical compound, particulate matter, soot, or mercury, or implementing the United Nations Framework Convention on Climate Change (the "***UNFCCC***"), the Kyoto Protocol to the UNFCCC, California's greenhouse gas legislation (including RPS Law and California Assembly Bill 32 (Global Warming Solutions Act of 2006) and any regulations implemented pursuant to that act, including any compliance instruments accepted under the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms regulations of the California Air Resources Board or any successor regulations thereto) or any similar international, federal, state or local program or crediting "early action" with a view thereto, laws or regulations involving or administered by the CAMD and all Environmental Attribute Reporting Rights, including all evidences (if any) thereof such as renewable energy certificates of any kind. Environmental Attributes for purposes of this definition are separate from the Energy produced from the Facility and do not include (a) investment tax credits, any local, state or federal production tax credits, depreciation deductions or other tax credits providing a tax benefit to Seller or any other Person based on an ownership or security interest in the Facility, (b) any other depreciation deductions and benefits, and other tax benefits arising from ownership of the Facility and (c) cash grants or other financial incentives from any local, state or federal government available to Seller with respect to the Facility.

"**EPA**" means the United States Environmental Protection Agency.

"**EPS Compliance**" or "**EPS Compliant**" when used with respect to the Facility, means that the Facility satisfies both the PUC Performance Standard and the CEC Performance Standard in effect at the time; *provided,* if it is impossible for the Facility to satisfy both the PUC Performance Standard and the CEC Performance Standard in effect at any time, the Facility shall be deemed EPS Compliant if it satisfies the CEC Performance Standard in effect at the time and those portions of the PUC Performance Standard in effect at the time that it is possible for the Facility to satisfy while at the same time satisfying the CEC Performance Standard in effect at the time.

"**EPS Law**" means Sections 8340 and 8341 of the California Public Utilities Code or its successor or comparable state or federal programs.

"**Extended Delivery Term**" has the meaning set forth in Section 2.2(b).

"**Facility**" means the four (4) hydroelectric generating facilities described in the Recitals hereto, and Appendix B, including all property interests and related Interconnection Facilities owned by Seller.

"**Facility Energy**" means Energy generated by the Facility, less station load, transformation losses and transmission losses to the Point of Delivery, as measured by CAISO-approved Electric Metering Devices.

"**Facility Monthly Variable Output**" has the meaning set forth in Appendix A.

"**FERC**" means the Federal Energy Regulatory Commission.

"**Fixed Monthly Payment**" has the meaning set forth in Appendix A.

"**Force Majeure**" has the meaning set forth in Section 12.6(b).

"**Force Majeure Notice**" has the meaning set forth in Section 12.6(a).

"**Forced Outage**" means the removal of service availability of the Facility, or any portion of the Facility, for emergency reasons or conditions in which the Facility, or any portion thereof, is unavailable due to unanticipated failure, including as a result of Force Majeure.

"**Full Capacity Deliverability Status**" or "**FCDS**" has the meaning set forth in the CAISO Tariff.

"**GAAP**" means generally accepted accounting principles set forth in opinions and pronouncements of the Accounting Principles Board of the American Institute of Certified Public Accountants and statements and pronouncements of the Financial Accounting Standards Board or in such other statements by such other entity as may be approved by a significant segment of the accounting profession, in each case as the same are applicable to the circumstances as of the date of determination.

"**Gains**" has the meaning set forth in Section 11.3(f)(i).

"**Governmental Authority**" means any federal, state, regional, city or local government, any intergovernmental association or political subdivision thereof, or other governmental, regulatory or administrative agency, court, commission, administration, department, board, or other governmental subdivision, legislature, rulemaking board, tribunal, or other governmental authority with jurisdiction over the Parties, the Facility, or this Agreement, or any Person acting as a delegate or agent of any Governmental Authority; provided that "Governmental Authority" specifically excludes Buyer, any successor or assignee of Buyer and the Participating Members.

"**Gross Facility Energy**" means the amount of Facility Energy delivered to the Point of Delivery during a Buyer Curtailment plus the amount of MWh calculated to approximate the amount of Energy that could have been produced and delivered to the Point of Delivery during the Buyer Curtailment, based on the volume of water bypassed at the Facility during a Buyer Curtailment. For the avoidance of doubt, volumes of water bypassed at the Facility for any reason other than a Buyer Curtailment, including natural spill conditions that may occur, shall not be included in the calculation of Gross Facility Energy.

"**IEEE**" means the Institute of Electrical and Electronics Engineers.

"**Insurance**" means the policies of insurance as set forth in Appendix E.

"**Interest Rate**" has the meaning set forth in Section 9.3.

"**Initial Delivery Date**" means December 19, 2021 and is the first day of the Delivery Term.

"**Initial Delivery Term**" has the meaning set forth in Section 2.2(b).

"**ISA**" means the Instrument Society of America.

"**Interconnection Agreement**" means the interconnection agreement entered into by Seller pursuant to which the Facility will be interconnected with the Transmission System, and pursuant to which Seller's Interconnection Facilities and any other Interconnection Facilities will be constructed, operated and maintained during the Delivery Term.

"**Interconnection Facilities**" means the interconnection facilities, control and protective devices and metering facilities required to connect the Facility with the Transmission System in accordance with the Interconnection Agreement.

"**Licensed Professional Engineer**" means an independent, professional engineer reasonably acceptable to Buyer, licensed in the State of California, and otherwise qualified to perform the work required hereunder.

"**Lien**" means any mortgage, deed of trust, lien, security interest, retention of title or lease for security purposes, pledge, charge, encumbrance, equity, attachment, claim, easement, right of way, covenant, condition or restriction, leasehold interest, purchase right or other right of any kind, including any option, of any other Person in or with respect to any real or personal property.

"**Local Capacity Requirement Attributes**" means the benefits or attributes now or existing in the future based on the procurement obligations of Buyer with respect to local resource capacity requirements as prescribed by the PUC, the CAISO or other regional entity, and that are associated with the electric generating capability of the Facility.

"**Locational Marginal Price**" or "**LMP**" has the meaning set forth in the CAISO Tariff.

"**Losses**" has the meaning set forth in Section 11.3(f)(ii).

"**Major Maintenance Blockout**" has the meaning set forth in Section 3.5(a).

"**Month**" means a calendar month commencing at 00:00 Pacific Prevailing Time on the first day of such month and ending at 24:00 Pacific Prevailing Time on the last day of such month.

"**Monthly Base Output**" has the meaning set forth in Appendix A.

"**MW**" means megawatt in alternating current, or ac.

"**MWh**" means megawatt-hours.

"**NERC**" means the North American Electric Reliability Corporation.

"Net Qualifying Capacity" has the meaning set forth in the CAISO Tariff; provided, however, the amount of Net Qualifying Capacity provided by the Facility shall be equal to the amount of Resource Adequacy Capacity that is eligible to be used by Buyer to satisfy Compliance Showing requirements, including adjustments to account for Facility availability, operational limitations and Scheduled Outages.

"**Non-Defaulting Party**" has the meaning set forth in Section 11.3(a).

"**Non-Availability Charge**" has the meaning set forth in the CAISO Tariff.

"**Notice of Termination**" has the meaning set forth in Section 2.2(c).

"**Notifying Party**" has the meaning set forth in Section 12.3(a).

"**OSHA**" means the Occupational Safety and Health Administration of the United States Department of Labor.

"**Pacific Prevailing Time**" means the local time in the State of California.

"**Participating Members**" means the Cities of Healdsburg, Lodi, Lompoc, Roseville, Santa Clara and Ukiah, and the San Francisco Bay Area Rapid Transit District, and the City of Oakland, acting by and through its Board of Port Commissioners.

"**Party**" or "**Parties**" has the meaning set forth in the preamble of this Agreement.

"**Permits**" means all applications, permits, licenses, franchises, certificates, concessions, consents, authorizations, certifications, self-certifications, approvals, registrations, orders, filings, entitlements and similar requirements of whatever kind and however described that are required to be filed, submitted, obtained or maintained by any Person with respect to the development, siting, design, acquisition, construction, equipping, financing, ownership, possession, shakedown, start-up, testing, operation or maintenance of the Facility, the production, sale and delivery of Products from the Facility, including Facility Energy, Capacity Rights and Environmental Attributes, or any other transactions or matter contemplated by this Agreement (including those pertaining to electrical, building, zoning, environmental and occupational safety and health requirements), including the, Conditional Use Permit, CEQA determinations and the Permits as may be applicable.

"**Person**" means any individual, corporation, partnership, joint venture, limited liability company, association, joint stock company, trust, unincorporated organization, entity, government or other political subdivision.

"**PNode**" means the CAISO Pricing Node for the Facility as defined in the CAISO Tariff to be established by CAISO, as set forth in Appendix B.

"**Point of Delivery**" mean the Point of Interconnection for each Facility.

"**Point of Interconnection**" has the meaning set forth in Appendix B.

"**Present Value Rate**" means, at any date, the sum of 0.50% plus the yield reported on page "USD" of the Bloomberg Financial Markets Services Screen (or, if not available, any other nationally-recognized trading screen reporting on-line intraday trading in United States government securities) at 11:00 a.m. (New York City, New York time) for the United States government securities having a maturity that most nearly matches the Remaining Term at that date.

"**Products**" means any and all Facility Energy, Capacity Rights, Environmental Attributes, and ancillary products, services or attributes similar to the foregoing that are or can be produced by, or are associated with, the Facility, whether now attainable or established in the future, including delivered energy, renewable attributes, operating reserves and renewable energy credits.

"**Prudent Utility Practices**" means those practices, methods, and acts, that are commonly used by a significant portion of the hydroelectric electric generation industry in prudent engineering and operations to design, construct, and operate and maintain electric equipment lawfully and with safety, dependability, reliability, efficiency, and economy, including any applicable practices, methods, acts, guidelines, standards and criteria of the CAISO, FERC, NERC, WECC, as each may be amended from time to time, and all applicable Requirements of Law.

Prudent Utility Practices are not intended to be limited to the optimum practice, method, or act, to the exclusion of all others, but rather is intended to include acceptable practices, methods, and acts generally accepted in the hydroelectric generation industry.

"**Public Utilities Code**" means the Public Utilities Code of the State of California, as may be amended from time to time.

"**PUC**" means the California Public Utilities Commission and any successor thereto.

"**PUC Performance Standard**" means, at any time, the greenhouse gas emission performance standard in effect at such time for electric generation facilities owned or operated (or both) by load-serving entities and not local publicly-owned electric utilities, or for which a load-serving entity and not a local publicly owned electric utility has entered into a contractual agreement for the purchase of power from such facilities, as established by the PUC or other Governmental Authority under the EPS Law.

"**QRE**" has the meaning set forth in Section 7.4.

"**RA Capacity Monthly Payment**" has the meaning set forth in Appendix A.

"**RA Capacity Rate**" has the meaning set forth in Appendix A.

"RA Deficiency Amount" means the liquidated damages payment that Seller shall pay to Buyer for an applicable RA Shortfall Month as calculated in accordance with Section 8.4.

"RA Shortfall Month" means, for purpose of calculating an RA Deficiency Amount under Section 8.4, any month which the amount of Resource Adequacy Capacity supplied from the Facility for such month was less than the Net Qualifying Capacity for such month.

"**Real-Time Market**" has the meaning set forth in the CAISO Tariff.

"**REC**" or "**Renewable Energy Credit**" means a certificate of proof associated with the generation of electricity from an eligible renewable energy resource, which certificate is issued through the accounting system established, used or approved by the CEC pursuant to the RPS Law, evidencing that one (1) MWh of Energy was generated and delivered from such eligible renewable energy resource. Such certificate is a tradable environmental commodity (also known as a "green tag" or "renewable energy certificate") for which the owner of the REC can evidence that it has purchased Energy that is CEC Certified.

"**Recipient Party**" has the meaning set forth in Section 12.3(a).

"**Remaining Term**" means, at any date, the remaining portion of the Delivery Term at that date without regard to any early termination of this Agreement.

"**Replacement RA**" has the meaning set forth in Section 8.4(c).

"**Requirements**" means, collectively, (a) any standards or requirements of ASTM, ASME, AWS, EPA, EEI, IEEE, ISA, National Electrical Code, NERC, National Electric Safety Code, OSHA, Cal-OSHA, Uniform Building Code, or Uniform Plumbing Code applicable to the design or construction of the Facility, (b) any applicable local county fire department standards or codes, (c) Prudent Utility Practices, (d) FERC licenses, and federal and state dam safety regulations, (e) all applicable Requirements of Law, including the UCC, and (f) all other requirements of this Agreement.

"**Requirement of Law**" means any federal, state, local or other law (including any environmental law, EPS Law or RPS Law), resolution, standard, code, rule, ordinance, directive, regulation, order, judgment, decree, ruling, determination, permit, certificate, authorization, license or approval of a Governmental Authority, including those pertaining to electrical, building, zoning, environmental, dam safety, cyber and physical security, and occupational safety and health requirements.

"**Resource Adequacy Attributes**" of "**Resource Adequacy Capacity**" means the benefits or attributes, including flexible attributes, if any, now or existing in the future based on the procurement obligations of Buyer with respect to Resource Adequacy as prescribed by the PUC, the CAISO or any other regional entity, and that are associated with the electric generating capability of the Facility.

"**RPS Compliance**" or "**RPS Compliant**" means, when used with respect to the Facility, that all Energy generated by such facility at all times shall, together with all of the associated Environmental Attributes, qualify as a "portfolio content category 1" eligible renewable resource, as such term is defined in Public Utilities Code Section 399.12 or Section 399.16, or equivalent if the RPS Law is changed, under the RPS Law.

"**RPS Law**" means the California Renewable Energy Resources Act, including the California Renewables Portfolio Standard Program, Article 16 of Chapter 2.3, Division 1 of the Public Utilities Code, California Public Resources Code § 25740 through 25751, any related regulations or guidebooks promulgated by the CEC or, as applicable, the PUC or its successor or equivalent state or federal programs.

"**SCADA**" means the supervisory control and data acquisition system for the Facility.

"**Schedule**" or "**Scheduling**" means the actions of Seller and Buyer, their Authorized Representatives, the Scheduling Coordinator and the Transmission Providers, if applicable, of notifying, requesting and confirming to the CAISO the amounts of Facility Energy expected to be delivered consistent with the Scheduling Interval at the Point of Delivery on any given date during the Delivery Term, all in the manner contemplated by the CAISO Tariff.

"**Scheduled Outage**" means any outage with respect to the Facility other than a Forced Outage.

"**Scheduled Outage Projection**" has the meaning set forth in Section 3.5(a).

"**Scheduling Coordinator**" has the meaning set forth in the CAISO Tariff.

"**Seller**" has the meaning set forth in the preamble of this Agreement.

"**Seller Indemnitees**" has the meaning set forth in Section 12.19(b).

"**Settlement Interval**" has the meaning set forth in the CAISO Tariff.

"**Settlement Statement**" has the meaning set forth in the CAISO Tariff.

"**Showing Month**" means the calendar month of the Delivery Period that is subject of the related Compliance Showing.

"**Subcontract**" means any agreement or contract entered into on or after the Effective Date by Seller and a Person other than Buyer, which Person is providing goods or services to Seller that are related to the performance of Seller's obligations under this Agreement. Subcontracts specifically include any agreement or contract that is referred to or defined as a "subcontract" in the policies, ordinances, codes or laws with which Seller must comply pursuant to this Agreement, or that is made with a "subcontractor" as such term is used or defined in such policies, ordinances, codes, or laws.

"**Subcontractor**" means any party to a Subcontract with Seller.

"**System Emergency**" means each of the following: (i) "System Emergency" as set forth in the CAISO Tariff and (ii) a condition or situation that in the judgment of Buyer (a) is imminently likely to endanger life or property; or (b) is imminently likely (as determined in a non-discriminatory manner) to cause a material adverse effect on the security of, reliability of, or damage to the Transmission System, Transmission Provider's interconnection facilities (as defined in the Interconnection Agreement) or the transmission systems of others to which the Transmission System is directly connected.

"**Tax**" or "**Taxes**" means each federal, state, county, local and other (a) net income, gross income, gross receipts, sales, use, ad valorem, business or occupation, transfer, franchise, profits, withholding, payroll, employment, excise, property or leasehold tax and (b) customs, duty or other fee, assessment or charge of any kind whatsoever, together with any interest and any penalties, additions to tax or additional amount with respect thereto.

"**Termination Notice**" has the meaning set forth in Section 11.3(a).

"**Termination Payment**" means a payment in an amount equal to the Non-Defaulting Party's (a) Losses, plus (b) Costs, minus (c) Gains; *provided, however*, that if such amount is a negative number, the Termination Payment shall be equal to zero.

"**Transmission Provider**" means the Person operating the Transmission System to and from the Point of Delivery.

"**Transmission Services**" means the transmission and other services required to transmit Facility Energy to or from the Point of Delivery.

"**Transmission System**" means the facilities utilized to provide Transmission Services.

"**Unexcused Cause**" has the meaning set forth in Section 12.6(b).

"**UNFCCC**" has the meaning set forth in the definition of "Environmental Attributes."

"**Variable Output**" has the meaning set forth in Appendix A.

"**Variable Output Monthly Payment**" has the meaning set forth in Appendix A.

"**Variable Output Rate**" has the meaning set forth in Appendix A.

"**Variable Output True-Up**" has the meaning set forth in Appendix A.

"**WECC**" means the Western Electricity Coordinating Council.

"**WREGIS**" means Western Renewable Energy Generation Information System.

"**WREGIS Certificates**" has the meaning set forth in Section 7.4.

"**WREGIS Operating Rules**" means the rules describing the operations of the WREGIS, as published by WREGIS.

Other terms defined herein have the meanings so given when used in this Agreement with initial-capitalized letters.

Section 1.2 Interpretation. In this Agreement, unless a clear contrary intention appears:

(a) time is of the essence;

(b) the singular number includes the plural number and vice versa;

(c) reference to any Person includes such Person's successors and assigns (regardless of whether such Person's successors and assigns are expressly referenced in the provision) but, in case of a Party hereto, only if such successors and assigns are permitted by this Agreement, and reference to a Person in a particular capacity excludes such Person in any other capacity or individually;

(d) reference to any gender includes the other;

(e) reference to any agreement (including this Agreement), document, act, statute, law, instrument, tariff or Requirement means such agreement, document, act, statute, law,

instrument, or tariff, or Requirement, as amended, modified, replaced or superseded and in effect from time to time in accordance with the terms thereof and, if applicable, the terms hereof, regardless of whether the reference to the agreement, document, act, statute, law, instrument, tariff, or Requirement expressly refers to amendments, modifications, replacements, or successors;

(f) reference to any Article, Section, or Appendix means such Article of this Agreement, Section of this Agreement, or such Appendix to this Agreement, as the case may be, and references in any Article or Section or definition to any clause means such clause of such Article or Section or definition;

(g) "hereunder," "hereof," "hereto" and words of similar import shall be deemed references to this Agreement as a whole and not to any particular Article or Section or other provision hereof or thereof;

(h) "including" (and with correlative meaning "include") means including without limiting the generality of any description preceding such term, regardless of whether words such as "without limitation" are expressly included in the applicable provision;

(i) relative to the determination of any period of time, "from" means "from and including," "to" means "to but excluding" and "through" means "through and including";

(j) unless otherwise indicated, reference to time shall always refer to Pacific Prevailing Time; and reference to any "day" shall mean a calendar day, unless otherwise indicated; and

(k) the term "or" is not exclusive, regardless of whether "and/or" is used in the applicable provision.

ARTICLE II
EFFECTIVE DATE, TERM, AND EARLY TERMINATION

Section 2.1 Effective Date. This Agreement is effective as of the Effective Date. On or prior to the Effective Date, each of the following has occurred: (a) both Parties have executed and delivered this Agreement; (b) Buyer has received copies of all requisite resolutions and incumbency certificates of Seller and any other documents evidencing all actions taken by Seller to authorize the execution and delivery of this Agreement, such resolutions to be certified as of the Effective Date by an authorized representative of Seller; and (b) Seller has received copies of all requisite resolutions and incumbency certificates of Buyer authorizing the execution and delivery of this Agreement, such resolutions to be certified as of the Effective Date by an authorized official of Buyer.

Section 2.2 Term.

(a) **Agreement Term**. The term of this Agreement (the "***Agreement Term***") shall commence on the Effective Date and end on the last day of the Delivery Term, or upon the earlier termination of this Agreement in accordance with the terms hereof.

(b) **Delivery Term**. The initial delivery term of this Agreement (the "**Initial Delivery Term**") shall begin on the Initial Delivery Date and shall continue uninterrupted through 11:59 pm on December 31, 2031, unless sooner terminated in accordance with the terms of this Agreement. At the end of the Initial Delivery Term of this Agreement, the term of this Agreement shall automatically extend for an additional ten (10) year period (the "**Extended Delivery Term**") unless Seller provides written Notice of Termination pursuant to Section 2.2(c), of its election to not automatically extend the term of this Agreement.

(c) **Notice of Termination**. This Agreement may be terminated by Seller at the end of the Initial Delivery Term by providing written notice to the Buyer at least three hundred sixty five (365) Calendar Days prior to the end of the Initial Delivery Term of this Agreement ("**Notice of Termination**").

Section 2.3 Survivability. The provisions of this ARTICLE II, ARTICLE X, ARTICLE XI, Section 12.9 and Section 12.21 shall survive for a period of one year following the termination of this Agreement. The provisions of ARTICLE IX shall survive for a period of four (4) years following final payment made by Buyer hereunder or the expiration or termination date of this Agreement, whichever is later. The provisions of ARTICLE V, ARTICLE VII, and ARTICLE VIII shall continue in effect after termination to the extent necessary to provide for final billing, adjustments, and deliveries related to any period prior to termination of this Agreement.

Section 2.4 Early Termination.

(a) **Early Termination by Mutual Agreement**. This Agreement may be terminated by mutual written agreement of the Parties.

(b) **Early Termination for Default**. Upon the occurrence of a Default, the Non-Defaulting Party may terminate this Agreement as set forth in Section 11.3.

(c) **Early Termination for Force Majeure**. This Agreement may be terminated pursuant to Section 12.6(c) or Section 12.6(d).

(d) **Effect of Termination**. Except as otherwise provided herein, any early termination of this Agreement under this Section 2.4 shall be without prejudice to the rights and remedies of a Party for Defaults occurring prior to such termination.

ARTICLE III
OPERATION AND MAINTENANCE OF THE FACILITY

Section 3.1 General Operational Requirements. Seller shall, at all times:

(a) At its sole expense, operate and maintain the Facility (i) in accordance with the Requirements and (ii) in a manner that is reasonably likely to result in a useful life for the Facility of not less than the Delivery Term;

(b) Use qualified and trained personnel for managing, operating and maintaining the Facility and for coordinating with Buyer, and ensure that necessary personnel are available on-site or on-call twenty-four (24) hours per day during the Delivery Term;

(c) Operate and maintain the Facility with due regard for the safety, security and reliability of the Interconnection Facilities; and

(d) Operate and maintain the Facility in accordance with the CAISO Tariff and other applicable requirements, including, but not limited to, submitting Facility technical and modeling information to the CAISO, as may be required; and

(e) Comply with operating and maintenance standards recommended or required by the Facility's equipment suppliers, and in accordance with Prudent Utility Practices.

Section 3.2 Operation and Maintenance Plan.

(a) Seller shall devise and implement a plan of inspection, maintenance, and repair for the Facility and the components thereof in order to maintain such equipment in accordance with Prudent Utility Practices, and shall keep records with respect to inspections, maintenance, and repairs thereto. The aforementioned plan and all records of such activities shall be available for inspection by Buyer during Seller's regular business hours upon reasonable notice.

(b) In addition to the other required and preventative maintenance actions required by this Agreement, Seller shall: (i) conduct regular visual equipment inspections and log significant parameters; (ii) identify and perform all preventative maintenance requirements for the following calendar year; (iii) schedule and assign routine maintenance during operations, planned outages, as well as maintenance that can be conducted in parallel; (iv) conduct periodic maintenance to various equipment; (v) conduct periodic quality assurance and quality control activities and inspections; and (vi) hire Subcontractors, as applicable to meet the Facility's maintenance, betterment, and improvement needs. Notwithstanding the requirements of this Section 3.2(b), Seller shall retain full discretion in budgeting and determining the priority in which it performs preventive maintenance in relation to Seller's other projects and actions.

Section 3.3 Decommissioning and Other Costs. Buyer shall not be responsible for any cost of decommissioning or demolition of the Facility or any environmental or other liability associated with the decommissioning or demolition of the Facility without regard to the timing or cause of the decommissioning or demolition.

Section 3.4 Environmental Credits. Seller shall, if applicable, obtain in its own name and at its own expense all pollution or environmental credits or offsets necessary to operate the Facility in compliance with any Requirement of Law; *provided* for the avoidance of doubt, Seller shall not use any Environmental Attributes to satisfy the foregoing obligation.

Section 3.5 Outages.

(a) Buyer and Seller shall cooperate to minimize Scheduled Outages during specified periods of time during each calendar year in accordance with Prudent Utility Practices and this Section 3.5 (such periods, the "***Major Maintenance Blockout***"). No later than May 1 prior the commencement of each Contract Year, Buyer shall provide Seller with its specified Major Maintenance Blockout. In the absence of such updated notification, the period of May 1 through September 30 shall apply. Seller shall attempt to minimize its Scheduled Outages during the Major Maintenance Blockout consistent with Prudent Utility Practices. No later than ninety (90) days prior to the first day of the Delivery Period, and for each calendar year thereafter, no later than four (4) months prior to the deadline for providing the CAISO Resource Adequacy filings and proposed maintenance outages for the following year as described in the CAISO Tariff, Seller shall provide Buyer and the Scheduling Coordinator with its non-binding written projection of all Scheduled Outages for the succeeding calendar year (the "***Scheduled Outage Projection***") reflecting Seller's attempt to minimize scheduled maintenance during the Major Maintenance Blockout. In addition, Seller shall cooperate in good faith with maintenance scheduling requests by Buyer consistent with Prudent Utility Practices, and Buyer and Seller shall strive to develop a final Scheduled Outage plan no later than three (3) months prior to the deadline for providing the CAISO Resource Adequacy filings and proposed maintenance outages for the following year as described in the CAISO Tariff. Notwithstanding the process described herein for coordination of Scheduled Outages between Buyer and Seller, both Buyer and Seller acknowledge that all Scheduled Outages submitted to the CAISO may be accepted or rejected by the CAISO as described in the CAISO Tariff. In the event the CAISO rejects a Scheduled Outage request submitted by Seller, Buyer and Seller agree to cooperate in good faith to timely coordinate and develop a revised final Scheduled Outage plan to account for any Scheduled Outages that are not approved by the CAISO. The Scheduled Outage Projection shall include information concerning all projected Scheduled Outages during such period, including (a) the anticipated start and end dates of each Scheduled Outage; (b) a description of the maintenance or repair work to be performed during the Scheduled Outage; and (c) the anticipated MW of operational capacity, if any, during the Scheduled Outage. Seller shall use commercially reasonable efforts to notify Buyer and its Scheduling Coordinator of any change in the Scheduled Outage Projection sixty-five (65) days prior to first day of the month of the originally-scheduled date of the Scheduled Outage but in no event shall Seller notify Buyer later than fifty-five (55) days prior to the first day of the month of the originally-scheduled date of the Scheduled Outage. Seller shall use commercially reasonable efforts to accommodate reasonable requests of Buyer with respect to the timing of Scheduled Outages and shall, to the extent feasible and consistent with Prudent Utility Practices, arrange for Scheduled Outages to occur between October 1 and May 1 of each year (or such other period as reasonably determined by Buyer from time to time) and coincident, to the extent known by Seller, with the Transmission Provider's planned transmission outages, but not to overlap with the Major Maintenance Blockout. In the event of a System Emergency, Seller shall consider and decide in its discretion if it is commercially reasonable to reschedule any Scheduled Outages previously scheduled so that it does not occurs during the System Emergency. In addition, Seller shall use commercially reasonable efforts to coordinate Scheduled Outages with a total duration of 30 calendar days or less to occur within a single calendar month period.

(b) In addition to reporting outages to Buyer and the Scheduling Coordinator within any applicable time period for reporting outages under the CAISO Tariff and applicable rules and regulations of the CAISO, immediately upon identification of a situation likely to result

in a Forced Outage occurring within a twenty-four (24) hour period that is likely to cause or require removal of the Facility from service, or a reduction in the maximum output capability of the Facility by one (1) MW or more from the value most recently recorded in the generation outage reporting system for the CAISO, Seller shall notify Buyer and the Scheduling Coordinator. For all other Forced Outages, Seller shall provide Buyer and the Scheduling Coordinator with as much advance notice as practicably possible, but in all cases, shall notify Buyer and the Scheduling Coordinator within 30 minutes after the commencement of the Forced Outage. Seller shall provide detailed information concerning each Forced Outage, including (i) the start and anticipated end dates of the Forced Outage; (ii) a description of the cause of the Forced Outage; (iii) a description of the maintenance or repair work to be performed during the Forced Outage; and (iv) the anticipated MW of operational capacity, if any, during the Forced Outage. Seller shall take all reasonable measures and exercise commercially reasonable efforts to avoid Forced Outages and to limit the duration and extent of any such outages.

(c) In addition to the requirements set forth in Section 3.5(a) and Section 3.5(b), the Parties shall cooperate to develop mutually acceptable procedures for addressing Scheduled Outages and any other outages arising in connection with the Facility.

(d) In the event of any inconsistency between the provisions in this Section 3.5 and any applicable requirements of CAISO, the provisions of CAISO shall govern.

ARTICLE IV
COMPLIANCE DURING OPERATIONS

Section 4.1 Buyers' Rights to Monitor in General. Buyer shall have the right, and Seller shall permit Buyer and its Authorized Representative, and any other advisors, engineers and consultants agreed by the Parties (where such agreement shall not be unreasonably withheld), to observe, inspect, and monitor the operations and activities of the Facility; provided that such activities on the part of Buyer and its Authorized Representative shall be coordinated with Seller so as to not interfere with the Facility, and as to other advisors, engineers and consultants, such third parties executing an agreement setting forth the terms and conditions required by the Parties, including insurance, indemnity and non-disclosure terms. Seller shall cause its personnel, consultants, and contractors to be available to, and cooperate in all reasonable respects with, Buyer and its Authorized Representative, advisors, engineers, and consultants at reasonable times and with prior notice for purposes of discussing any aspect of the Facility testing, performance, operation, or maintenance thereof and Buyer's exercise of its rights under this Section 4.1. Buyer's rights to access the Facility shall be subject to Seller's reasonable safety protocols.

Section 4.2 Effect of Review by Buyer. Any review by Buyer or a Buyer's Authorized Representative of the operation or maintenance of the Facility, or observation of any testing, is solely for the information of Buyer. Buyer shall have no obligation to share the results of any such review or observations with Seller, nor shall any such review or the results thereof (whether or not the results are shared with Seller), nor any failure to conduct any such review, nor any observation of testing or failure to observe testing, relieve Seller from any of its obligations under this Agreement. By making any such review or observing any such testing, Buyer makes no representation as to the economic and technical feasibility, operational capability or reliability of

the Facility. Seller shall in no way represent to any third party that any such review by Buyer or Buyer's Authorized Representative of the Facility thereof, including any review of the operation or maintenance, is a representation by Buyer as to the economic and technical feasibility, operational capability or reliability of the Facility. Seller is solely responsible for the economic and technical feasibility, operational capability and reliability thereof.

Section 4.3 No Liens. Except as otherwise permitted by this Agreement: (a) the Facility shall be owned by Seller during the Agreement Term; and (b) Seller shall not sell or otherwise dispose of or create, incur, assume or permit to exist any Lien on any portion of the Facility or any other property or assets that are related to the operation, maintenance and use of the Facility without the prior written approval of Buyer, which such written approval shall not be unreasonably withheld.

ARTICLE V
PURCHASE AND SALE OF PRODUCT

Section 5.1 Purchases by Buyer. Subject to the terms and conditions of this Agreement, during the Delivery Term, Buyer will purchase and receive all the Products produced by or associated with the Facility at the Contract Price and in accordance with Appendix A, and Seller shall supply and deliver to Buyer all the Products produced by or associated with the Facility. At its sole discretion, Buyer may during the Delivery Term re-sell or use for another purpose all or a portion of the Products, provided that no such re-sale or use shall relieve Buyer of any obligations hereunder. During the Delivery Term, Buyer will have exclusive rights to offer, bid, or otherwise submit the Product from the Facility after the Point of Delivery for resale in the market or to any third party, and retain and receive any and all related revenues. Buyer has no obligation to purchase from Seller any Products for which the associated Facility Energy is not or cannot be delivered to the Point of Delivery as a result of an outage of the Facility, a Force Majeure Event, or a Curtailment Period.

Section 5.2 Sale of Environmental Attributes. During the Delivery Term, Seller shall sell and deliver to Buyer, and Buyer shall purchase and receive from Seller, all Environmental Attributes attributable to the Facility Energy generated by the Facility.

ARTICLE VI
TRANSMISSION AND SCHEDULING; TITLE AND RISK OF LOSS

Section 6.1 Delivery.

(a) Energy and Capacity. Subject to the provisions of this Agreement, during the Delivery Term, Seller shall supply and deliver the Products to Buyer at the Point of Delivery, and Buyer shall take delivery of the Products at the Point of Delivery in accordance with the terms of this Agreement. Seller will be responsible for paying or satisfying when due any costs or charges imposed in connection with the delivery of Facility Energy to the Point of Delivery, including without limitation, Station Use, Electrical Losses, and any operation and maintenance charges imposed on Seller by the Transmission Provider directly relating to the Facility's operations. Buyer shall be responsible for all costs, charges and penalties, if any, imposed in connection with

the delivery of Facility Energy at and after the Point of Delivery, including without limitation transmission costs and transmission line losses. Throughout the Delivery Term, Buyer shall Schedule and dispatch the Facilities in accordance with Prudent Utility Practices and shall have the exclusive right to bid or schedule all Products from each Facility, and provide (or cause to be provided), at its own expense, and will be solely responsible for the performance of all Scheduling Coordinator services required under the term of this Agreement, the CAISO Tariff, applicable protocols and scheduling practices, and any other applicable law, rule or regulatory requirement applicable to Scheduling Coordinators, for the Facilities. The Facility Energy will be scheduled and dispatched with the CAISO by Buyer (or Buyer's designated Scheduling Coordinator for the Facility) in accordance with Appendix C.

(b) Environmental Attributes. All Environmental Attributes associated with the Facility during the Delivery Term are exclusively dedicated to and will be conveyed to Buyer. Seller represents and warrants that Seller holds the rights to all Environmental Attributes from the Facility, and Seller agrees to convey and hereby conveys all such Environmental Attributes to Buyer as included in the delivery of the Product from the Facility.

Section 6.2 Scheduling Coordinator; CAISO Cost Allocation. Buyer or Buyer's designee shall act as Scheduling Coordinator for the Facility and shall have the full right and obligation to Schedule and dispatch all Facility Energy and capacity in accordance with the CAISO Tariff and other applicable requirements. Seller shall provide the capability to implement dispatch order, including adjustments to operating constraints, such as ramp rates, megawatt output, and megavar output, in real-time by means of set points received by the SCADA system or Facility controller of Seller, provided that the dispatch order is consistent with the Facility's operational characteristics as then-currently modeled in the CAISO Master File. The Facility shall have one or more designed resource IDs with CAISO for scheduling purposes, as set forth in the CAISO Master File. Buyer shall be financially responsible for and shall pay for all CAISO Costs; provided however, that notwithstanding the foregoing, Seller shall assume all liability and reimburse Buyer for any and all costs or charges under a Settlement Statement incurred by Buyer because of Seller's failure to perform any covenant or obligation set forth in this Agreement.

Section 6.3 Interconnection Facilities. Seller shall maintain an Interconnection Agreement and applicable Interconnection Facilities with the Transmission Provider to enable the Facility to interconnect with the Transmission System at the Point of Delivery. Seller shall be solely responsible for and pay all costs and charges arising under the Interconnection Agreement in compliance with the Interconnection Agreement and applicable rules and requirements in place throughout the Delivery Term.

Section 6.4 Forecasting. Seller shall provide the forecasts described below at its sole expense and in a format reasonably acceptable to Buyer (or Buyer's designee). Seller shall use reasonable efforts to provide forecasts that are accurate and, to the extent not inconsistent with the requirements of this Agreement, shall prepare such forecasts, or cause such forecasts to be prepared, in accordance with Prudent Operating Practices.

(a) Annual Forecast of Energy. No less than forty-five (45) days before (i) the first day of the first Contract Year of the Delivery Term and (ii) at the beginning of each calendar

year for every subsequent Contract Year during the Delivery Term, Seller shall provide to Buyer a non-binding forecast of each month's average-day expected Facility Energy, and associated hydrological storage, for the following calendar year in a form reasonably requested by Buyer.

(b) Monthly Forecast of Energy and Available Generating Capacity. No less than thirty (30) days before the Initial Delivery Date, and thereafter ten (10) Business Days before the beginning of each month during the Delivery Term, Seller shall provide to Buyer a non-binding forecast of the hourly expected Facility Energy, hydrological storage, and Available Generating Capacity for each day of the following month in a form reasonably requested by Buyer ("**Monthly Delivery Forecast**").

(c) Day-Ahead Forecast. By 5:30 AM Pacific Prevailing Time on the Business Day immediately preceding the date of delivery, or as otherwise specified by Buyer consistent with Prudent Operating Practice, Seller shall provide Buyer with a non-binding forecast of (i) Available Generating Capacity and (ii) environmental requirements, including minimum water release requirements, in each case, for each hour of the immediately succeeding day ("**Day-Ahead Forecast**"). A Day-Ahead Forecast provided in a day prior to any non-Business Day(s) shall include non-binding forecasts for the immediate day, each succeeding non-Business Day and the next Business Day. Each Day-Ahead Forecast shall clearly identify, for each hour, Seller's non-binding best estimate of (i) the Available Generating Capacity and (ii) applicable requirements and minimum water release requirements.

(d) Water Transfers. Seller, in Seller's discretion, may implement temporary or long-term reservoir reoperation or other water transfers during the Delivery Term. Seller will include any such transfers in the Monthly Delivery Forecast and Day-Ahead Forecast. If a transfer is forecasted at the time the Annual Forecast is due, then Seller shall provide notice to Buyer in the Annual Forecast; otherwise, Seller will provide notice to Buyer of any potential water transfer when it is first forecasted. Buyer and the Scheduling Coordinator agree to implement any water transfers and any accompanying regulatory or legal requirements of the transfer, including refill criteria and ramping rates. Buyer and Scheduling Coordinator will neither object to Seller water transfers, nor charge an accommodation or other fee or request any other offset or payment for such transfers during the Delivery Term.

(e) Throughout the Delivery Term, Seller shall provide to Buyer and the Scheduling Coordinator the following data on a real-time basis, and in a format that reasonably allows Buyer and the Scheduling Coordinator to copy, paste or otherwise use such data:

(i) Read-only and/or write access via secure login credentials to Energy output information and operational information collected by the SCADA system for the Facility; *provided* that if Buyer or the Scheduling Coordinator is unable to access the Facility's SCADA system, then upon written request from Buyer or the Scheduling Coordinator, Seller shall provide Energy output information and operational information through such other format as may be mutually acceptable to Seller and Buyer, all as may be updated from time to time based on advancements in technology in accordance with Prudent Utility Practices; and

(ii) Read-only access to all Electric Metering Devices.

(f) Seller, Buyer and the Scheduling Coordinator shall mutually develop forecasting and Scheduling procedures in addition to those set forth in this Section 6.4 and Appendix C, in order to administer the provisions of this Agreement in compliance with all applicable Requirements and requirements of the Transmission Provider, CAISO, NERC, WECC, and any balancing authority involved in the Scheduling of Energy and capacity under this Agreement. Seller, Buyer and the Scheduling Coordinator shall promptly cooperate to make any reasonably necessary and appropriate modifications to such forecasting or Scheduling procedures as may be required from time to time.

Section 6.5 Curtailment.

(a) Seller shall reduce deliveries of Facility Energy to the Point of Delivery as soon a reasonably possible upon notice from the Scheduling Coordinator, the CAISO, a Transmission Provider, or any balancing authority or reliability entity during Curtailment Periods. Buyer shall be excused from receiving any Facility Energy from Seller and shall not be obligated to pay Seller for the amount of reduced Facility Energy arising during a Curtailment Period. If required by the Scheduling Coordinator, the CAISO, a Transmission Provider, any balancing authority or reliability entity, or if requested by Buyer, Seller shall provide the dispatch and operating capability to implement curtailments and adjust ramp rates, megawatt output, and (if applicable) megavar output in real-time by means of setpoints received by the SCADA system or Facility controller of Seller.

(b) Separate from the curtailments described in Section 6.5(a), Buyer may, upon delivering curtailment instruction to Seller, curtail deliveries of Facility Energy at any time and for the duration specified by Buyer ("**Buyer Curtailment**"). For the avoidance of doubt, if the curtailment is resulting from Buyer's bidding and scheduling strategies and activities, including Buyer's strategies to minimize Buyer's exposure to negative pricing, the Facility will be deemed to have been curtailed pursuant to this Section 6.5(b), for which Buyer will be required to reimburse Seller as set forth herein. Buyer, Buyer's real-time operators or the Scheduling Coordinator shall provide to Seller a dispatch notice or instruction in accordance with CAISO scheduling timelines set forth in the CAISO Tariff, or in accordance with the Scheduling and dispatch procedures set forth in Appendix C, of its request for curtailment under this Section 6.5(b), and Seller shall comply with such request in accordance with Prudent Utility Practices, provided that the dispatch order is consistent with the Facility's operational characteristics as then-currently modeled in the CAISO Master File. The curtailment notice to Seller shall indicate the amount of any Facility Energy to be produced in each applicable Settlement Interval. Seller shall respond to curtailment notices (including the end of such curtailment periods) in accordance with Prudent Utility Practices. Seller shall provide the capability to implement curtailment notices, including adjustments to operating constraints, such as ramp rates, megawatt output, and megavar output, in real-time by means of set points received by the SCADA system or Facility controller of Seller. Buyer shall compensate Seller for any Deemed Generated Energy by accounted for Deemed Generated Energy as Monthly Base Output, as further set forth in Appendix A.

(c) "***Deemed Generated Energy***" means the amount of Facility Energy, expressed in MWh, that the Facility would have produced and delivered to the Point of Delivery, but for a curtailment event arising under Section 6.5(b), which amount shall be equal to (i) Gross Facility Energy, less (ii) the amount of Facility Energy delivered to the Point of Delivery during the curtailment or other event, if any; *provided* that, if the applicable difference calculated pursuant to the formula provided above is negative, the Deemed Generated Energy shall be zero (0).

(d) Within thirty (30) days after any curtailment pursuant to Section 6.5(a) and Section 6.5(b), Buyer shall provide Seller with all necessary information needed and reasonably requested by Seller, whether from Buyer or CAISO, including CAISO "flags" with respect to the curtailments, for Seller to determine if compensation is owed to Seller by Buyer pursuant to Section 6.5(b).

Section 6.6 No Payment. Buyer shall not be obligated to pay Seller for any Facility Energy that is not or cannot be delivered to the Point of Delivery for any reason (including Force Majeure), except as otherwise stated in Section 6.5(b).

Section 6.7 Title; Risk of Loss. As between the Parties, Seller shall be deemed to be in exclusive control (and responsible for any damages or injury caused thereby) of all Energy prior to the Point of Delivery, and Buyer shall be deemed to be in exclusive control (and responsible for any damages or injury caused thereby), of the Energy at and from the Point of Delivery. Seller warrants that it will deliver all Products, including all of the associated Environmental Attributes, to Buyer free and clear of all Liens created by any Person other than Buyer.

Section 6.8 RPS and EPS Compliance.

(a) Seller warrants and guarantees that during the Delivery Period the Facility Energy produced by each Facility that is CEC Certified as of the Effective Date, and at all times thereafter until the expiration or earlier termination of the Agreement, the Facility (including the Facility Energy and the associated Environmental Attributes) shall be both RPS Compliant and EPS Compliant (if EPS Law is applicable to the Facility), except if the Facility fails to be RPS Compliant or EPS Compliant (if EPS Law is applicable to the Facility) as a result of (i) a Change in Law making it impossible, after the use of commercially reasonable efforts as required under Section 6.8(b), for the Facility to be RPS Compliant or EPS Complaint, or (ii) any repeal of the RPS Law or EPS Law.

(b) If a Change in Law occurs after the Initial Delivery Date that (i) does not repeal the RPS Law or the EPS Law, (ii) causes the Facility to cease to be RPS Compliant and/or EPS Compliant and (iii) reduces the value to Buyer of the Environmental Attributes, then Seller shall use commercially reasonable efforts to comply with such Change in Law and cause the Facility to be RPS Compliant and EPS Compliant. To the extent a Change in Law occurs after the execution of this Agreement that causes this representation and warranty to be materially false or misleading, it shall not be an Event of Default if Seller has used commercially reasonable efforts to comply with such Change in Law. The term "commercially reasonable efforts" as used in this Section 6.8 means efforts consistent with the subject to Section 6.9.

(c) Subject to Section 7.1, Seller shall also take all other reasonable actions necessary to ensure that the Facility Energy is tracked for purposes of satisfying the RPS Law, as may be amended or supplemented by the PUC or CEC from time to time.

Section 6.9 Compliance Expenditure Cap. If a Change in Law occurring after the Effective Date has increased Seller's known or reasonably expected costs to comply with Seller's obligations under this Agreement with respect to obtaining, maintaining, conveying or effectuating Buyer's use of (as applicable) any Products, then the Parties agree that the maximum aggregate amount of out-of-pocket costs and expenses ("**Compliance Costs**") Seller shall be required to bear during the Delivery Term to comply with all of such obligations shall be capped at twenty-five thousand dollars ($25,000.00) per MW of Contract Capacity ("**Compliance Expenditure Cap**"). Seller's internal administrative costs associated with obtaining, maintaining, conveying or effectuating Buyer's use of (as applicable) any Product are excluded from the Compliance Expenditure Cap.

Any actions required for Seller to comply with its obligations set forth in the first paragraph above, the Compliance Costs of which will be included in the Compliance Expenditure Cap, shall be referred to collectively as the "**Compliance Actions**." Seller will determine, in Seller's reasonable discretion, the implementation schedule for Compliance Actions.

If Seller reasonably anticipates the need to incur Compliance Costs in excess of the Compliance Expenditure Cap in order to take any Compliance Action Seller shall provide Notice to Buyer of such anticipated Compliance Costs.

Buyer will have sixty (60) days to evaluate such Notice (during which time period Seller is not obligated to take any Compliance Actions described in the Notice) and shall, within such time, either (1) agree to reimburse Seller for all of the Compliance Costs that exceed the Compliance Expenditure Cap (such Buyer-agreed upon costs, the "**Accepted Compliance Costs**"), or (2) waive Seller's obligation to take such Compliance Actions, or any part thereof for which Buyer has not agreed to reimburse Seller. If Buyer does not respond to a Notice given by Seller under this Section 6.9 within sixty (60) days after Buyer's receipt of same, Buyer shall be deemed to have waived its rights to require Seller to take the Compliance Actions that are the subject of the Notice, and Seller shall have no further obligation to take, and no liability for any failure to take, these Compliance Actions for the remainder of the Term.

If Buyer agrees to reimburse Seller for the Accepted Compliance Costs, then Seller shall endeavor in good faith to expeditiously implement the Compliance Actions covered by the Accepted Compliance Costs as agreed upon by the Parties and Buyer shall reimburse Seller for Seller's actual costs to effect the Compliance Actions, not to exceed the Accepted Compliance Costs, within sixty (60) days of Buyer's receipt of any invoice from Seller.

ARTICLE VII
ENVIRONMENTAL ATTRIBUTES

Section 7.1 Transfer of Environmental Attributes. For and in consideration of Buyer entering into this Agreement, and in addition to the agreement by and between Buyer and Seller

to purchase and sell Facility Energy on the terms and conditions set forth herein, Seller shall transfer to Buyer, and Buyer shall receive from Seller, all right, title, and interest in and to all Environmental Attributes, whether now existing or acquired by Seller or that hereafter come into existence or are acquired by Seller during the Delivery Term associated with the Facility Energy. Seller agrees to transfer and make such Environmental Attributes available to Buyer immediately to the fullest extent allowed by applicable law upon Seller's production or acquisition of the Environmental Attributes. Seller represents and covenants that it has not assigned, transferred, conveyed, encumbered, sold or otherwise disposed of and shall not assign, transfer, convey, encumber, sell or otherwise dispose of all or any portion of such Environmental Attributes to any Person other than Buyer or attempt to do any of the foregoing with respect to any of the Environmental Attributes except with respect to any sales by Seller pursuant to Section 5.1. Buyer and Seller acknowledge and agree that the consideration for the transfer of Environmental Attributes is contained within the Contract Price.

Section 7.2 Reporting of Ownership of Environmental Attributes. During the Agreement Term, Seller shall not report to any Person that the Environmental Attributes granted hereunder to Buyer belong to any Person other than Buyer, and Buyer may report under any program that such Environmental Attributes purchased hereunder belong to it except with respect to any sales by Seller pursuant to Section 5.1, and during a Force Majeure.

Section 7.3 Environmental Attributes. Upon the request of Buyer or Buyer's Authorized Representative, Seller shall take all reasonable actions and execute all documents or instruments necessary under applicable law regulations, guidebooks promulgated by the CEC or PUC, bilateral arrangements or other voluntary Environmental Attribute programs of any kind, as applicable, to maximize the attribution, accrual, realization, generation, production, recognition and validation of Environmental Attributes throughout the Agreement Term and Seller shall file with the CEC and any other applicable Persons all materials and documents required to demonstrate that the Facility is entitled to be CEC Certified.

Section 7.4 WREGIS. In furtherance and not in limitation of Section 7.3, prior to Seller's first delivery of Facility Energy hereunder, Seller shall register with WREGIS to evidence the transfer of any Environmental Attributes under applicable law or any voluntary program ("***WREGIS Certificates***") associated with Facility Energy in accordance with WREGIS reporting protocols and WREGIS Operating Rules and shall register the Facility with WREGIS. After the Facility is registered with WREGIS, at the option of Buyer's Authorized Representative, Seller shall transfer WREGIS Certificates using the Forward Certificate Transfer method as described in WREGIS Operating Rules from Seller's WREGIS account to Buyer's WREGIS accounts, as designated by Buyer's Authorized Representative. Seller shall be responsible for WREGIS Certificate issuance fees and WREGIS expenses associated with registering the Facility, maintaining its account, acquiring and arranging for a Qualified Reporting Entity ("***QRE***") and any applicable QRE agreements, and transferring WREGIS Certificates to Buyer, Buyer's Authorized Representative, or any other designees. Buyer shall be responsible for its WREGIS expenses associated with maintaining its own account, or the accounts of its designees, if any, and subsequent transferring or retiring by it of WREGIS Certificates, or Seller's fees for the retirement of WREGIS Certificates on behalf of Buyer. Forward Certificate Transfers shall occur monthly based on the certificate creation timeline established by the WREGIS Operating Rules. Seller shall

be responsible for, at its expense, validating and disputing data with WREGIS prior to WREGIS Certificate creation each Month. In addition to the foregoing, Seller shall document the production and transfer of Environmental Attributes under this Agreement to Buyer by delivering to Buyer an attestation in substantially the form attached as Appendix D for the Environmental Attributes associated with Facility Energy, if any, measured in whole MWh, or by such other method as Buyer shall designate.

Section 7.5 Further Assurances. In addition to and not in limitation of Section 7.4, Seller shall document the production of Environmental Attributes by delivering with each invoice to Buyer an attestation for the Environmental Attributes associated with Facility Energy, if any, for the preceding Month in the form of the attestation set forth as Appendix D. At Buyer's Authorized Representative's request, the Parties shall execute all reasonable documents and instruments and take commercially reasonable actions in order to effect the transfer of the Environmental Attributes specified in this Agreement to Buyer and to maximize the attribution, accrual, realization, generation, production, recognition and validation of Environmental Attributes throughout the Agreement Term. In the event of the promulgation of a scheme involving Environmental Attributes administered by CAMD, upon notification by CAMD that any transfers contemplated by this Agreement shall not be recorded, each Party shall promptly cooperate in taking all reasonable actions necessary so that such transfer can be recorded. Each Party shall promptly give the other Party copies of all documents it submits to CAMD to effectuate any transfers.

ARTICLE VIII
CAPACITY RIGHTS

Section 8.1 Capacity Rights. For and in consideration of Buyer entering into this Agreement, and in addition to the agreement by Buyer and Seller to purchase and sell Facility Energy and Environmental Attributes on the terms and conditions set forth herein, Seller hereby transfers to Buyer, and Buyer hereby accepts from Seller, all of Seller's rights, title and interest in and to the Capacity Rights. The consideration for the transfer of Capacity Rights, if any, is contained within the Contract Price. In no event shall Buyer have any obligation or liability whatsoever for any debt pertaining to the Facility by virtue of Buyer's ownership of the Capacity Rights or otherwise. Throughout the Delivery Term, Seller shall use commercially reasonable efforts to maintain eligibility for Full Capacity Deliverability Status for the Facility from the CAISO and shall perform all actions necessary to ensure that the Facility qualifies to provide Resource Adequacy Benefits to Seller.

Section 8.2 Covenant Regarding Capacity Rights. Seller represents and covenants that it has not assigned, transferred, conveyed, encumbered, sold or otherwise disposed of and shall not in the future assign, transfer, convey, encumber, sell or otherwise dispose of any of the Capacity Rights to any Person other than Buyer or attempt to do any of the foregoing with respect to any of the Capacity Rights. During the Agreement Term, Seller shall not report to any Person that any of the Capacity Rights belong to any Person other than Buyer. Buyer may, at its own risk and expense, report to any Person that the Capacity Rights belongs to it.

Section 8.3 Further Assurances. Seller shall execute and deliver such documents and instruments and take such other action as reasonably required by the CAISO and as Buyer's Authorized Representative may reasonably request to effect recognition and transfer of the Capacity Rights to Buyer. Seller shall bear the costs associated therewith.

Section 8.4 Resource Adequacy Failure.

(a) RA Deficiency Determination. For each RA Shortfall Month, Seller shall pay to Buyer the RA Deficiency Amount as liquidated damages or provide Replacement RA, in each case, as the sole and exclusive remedy for the Capacity Rights Seller failed to convey to Buyer.

(b) RA Deficiency Amount Calculation. Commencing on the Initial Delivery Date, for each RA Shortfall Month, Seller shall pay to Buyer an amount (the "**RA Deficiency Amount**") equal to the product of the difference, expressed in kW, of (i) the Net Qualifying Capacity for such month, minus (ii) the amount of Resource Adequacy Capacity supplied from the Facility for such month, multiplied by the RA Capacity Rate; *provided* that Seller may, as an alternative to paying RA Deficiency Amounts, provide Replacement RA in the amount of (X) the Net Qualifying Capacity with respect to such month, minus (Y) the amount of Resource Adequacy Capacity supplied from the Facility with respect to such month, provided that any Replacement RA capacity is communicated by Seller to Buyer with Replacement RA product information in a written notice at least sixty-five (65) days before the relevant deadlines for the corresponding Compliance Showings applicable to the relevant Showing Month.

(c) Option to Provide Replacement RA. If Seller desires to provide replacement Resource Adequacy Capacity for any Showing Month from a different generating unit other than the Facility (the "**Replacement RA**"), then Seller may provide Buyer with Replacement RA from one or more replacement units, provided that in each case the Replacement RA is supplied from like-for-like replacement units that provide Buyer with equivalent Capacity Attributes as the Facility.

(d) Availability Standards. Seller agrees that the Facility may be subject to the terms of the Availability Standards, Non-Availability Charges, and Availability Incentive Payments as contemplated in the CAISO Tariff. Furthermore, the Parties agree that any Availability Incentive Payments are for the benefit of the Buyer and for Buyer's account and that any Non-Availability Charges are the responsibility of the Buyer and for Buyer's account; provided however, that notwithstanding the foregoing, Seller shall assume all liability and reimburse Buyer for any and all Non-Availability Charges incurred by Buyer because of Seller's failure to perform any covenant or obligation set forth in this Agreement.

ARTICLE IX
BILLING; PAYMENT; AUDITS; METERING; ATTESTATIONS; POLICIES

Section 9.1 Billing and Payment. Billing and payment for all Products shall be as set forth in this ARTICLE IX.

Section 9.2 Calculation of Energy Delivered; Invoices and Payment.

(a) Not later than the tenth (10th) day of each Month, commencing with the next Month following the Month in which Facility Energy is first delivered by Seller and received by Buyer pursuant to the terms and conditions of this Agreement, Seller shall deliver to Buyer an invoice showing the amount due for the preceding Month from Buyer to Seller for Facility Energy, Capacity Rights and Environmental Attributes. Seller shall calculate the amount of Facility Energy from meter readings at the Electric Metering Devices maintained pursuant to Section 9.6, adjusting for any applicable station load, transformation losses and transmission losses to the Point of Delivery in accordance with a methodology agreed to by Buyer. Each invoice shall show the title of the Agreement and, if applicable, the Agreement number, the name, address and identifying information of Seller and the identification of material, equipment or services covered by the invoices, and shall be sent to the address set forth in Appendix F or such other address as Buyer may provide to Seller. Seller shall separately provide in such invoice for any other amounts due to Seller, including amounts due under Section 6.5. Any electronic information delivered by Seller under this ARTICLE IX shall be in a format such as Microsoft Excel (or its equivalent) that allows Buyer to cut, paste or otherwise readily use and work with such information or documentation or as otherwise mutually agreed by the Parties.

(b) Concurrently with the delivery of each Monthly invoice, Seller shall deliver attestations of all Environmental Attribute transfers (including those transferred with WREGIS) substantially in the form set forth in Appendix D.

(c) Subject to Section 9.2(d) and Section 9.3, not later than the twenty-fifth (25th) day after receipt by Buyer of Seller's Monthly invoice (or the next succeeding Business Day, if the twenty-fifth (25th) day is not a Business Day), Buyer shall pay to Seller, by wire transfer of immediately available funds to an account specified by Seller or by any other means agreed to by the Parties from time to time, the amount set forth as due in such Monthly invoice.

(d) Notwithstanding Section 9.2(c), if Buyer believes that it has insufficient information to verify the amount of Deemed Generated Energy calculated by Seller in the invoice, or if Buyer requires additional time to verify such information, Buyer shall notify Seller thereof within twenty-five (25) days after receipt of an invoice from Seller, and timely pay the amounts set forth in such Monthly invoice not related to Deemed Generated Energy. Within thirty (30) days after receipt by Buyer of additional information regarding such Deemed Generated Energy calculation, or on the date mutually agreed to by the Parties, Buyer shall pay to Seller the amount specified in the invoice or notify Seller of any discrepancies with respect to its calculation of the Deemed Generated Energy, in which event such invoice shall be subject to the provisions of Section 9.3.

(e) Seller shall, in subsequent invoices, adjust previously invoiced amounts to reflect (i) adjustments pursuant to Section 9.3, or (ii) adjustments, reconciliations or final settlements with WREGIS occurring after the date of the initial invoice, or any other adjustments agreed to by the Parties (which shall be without interest of any kind), *provided* that Buyer shall not be required to make invoice payments if the invoice is received more than one (1) year after the billing period.

(f) Except with respect to disputed invoices where the dispute is first raised within six months after the applicable Monthly billing period and for any adjustments made pursuant to Section 9.2(e) and Section 9.6(a), Buyer shall not be required to make invoice payments if the invoice is received more than six (6) Months after the applicable Monthly billing period.

Section 9.3 Disputed Invoices. If any portion of any invoice is in dispute, the undisputed amount shall be paid when due. The Party disputing a payment shall promptly notify the other Party of the basis for the dispute, setting forth the details of such dispute in reasonable specificity. Disputes shall be discussed directly by the Parties' Authorized Representatives, who shall use reasonable efforts to amicably and promptly resolve such Disputes, and any failure to agree shall be subject to resolution in accordance with Section 12.3. Upon resolution of any Dispute, if all or part of the disputed amount is later determined to have been due, then the Party owing such payment or refund shall pay within ten (10) days after receipt of notice of such determination the amount determined to be due plus interest thereon at the Interest Rate from the due date until the date of payment. For purposes of this Section 9.3, "***Interest Rate***" shall mean the lesser of (i) two percent (2%) above the per annum Prime Rate reported daily in *The Wall Street Journal*, or (ii) the maximum rate permitted by applicable Requirements of Law.

Section 9.4 Right of Setoff. In addition to any right now or hereafter granted under applicable law and not by way of limitation of any such rights, each Party shall have the right at any time or from time to time without notice to other Party or to any other Person, any such notice being hereby expressly waived, to set off against any amount due a Party from the other Party under this Agreement or otherwise any amount due such Party from the other Party under this Agreement or otherwise, including any amounts due because of breach of this Agreement or any other obligation.

Section 9.5 Records and Audits. Seller shall maintain, and the Authorized Auditors shall have access to, all records and data pertaining to the performance and management of this Agreement (including compliance with the Requirements) and related Subcontracts, and as necessary to properly reflect all costs claimed to have been incurred hereunder and thereunder, including (a) in their original form, all (i) documents provided to Seller in the ordinary course of business for the Facility, (ii) documents for billing, costs, metering, and Environmental Attributes, (iii) books, records, documents, reports, deliverables, employee time sheets, accounting procedures and practices, and (iv) records of financial transactions, and (b) other evidence, regardless of form (for example, machine readable media such as disk or tape, etc.) or type (for example, databases, applications software, database management software, or utilities). If Seller is required to submit cost or pricing data in connection with this Agreement, Seller shall maintain all records and documents necessary to permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used. In the event of a Dispute, records that relate to the Agreement, Dispute, litigation or costs, or items to which an audit exception has been taken, shall be maintained by both Buyer and Seller. All records shall be retained, and shall be subject to examination and audit by the Authorized Auditors, for a period of not less than four (4) years following final payment made by Buyer hereunder, the expiration or termination date of this Agreement, or final settlement of all disputes, claims, or litigation, whichever is later. Seller

shall make said records or, to the extent accepted by the Authorized Auditors, photographs, micro-photographs, or other authentic reproductions thereof, available to the Authorized Auditors at Seller's principal business office or any other of Seller's offices as mutually agreed upon by Buyer and Seller, at all reasonable times and without charge. The Authorized Auditors may reproduce, photocopy, download, transcribe, and the like any such records. Any information provided by Seller on machine-readable media shall be provided in a format accessible and readable by the Authorized Auditors. Seller shall not, however, be required to furnish the Authorized Auditors with commonly available software. Seller shall be subject at any time with fourteen (14) days prior written notice to audits or examinations by Authorized Auditors, relating to all billings and required to verify compliance with all Agreement requirements relative to practices, methods, procedures, performance, compensation, and documentation. Examinations and audits shall be performed using generally accepted auditing practices and principles and applicable governmental audit standards. If Seller utilizes or is subject to Federal Acquisition Regulation, Part 30 and 31, et seq. accounting procedures, or a portion thereof, examinations and audits shall utilize such information. To the extent that an Authorized Auditor's examination or audit reveals inaccurate, incomplete or non-current records, or records are unavailable, the records shall be considered defective. Consistent with standard auditing procedures, Seller shall be provided fifteen (15) days to review an Authorized Auditor's examination results or audit and respond to Buyer prior to the examination's or audit's finalization and public release. Seller shall contractually require all Subcontractors performing services under this Agreement to comply with the provisions of this Section 9.5 by inserting this Section 9.5 into each Subcontract.

Section 9.6 Electric Metering Devices.

(a) Facility Energy shall be measured using a CAISO-approved revenue-quality Electric Metering Device that complies with the CAISO Tariff and relevant protocols and is dedicated exclusively to the Facility. The Electric Metering Device may be installed on the low-side of Seller's transformer and will include adjustments to reflect losses to the Point of Delivery. Seller shall arrange and bear all costs associated with the installation of the Electric Metering Devices needed for the registration, recording and transmission of information regarding the Facility Energy. Seller hereby agrees to provide a mutually agreed set of meter data to Buyer, which data shall be accessible to, and usable by, Buyer. In addition to providing Buyer with its meter data, Seller shall use commercially reasonable efforts to support any efforts by Buyer to obtain CAISO meter data applicable to the Facility and all inspection, testing and calibration data and reports from the CAISO. If the CAISO makes any adjustment to any CAISO meter data for a given time period not exceeding three (3) months, Seller agrees that it shall submit revised Monthly invoices, pursuant to this ARTICLE IX covering the entire applicable time period in order to fully conform such adjustments to the meter data. Seller shall submit any revised invoices no later than thirty (30) days after the date on which the CAISO provides Seller with binding adjustments to the meter data.

(b) Seller or its Authorized Representative, at no expense to Buyer, shall inspect and test all Electric Metering Devices upon installation and at least annually thereafter. Seller shall provide Buyer with reasonable advance notice of, and permit representatives of Buyer to witness and verify, such inspections and tests. Upon reasonable request by Buyer, Seller or its Authorized Representative shall perform additional inspections or tests of any Electric Metering

Device and shall permit a qualified representative of Buyer to inspect or witness the testing of any Electric Metering Device. The actual expense of any additional inspection or testing reasonably requested shall be borne by Seller. Seller shall provide copies of any inspection or testing reports to Buyer.

(c) If an Electric Metering Device fails to register, or if the measurement made by an Electric Metering Device is found upon testing to be inaccurate by more than plus or minus one percent (+/- 1.0%), an adjustment shall be made to correct all measurements made by the inaccurate or defective Electric Metering Device for both the amount of the inaccuracy and the period of the inaccuracy, such adjustment to be made by the Scheduling Coordinator. To the extent that the adjustment period covers a period of deliveries for which payment has already been made by Buyer, Buyer shall use the corrected measurements as determined in accordance with this Section 9.6 to recompute the amount due for the period of the inaccuracy and shall subtract the previous payments by Buyer for this period from such recomputed amount. If the difference is a positive number, the difference shall be paid by Buyer to Seller; if the difference is a negative number, that difference shall be paid by Seller to Buyer, or at the direction of Buyer, may take the form of an offset to payments due to Seller from Buyer. Payment of such difference by the owing Party shall be made not later than thirty (30) days after the owing Party receives notice of the amount due, unless Buyer elects payment via an offset.

Section 9.7 Taxes. Seller shall be responsible for and shall pay, before the due dates therefor, any and all federal, state, and local Taxes incurred by it as a result of entering into this Agreement and all Taxes imposed or assessed with respect to the Facility, or any other assets of Seller, the Products or the transaction arising before or at the Point of Delivery. Buyer shall pay or cause to be paid all Taxes on or with respect to the Products or the transaction from (but excluding) the Point of Delivery to Buyer. If Seller is required by a Requirement of Law to remit or pay Taxes that are the responsibility of Buyer hereunder, Buyer shall promptly reimburse Seller for such Taxes. If Buyer is required by Requirement of Law to remit or pay Taxes that are Seller's responsibility hereunder, Buyer may deduct such amounts from payments to Seller hereunder; if Buyer elects not to deduct such amounts from Seller's payments, Seller shall promptly reimburse Buyer for such amounts upon request. Nothing shall obligate or cause a Party to pay or be liable to pay any Taxes for which it is exempt under law. A Party that is exempt at any time and for any reason from one or more Taxes shall bear the risk that such exemption shall be lost or the benefit of such execution be reduced.

ARTICLE X
REPRESENTATIONS, WARRANTIES AND COVENANTS

Section 10.1 Representations and Warranties of Buyer. Buyer makes the following representations and warranties to Seller as of the Effective Date and continuing throughout the Delivery Term:

(a) Buyer is a validly existing California joint powers authority, and has the legal power and authority to own its properties, to carry on its business as now being conducted and to enter into this Agreement, and to carry out the transactions contemplated hereby, and to

perform and carry out all covenants and obligations on its part to be performed under and pursuant to this Agreement.

(b) The execution, delivery and performance by Buyer of this Agreement (i) have been duly authorized by all necessary action, and does not and will not require any consent or approval of Buyer's regulatory or governing bodies, other than that which has been obtained; and (ii) does not violate any federal, state, and local law, including the California Government Code and similar laws.

(c) This Agreement constitutes the legal, valid and binding obligation of Buyer enforceable in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization or similar laws relating to or affecting the enforcement of creditors' rights generally or by general equitable principles, regardless of whether such enforceability is considered in a proceeding in equity or at law.

Section 10.2 Representations and Warranties of Seller. Except as otherwise set forth in this Agreement, Seller makes each of the following representations and warranties to Buyer as of the Effective Date and continuing throughout the Delivery Term.

(a) Seller is an independent special district formed under the Irrigation District Act (Division 11 of the California Water Code) of the State of California, and has legal power and authority under the Irrigation District Act (Division 11 of the California Water Code) of the State of California to carry on its business as now being conducted and to enter into this Agreement, and to carry out the transactions contemplated hereby, and to perform and carry out all covenants and obligations on its part to be performed under and pursuant to this Agreement.

(b) Seller owns and operates the Facility and has not assigned, transferred, conveyed, sold or otherwise disposed of the Facility.

(c) Seller owns or has contractual right to all of the water rights necessary to operate the Facility in accordance with the Agreement.

(d) Seller has filed an Application for a New License for the South Feather Power Project pursuant to the Federal Power Act and FERC's regulations thereunder; and Seller had filed an application with FERC for approval of this Agreement pursuant to Section 22 of the Federal Power Act, 16 U.S.C. § 815.

(e) Except for Seller's need to obtain the regulatory approval addressed in Section 11.1(h), the execution, delivery and performance by Seller of this Agreement (i) have been duly authorized by all necessary action, and does not and will not require any consent or approval of Seller's regulatory or governing bodies, other than that which has been obtained; and (ii) does not violate any federal, state, and local law, including the California Government Code and similar laws.

(f) This Agreement constitutes the legal, valid and binding obligation of Seller enforceable in accordance with its terms, except as such enforceability may be limited by

bankruptcy, insolvency, reorganization or similar laws relating to or affecting the enforcement of creditors' rights generally or by general equitable principles, regardless of whether such enforceability is considered in a proceeding in equity or at law.

(g) The Parties note Seller's pending application for regulatory approval addressed in Section 11.1(h). Assuming receipt of that approval, the execution and delivery of this Agreement, the consummation of the transactions contemplated hereby and thereby and the fulfillment of and compliance with the provisions of this Agreement, does not conflict with or constitute a breach of or a default under, any of the terms, conditions or provisions of any Requirement of Law, or any organizational documents, agreement, deed of trust, mortgage, loan agreement, other evidence of indebtedness or any other agreement or instrument to which Seller is a party or by which it or any of its property is bound, or result in a breach of or a default under any of the foregoing or result in or require the creation or imposition of any Lien upon any of the properties or assets of Seller (except as contemplated hereby), and Seller has obtained all Permits and licenses required for the operation, and maintenance of the Facility in accordance with the Requirements and the performance of Seller's obligations hereunder to which Seller is a party, or such Permits and licenses are reasonably expected to be timely obtained in the ordinary course of business.

(h) Other than Seller's pending application for regulatory approval addressed in Section 11.1(h), there is no pending, or to the knowledge of Seller, threatened action or proceeding affecting Seller before any Governmental Authority, which purports to affect the legality, validity or enforceability of this Agreement.

(i) In 2005 Seller and a neighboring water provider, North Yuba Water District, settled a longstanding dispute through agreement that, among other terms, requires Seller to share fifty percent (50%) of the annual net revenue, if any, from the generation of hydroelectric power from certain facilities. Neither the 2005 Agreement, nor litigation concerning the 2005 Agreement titled North Yuba Water District vs. South Feather Water and Power Agency, Superior Court of the State of California, County of Butte, Case No. 21CV01563 and any related cases affects the legality, validity or enforceability of this Agreement.

(j) Assuming receipt of the regulatory approval described in Section 11.1(h), Seller is not in violation of any Requirement of Law, which violations, individually or in the aggregate, would reasonably be expected to result in a material adverse effect on the business, assets, operations, condition (financial or otherwise) or prospects of Seller, or the ability of Seller to perform any of its obligations under this Agreement.

(k) Assuming receipt of the regulatory approval addressed in Section 11.1(h), Seller owns or possesses or will acquire all patents, rights to patents, trademarks, copyrights and licenses necessary for the performance by Seller of its obligations under this Agreement, and, to Seller's knowledge, Seller's use thereof does not infringe on the intellectual property rights of third parties.

(l) Seller has not assigned, transferred, conveyed, encumbered, sold or otherwise disposed of the Products except as provided herein.

(m) The Facility is located in the State of California.

(n) Seller will be responsible for obtaining all permits necessary to enter into this Agreement and operate the Facility and Seller will be the applicant on any CEQA documents.

ARTICLE XI
DEFAULT; TERMINATION AND REMEDIES; PERFORMANCE DAMAGE

Section 11.1 Default. Each of the following events or circumstances shall constitute a "***Default***" by the responsible Party (the "***Defaulting Party***"):

(a) **Payment Default**. Failure by a Party to make any payment under this Agreement when and as due (other than payments disputed in good faith) that is not cured within thirty (30) days after receipt of notice thereof from the other Party (which amount shall include payment of interest from the due date at the Interest Rate).

(b) **Performance Default**. Failure by a Party to perform any of its duties or obligations under this Agreement (other than any failure that is separately listed as a Default of Seller under this Section 11.1) that is not cured within thirty (30) days after receipt of notice thereof from the other Party; *provided* that if such failure is curable, but cannot be cured within such thirty (30) day period despite reasonable commercial efforts and such failure is not a failure to make a payment when due, such Party shall have up to sixty (60) additional days to cure.

(c) **Breach of Representation and Warranty.** Any representation, warranty, certification or other statement made by a Party in this Agreement that is false or inaccurate at the time made and materially and adversely affects the Party's ability to perform its obligations hereunder; *provided* that no Default shall exist if such falsity or inaccuracy is remedied within thirty (30) days after receipt of notice thereof from another Party; and further provided that if such falsity or inaccuracy is curable, but cannot be cured within such thirty (30) day period despite reasonable commercial efforts, such Party shall have up to sixty (60) additional days to cure.

(d) **Bankruptcy**. Bankruptcy of Buyer or Seller.

(e) **Insurance Default**. The failure of Seller to maintain and provide acceptable evidence of the required Insurance for the required period of coverage as set forth in Appendix E that is not cured within five (5) Business Days after receipt of notice of such failure from Buyer.

(f) **Fundamental Change**. Except as permitted by Section 12.7, a Party makes an assignment of its rights or delegation of its obligations under this Agreement.

(g) **Casualty**. Seller fails to meet its obligations under Section 12.19(d).

(h) **Adverse Regulatory Determination Default**. The Parties recognize that Seller requires regulatory approval from FERC to sell and deliver power from the South Feather

Power Project for periods extending beyond the date of termination of Seller's annual license for the Project. The Parties also recognize that the ten-year term for this Agreement is necessary for Buyer to receive the full benefit of this Agreement. Accordingly, Seller must receive by March 31, 2022, either (1) a new FERC license for the South Feather Power Project for a term at least exceeding the Initial Delivery Term of this Agreement, or (2) FERC approval of this Agreement under Section 22 of the Federal Power Act. Seller has applied for both. Failure to receive one of these approvals by March 31, 2022 shall constitute a Default. The Parties recognize that they cannot predict the timing in which FERC will act, and that FERC action could cure the Default. If Seller continues to operate under a new annual license after March 31, 2022, Seller shall have until December 31, 2022 to cure the Default. Further extensions to the time period for curing the Default may be agreed by the Parties. In the event that such an Adverse Regulatory Determination Default is not cured, no Termination Payment shall be due to either Party.

Section 11.2 Default Remedy.

(a) If Buyer is in Default for nonpayment, subject to any duty or obligation under this Agreement, Seller may, at its option, suspend performance hereunder or continue to provide services pursuant to its obligations under this Agreement; *provided* that nothing in this Section 11.2(a) shall affect Seller's rights and remedies set forth in this Section 11.2. Seller's continued service to Buyer shall not act to relieve Buyer of any of its duties or obligations under this Agreement.

(b) Notwithstanding any other provision herein, if any Default has occurred and is continuing, the affected Party may, whether or not the dispute resolution procedure set forth in Section 12.3 has been invoked or completed, bring an action in any court of competent jurisdiction as set forth in Section 12.3 seeking injunctive relief in accordance with applicable rules of civil procedure.

(c) Except as expressly limited by this Agreement, if a Default has occurred and is continuing and Buyer is the Defaulting Party, Seller may without further notice exercise any rights and remedies provided herein or otherwise available at law or in equity including a termination of this Agreement pursuant to Section 11.3. No failure of Seller to exercise, and no delay in exercising, any right, remedy or power hereunder shall operate as a waiver thereof, nor shall any single or partial exercise by Seller of any other right, remedy or power hereunder preclude any other or future exercise of any right, remedy or power.

(d) Except as expressly limited by this Agreement, if a Default has occurred and is continuing and Seller is the Defaulting Party, Buyer may without further notice exercise any rights and remedies provided for herein, or otherwise available at law or equity, including termination of this Agreement pursuant to Section 11.3. No failure of Buyer to exercise, and no delay in exercising, any right, remedy or power hereunder shall operate as a waiver thereof, nor shall any single or partial exercise by Buyer of any right, remedy or power hereunder preclude any other or future exercise of any right, remedy or power by Buyer.

Section 11.3 Termination for Default.

(a) If a Default occurs, the Party that is not the Defaulting Party (the "***Non-Defaulting Party***") may, for so long as the Default is continuing and, to the extent permitted by applicable law, without limiting any other rights or remedies available to the Non-Defaulting Party under this Agreement, by notice by it ("***Termination Notice***") to the Defaulting Party (i) establish a date (which shall be no earlier than the date of such notice and no later than twenty (20) days after the date of such notice) ("***Early Termination Date***") on which this Agreement shall terminate, and (ii) withhold any payments due in respect of this Agreement; *provided*, upon the occurrence of any Default of the type described in Section 11.1(d), this Agreement shall automatically terminate, without notice or other action by either Party as if an Early Termination Date had been declared immediately prior to such event.

(b) If an Early Termination Date has been designated, the Non-Defaulting Party shall appoint a qualified independent third party to calculate in a commercially reasonable manner its Gains, Losses and Costs resulting from the termination of this Agreement and the resulting Termination Payment. The Gains, Losses and Costs relating to the Products that would have been required to be delivered under this Agreement had it not been terminated shall be determined by comparing the amounts Buyer would have paid for the Products under this Agreement to the equivalent quantities and relevant market prices, either quoted by one or more bona fide third party offers, or which are reasonably expected by the Non-Defaulting Party to be available in the market under a replacement contract for this Agreement covering the same products and having a term equal to the Remaining Term at the date of the Termination Notice, adjusted to account for differences in transmission, if any. To ascertain the market prices of a replacement contract, the Non-Defaulting Party may consider, among other valuations, quotations from dealers in Energy contracts and bona fide third party offers. The Non-Defaulting Party shall not be required to enter into any such replacement agreement in order to determine its Gains, Losses and Costs or the Termination Payment.

(c) For purposes of the Non-Defaulting Party's determination of its Gains, Losses and Costs and the Termination Payment, it shall be assumed, regardless of the facts, that Seller would have sold, and Buyer would have purchased, each day during the Remaining Term (i) Facility Energy in an amount equal to the Assumed Daily Deliveries, (ii) the Environmental Attributes associated therewith, and (iii) all other components of the Products. The "***Assumed Daily Deliveries***" shall be an amount equal to the average daily amount of Facility Energy forecasted to be delivered during an average hydrological period by Seller, during the Delivery Term, if any.

(d) The Non-Defaulting Party shall notify the Defaulting Party of the Termination Payment, which notice shall include a written statement explaining in reasonable detail the calculation of such amount. If the Termination Payment is a positive number, the Defaulting Party shall, within ten (10) Business Days after receipt of such notice, pay the Termination Payment to the Non-Defaulting Party, together with interest accrued at the Interest Rate from the Early Termination Date until paid.

(e) If the Defaulting Party disagrees with the calculation of the Termination Payment and the Parties cannot otherwise resolve their differences, the calculation of the Termination Payment shall be submitted to the dispute resolution process provided in Section 12.3.

Following resolution of the dispute, the Defaulting Party shall pay the full amount of the Termination Payment (if any) as determined by such resolution as and when required, but no later than thirty (30) days following the date of such resolution, together with all interest, at the Interest Rate, that accrued from the Early Termination Date until the date the Termination Payment is paid.

(f) For purposes of this Agreement:

(i) "***Gains***" means, with respect to a Party, an amount equal to the present value of the economic benefit (exclusive of Costs), if any, resulting from the termination of its obligations under this Agreement, determined in a commercially reasonable manner;

(ii) "***Losses***" means, with respect to a Party, an amount equal to the present value of the economic loss (exclusive of Costs), if any, resulting from the termination of its obligations under this Agreement, determined in a commercially reasonable manner;

(iii) "***Costs***" means, with respect to a Party, brokerage fees, commissions and other similar transaction costs and expenses reasonably incurred in terminating any arrangement pursuant to which it has hedged its obligations or in entering into new arrangements which replace this Agreement, excluding attorneys' fees, if any, incurred in connection with enforcing its rights under this Agreement. Each Party shall use reasonable efforts to mitigate or eliminate its Costs.

(iv) In no event shall a Party's Gains, Losses or Costs include any penalties or similar charges imposed by the Non-Defaulting Party.

(v) The Present Value Rate shall be used as the discount rate in all present value calculations required to determine Gains, Losses and Costs.

(g) At the time for payment of any amount due under this Section 11.3 each Party shall pay to the other Party, all additional amounts, if any, payable by it under this Agreement (including any amounts withheld pursuant to Section 11.3(a)).

(h) Notwithstanding the forgoing provisions of Section 11.3, in no event shall a termination payment be due to a Defaulting Party.

ARTICLE XII
MISCELLANEOUS

Section 12.1 Authorized Representative. Each Party shall designate an authorized representative who shall be authorized to act on its behalf with respect to those matters contained herein (each an "***Authorized Representative***"), which shall be the functions and responsibilities of such Authorized Representatives. Each Party may also designate an alternate who may act for the Authorized Representative. Within thirty (30) days after execution of this Agreement, each Party shall notify the other Party of the identity of its Authorized Representative, and alternates if

designated, and shall promptly notify the other Party of any subsequent changes in such designation. The Authorized Representatives shall have no authority to alter, modify, or delete any of the provisions of this Agreement. To the extent that an Authorized Representative's contact information is not provided in Appendix F, at the time a Party designates such Authorized Representative, such Party shall concurrently provide written notice to the other Party of such Authorized Representative's contact information.

Section 12.2 Notices. With the exception of billing invoices pursuant to Article 9 and day-to-day ordinary course and operational communications, all notices, requests, demands, consents, approvals, waivers and other communications which are required under this Agreement shall be (a) in writing (regardless of whether the applicable provision expressly requires a writing), (b) deemed properly sent if delivered in person or sent by facsimile transmission, reliable overnight courier, or sent by registered or certified mail, postage prepaid to the persons specified in Appendix F, and (c) deemed delivered, given and received on the date of delivery, in the case of facsimile transmission, or on the date of receipt or rejection in the case of delivery in person, by reliable overnight courier, or by registered or certified mail. In addition to the foregoing, the Parties may agree in writing at any time to deliver notices, requests, demands, consents, approvals, waivers and other communications through alternate methods, such as electronic mail.

Section 12.3 Dispute Resolution.

(a) In the event of any claim, controversy or dispute between the Parties arising out of or relating to or in connection with this Agreement (including any dispute concerning the validity of this Agreement or the scope and interpretation of this Section 12.3) (a "***Dispute***"), either Party (the "***Notifying Party***") may deliver to the other Party (the "***Recipient Party***") notice of the Dispute with a detailed description of the underlying circumstances of such Dispute (a "***Dispute Notice***"). The Dispute Notice shall include a schedule of the availability of the Notifying Party's senior officers (having a title of senior vice president (or its equivalent) or higher) duly authorized to settle the Dispute, or, in the case of Seller, authorized to recommend settlement to Seller's Board of Directors, during the thirty (30) day period following the delivery of the Dispute Notice.

(b) The Recipient Party shall, within five (5) Business Days following receipt of the Dispute Notice, provide to the Notifying Party a parallel schedule of availability of the Recipient Party's senior officers (having a title of senior vice president (or its equivalent) or higher) duly authorized to settle the Dispute, or, in the case of Seller, authorized to recommend settlement to the Seller's Board of Directors. Following delivery of the respective senior officers' schedules of availability, the senior officers of the Parties shall meet and confer as often as they deem reasonably necessary during the remainder of the thirty (30) day period in good faith negotiations to resolve the Dispute to the satisfaction of each Party.

(c) In the event a Dispute is not resolved pursuant to the procedures set forth in Section 12.3(a) and Section 12.3(b) by the expiration of the thirty (30) day period set forth in Section 12.3(a), then a Party may pursue any legal remedy available to it in accordance with the provisions of Section 12.12 and Section 12.13 of this Agreement.

(d) In addition to the Dispute resolution process set forth in this Section 12.3, the Parties shall comply with California law governing claims against public entities and presentment of such claims, if applicable.

Section 12.4 Further Assurances; Change in Electric Market Design.

(a) Each Party agrees to execute and deliver all further instruments and documents, and take all further actions not inconsistent with the provisions of this Agreement that may be reasonably necessary to effectuate the purposes and intent of this Agreement.

(b) If a change in the CAISO Tariff renders this Agreement or any provisions hereof incapable of being performed or administered, then either Party may request that Buyer and Seller enter into negotiations to make the minimum changes to this Agreement necessary to make this Agreement capable of being performed and administered, while attempting to preserve to the maximum extent possible the benefits, burdens, and obligations set forth in this Agreement as of the Effective Date. Upon delivery of such a request, Buyer and Seller shall engage in such negotiations in good faith. If Buyer and Seller are unable, within sixty (60) days after delivery of such request, to agree upon changes to this Agreement or to resolve issues relating to changes to this Agreement, then either Party may submit issues pertaining to changes to this Agreement to the Dispute resolution process set forth in Section 12.3. Notwithstanding the foregoing, a change in cost shall not in and of itself be deemed to render this Agreement or any of the provisions hereof incapable of being performed or administered, or constitute, or form the basis of, a Force Majeure.

Section 12.5 No Dedication of Facilities. Any undertaking by one Party to the other Party under any provisions of this Agreement shall not constitute the dedication of the Facility or any portion thereof of either Party to the public or to the other Party or any other Person, and it is understood and agreed that any such undertaking by either Party shall cease upon the termination of such Party's obligations under this Agreement.

Section 12.6 Force Majeure.

(a) A Party shall not be considered to be in Default in the performance of any of its obligations under this Agreement when and to the extent such Party's performance is prevented by a Force Majeure that, despite the exercise of due diligence, such Party is unable to prevent or mitigate, *provided* the Party has given a written detailed description of the full particulars of the Force Majeure to the other Party reasonably promptly after becoming aware thereof (and in any event within fourteen (14) days after the initial occurrence of the claimed Force Majeure event) (the "***Force Majeure Notice***"), which notice shall include information with respect to the nature, cause and date and time of commencement of such event, and the anticipated scope and duration of the delay. The Party providing such Force Majeure Notice shall be excused from fulfilling its obligations under this Agreement until such time as the Force Majeure has ceased to prevent performance or other remedial action is taken, at which time such Party shall promptly notify the other Party of the resumption of its obligations under this Agreement. If Seller is unable to deliver, or Buyer is unable to receive, Facility Energy due to a Force Majeure, then Buyer shall have no obligation to pay Seller for Facility Energy not delivered or received by reason thereof. In no event shall Buyer be obligated to compensate Seller or any other Person for any losses,

expenses or liabilities that Seller or such other Person may sustain as a consequence of any Force Majeure.

(b) The term "***Force Majeure***" means any act of God (including fire, flood, earthquake, extremely severe storm, lightning strike, tornado, volcanic eruption, hurricane or other natural disaster), labor disturbance, pandemic, strike or lockout of a national scope, act of the public enemy, war, insurrection, riot, explosion, terrorist activities or any order, regulation or restriction imposed by Governmental Authority, military or lawfully established civilian authorities, or other occurrence that (i) prevents one Party from performing any of its obligations under this Agreement, (ii) could not reasonably be anticipated as of the date of this Agreement, (iii) is not within the reasonable control of, or the result of negligence, willful misconduct, breach of contract, intentional act or omission or wrongdoing on the part of the affected Party (or any subcontractor or Affiliate of that Party, or any Person under the control of that Party or any of its subcontractors or Affiliates, or any Person for whose acts such subcontractor or Affiliate is responsible), and (iv) by the exercise of due diligence the affected Party is unable to overcome or avoid or cause to be avoided; *provided*, nothing in clause (iv) above shall be construed so as to require a Party to accede or agree to any provision not satisfactory to it in order to settle and terminate a strike or labor dispute in which it may be involved. Any Party rendered unable to fulfill any of its obligations by reason of a Force Majeure shall exercise due diligence to remove such inability with reasonable dispatch within a reasonable time period and mitigate the effects of the Force Majeure. The relief from performance shall be of no greater scope and of no longer duration than is required by the Force Majeure. Without limiting the generality of the foregoing, a Force Majeure does not include any of the following (each an "***Unexcused Cause***"): (1) any requirement to comply with a RPS Law or any change (whether voluntary or mandatory) in any RPS Law, or other Change in Law, that may affect the value of the Products; (2) events arising from the failure by Seller to operate or maintain the Facility in accordance with this Agreement; (3) any increase of any kind in any cost; (4) delays in or inability of a Party to obtain financing or other economic hardship of any kind; (5) Seller's ability to sell any Facility Energy at a price in excess of those provided in this Agreement or Buyer's ability to purchase Product or any part thereof at a price lower than those provided in this Agreement; (6) curtailment or other interruption of any Transmission Service, including public safety power shutoff's by the Transmission Provider; (7) failure of third parties to provide goods or services essential to a Party's performance; (8) Facility or equipment failure of a kind that is not caused by Force Majeure; or (9) any changes in the financial condition of Buyer or Seller affecting the affected Party's ability to perform its obligations under this Agreement.

(c) Buyer may terminate this Agreement if (i) a Force Majeure event occurs that diminishes the production of the Facility by more than fifty percent (50%) of the Contract Capacity for a period of eighteen (18) consecutive months, or (ii) the Facility is rendered inoperable and an independent engineer that is mutually acceptable to both Parties determines that the Facility cannot be repaired or replaced within a period not to exceed twenty four (24) months following the date of the occurrence of the Force Majeure event.

(d) Seller may terminate this Agreement if a Force Majeure event occurs that renders Buyer's facilities that are used to Schedule and dispatch the Facility inoperable for a period of eighteen (18) consecutive months.

(e) Any termination of this Agreement under Section 12.6(c) or Section 12.6(d) shall be "no-fault" and neither Party shall have any liability or obligation to the other Party arising out of such termination. Notwithstanding the foregoing, upon any such termination, each Party shall pay the other Party for any and all amounts hereunder that may be owing, or other outstanding payments due in the ordinary course that occurred prior to the termination. The exercise by Buyer of its right to terminate the Agreement shall not render Buyer or Seller liable for any losses or damages incurred by the other Party whatsoever.

Section 12.7 Assignment of Agreement. Except as otherwise set forth in this Agreement, a Party shall not assign any of its rights, or delegate any of its obligations, in or under this Agreement, without the prior written consent of the other Party, and such consent not to be unreasonably withheld. Any purported assignment or delegation in violation of this provision shall be null and void and of no force or effect.

Section 12.8 Ambiguity. The Parties acknowledge that this Agreement was jointly prepared by them, by and through their respective legal counsel, and any uncertainty or ambiguity existing herein shall not be interpreted against either Party on the basis that the Party drafted the language, but otherwise shall be interpreted according to the application of the rules on interpretation of contracts.

Section 12.9 Attorneys' Fees & Costs. Both Parties agree that in any action to enforce the terms of this Agreement that each Party shall be responsible for its own attorneys' fees and costs. Each of the Parties to this Agreement was represented by its respective legal counsel during the negotiation and execution of this Agreement.

Section 12.10 Voluntary Execution. Both Parties acknowledge that they have read and fully understand the content and effect of this Agreement and that the provisions of this Agreement have been reviewed and approved by their respective counsel. The Parties further acknowledge that they have executed this Agreement voluntarily, subject only to the advice of their own counsel, and do not rely on any promise, inducement, representation or warranty that is not expressly stated herein.

Section 12.11 Entire Agreement; Amendments. This Agreement (including all Appendices and Exhibits) contains the entire understanding concerning the subject matter herein and supersedes and replaces any prior negotiations, discussions or agreements between the Parties, or any of them, concerning that subject matter, whether written or oral, except as expressly provided for herein. This is a fully integrated document. Each Party acknowledges that no other party, representative or agent, has made any promise, representation or warranty, express or implied, that is not expressly contained in this Agreement that induced the other Party to sign this document. This Agreement may be amended or modified only by an instrument in writing signed by each Party; provided, however, Appendix C contains detailed principles, descriptions and procedures for Scheduling and operation of the Facility, and Appendix C may be amended from time to time upon mutual written consent of the Authorized Representative of each Party.

Section 12.12 Governing Law. This Agreement was made and entered into in the County of Placer, California and shall be governed by, interpreted and enforced in accordance with the laws of the State of California, without regard to conflict of law principles.

Section 12.13 Venue. All litigation arising out of, or relating to this Agreement, shall be brought in a state or federal court in the County of Placer or the County of Butte in the State of California. The Parties irrevocably agree to submit to the exclusive jurisdiction of such courts and waive any defense of forum non conveniens.

Section 12.14 Execution in Counterparts. This Agreement may be executed in counterparts and upon execution by each signatory, each executed counterpart shall have the same force and effect as an original instrument and as if all signatories had signed the same instrument. Any signature page of this Agreement may be detached from any counterpart of this Agreement without impairing the legal effect of any signature thereon, and may be attached to another counterpart of this Agreement identical in form hereto by having attached to it one or more signature pages.

Section 12.15 Effect of Section Headings. Section headings appearing in this Agreement are inserted for convenience only and shall not be construed as interpretations of text.

Section 12.16 Waiver; Available Remedies. The failure of either Party to this Agreement to enforce or insist upon compliance with or strict performance of any of the terms or conditions hereof, or to take advantage of any of its rights hereunder, shall not constitute a waiver or relinquishment of any such terms, conditions or rights, but the same shall be and remain at all times in full force and effect. Except to the extent this Agreement expressly provides an exclusive remedy for a breach, nothing contained herein shall preclude either Party from seeking and obtaining any available remedies hereunder, including recovery of damages caused by the breach of this Agreement and specific performance or injunctive relief, or any other remedy given under this Agreement or now or hereafter existing in law or equity or otherwise. Seller acknowledges that money damages may not be an adequate remedy for violations of this Agreement and that Buyer may, in its sole discretion seek and obtain from a court of competent jurisdiction specific performance or injunctive or such other relief as such court may deem just and proper to enforce this Agreement or to prevent any violation hereof. Seller hereby waives any objection to specific performance or injunctive relief; provided that where this Agreement provides an exclusive remedy, then specific performance and injunctive relief are not available. The rights granted herein are cumulative except where otherwise provided herein.

Section 12.17 Relationship of the Parties. This Agreement shall not be interpreted to create an association, joint venture or partnership between the Parties hereto or to impose any partnership obligation or liability upon either Party. Neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as an agent or representative of, the other Party.

Section 12.18 Third Party Beneficiaries. The provisions of this Agreement are solely for the benefit of the Parties. Nothing in this Agreement, whether express or implied, shall be construed to give to, or be deemed to create in, any other Person, whether as a third party

beneficiary of this Agreement or otherwise, any legal or equitable right, remedy or claim in respect of this Agreement or any covenant, condition, provision, duty, obligation or undertaking contained or established herein. This Agreement shall not be construed in any respect to be a contract in whole or in part for the benefit of any Person that is not a party hereto.

Section 12.19 Indemnification; Damage or Destruction; Insurance; Condemnation; Limit of Liability.

(a) **Indemnification by Seller.** Seller undertakes and agrees to indemnify and hold harmless Buyer, Participating Members, and all of their respective commissioners, officers, agents, employees, advisors, and Authorized Representatives and assigns and successors in interest (collectively, "***Buyer Indemnitees***") and, at the option of Buyer, to defend such Buyer Indemnitees from and against any and all suits and causes of action (including proceedings before administrative agencies), claims, charges, damages, demands, judgments, civil fines and penalties, other monetary remedies or losses of any kind or nature whatsoever, for death, bodily injury or personal injury to any person, including Seller's employees and agents, or third persons, or damage or destruction to any property of either Party or third persons, in any manner arising by reason of any breach of this Agreement by Seller, any failure of a representation, warranty or guarantee of Seller hereunder to be true in all material respects, the negligent acts, errors, omissions or willful misconduct incident to the performance of this Agreement on the part of Seller, or any of the Seller's officers, agents, employees, or subcontractors of any tier, except to the extent caused by the gross negligence or willful misconduct of any such Seller Indemnitee. Any liability of Seller shall be limited to the extent of actual coverage and coverage limits of the insurance policies described in Appendix E.

(b) **Indemnification by Buyer.** Buyer undertakes and agrees to indemnify and hold harmless Seller, and all of its respective officers, agents, employees, directors, advisors, and Authorized Representatives and assigns and successors in interest (collectively, "***Seller Indemnitees***") and, at the option of Seller, to defend such Seller Indemnitees from and against any and all suits and causes of action (including proceedings before administrative agencies), claims, charges, damages, demands, judgments, civil fines and penalties, other monetary remedies or losses of any kind or nature whatsoever, for death, bodily injury or personal injury to any person, including Buyer's employees and agents, or third persons, or damage or destruction to any property of either Party or third persons, in any manner arising by reason of any breach of this Agreement by Buyer, any failure of a representation, warranty or guarantee of Buyer hereunder to be true in all material respects, the negligent acts, errors, omissions or willful misconduct incident to the performance of this Agreement on the part of Buyer, or any of the Buyer's officers, agents, employees, or subcontractors of any tier, except to the extent caused by the gross negligence or willful misconduct of any such Buyer Indemnitee. Any liability of Buyer shall be limited to the lesser of the extent of actual coverage and coverage limits of Buyer's insurance policies or the minimum insurance requirements for Seller described in Appendix E.

(c) **Notice.** The Parties shall give each other prompt notice of the making of any claim or the commencement of any action, suit or proceeding covered by the provisions of this Section 12.19.

(d) **Damage or Destruction.** If there is a casualty event or other event causing the destruction of the Facility that renders the Facility incapable of generating 50% or more of the Contract Capacity, Seller shall, within four (4) months of such event, enter into a contract for the design of a replacement facility designed to be capable of satisfying the obligations of Seller under this Agreement.

(e) **Insurance.** Seller shall obtain and maintain the Insurance coverages listed in Appendix E.

(f) **Condemnation or Other Taking.** Throughout the Agreement Term, Seller shall immediately notify buyer of the institution of any proceeding for the condemnation or other taking of the Facility, the Facility assets, or any portion thereof, including the occurrence of any hearing associated therewith. Buyer may participate in any such proceeding and Seller shall deliver to Buyer all instruments necessary or required by Buyer to permit such participation. Without Buyer's prior written consent, Seller (i) shall not agree to any compensation or award, and (ii) shall not take any action or fail to take any action which would cause the compensation to be determined.

(g) **Limitation of Liability.** EXCEPT TO THE EXTENT INCLUDED IN THE LIQUIDATED DAMAGES, INDEMNIFICATION OBLIGATIONS RELATED TO THIRD PARTY CLAIMS, OR OTHER SPECIFIC CHARGES EXPRESSLY PROVIDED FOR HEREIN, IN NO EVENT SHALL EITHER PARTY OR ITS INDEMNITEES, BE LIABLE FOR SPECIAL, INCIDENTAL, EXEMPLARY, INDIRECT, PUNITIVE OR CONSEQUENTIAL DAMAGES, LOST PROFITS OR OTHER COSTS, BUSINESS INTERRUPTION DAMAGES RELATED TO OR ARISING OUT OF A PARTY'S PERFORMANCE OR NON-PERFORMANCE OF THIS AGREEMENT, WHETHER BASED ON OR CLAIMED UNDER STATUTE, CONTRACT, TORT (INCLUDING SUCH PARTY'S OWN NEGLIGENCE) OR ANY OTHER THEORY OF LIABILITY AT LAW OR IN EQUITY. IT IS THE INTENT OF THE PARTIES THAT THE LIMITATIONS HEREIN IMPOSED ON REMEDIES AND THE MEASURE OF DAMAGES BE WITHOUT REGARD TO THE CAUSE OR CAUSES OF SUCH DAMAGES, INCLUDING THE NEGLIGENCE OF ANY PARTY, WHETHER SUCH NEGLIGENCE BE SOLE, JOINT, CONTRIBUTORY, CONCURRENT, OR ACTIVE OR PASSIVE. THE PARTIES HEREBY WAIVE ANY RIGHT TO CONTEST SUCH PAYMENTS AS AN UNREASONABLE PENALTY.

(h) To the extent any damages required to be paid hereunder are liquidated, the Parties acknowledge that the damages are difficult or impossible to determine, and that the liquidated damages constitute a reasonable approximation of the anticipated harm or loss.

(i) Regardless of the indemnitees provided in Section 12.19(a) of this Agreement, Seller shall defend and indemnify Buyer regarding the Scheduling and dispatch actions performed by Buyer in accordance with Article VI and Appendix C of this Agreement.

Section 12.20 Severability. In the event any of the terms, covenants or conditions of this Agreement, or the application of any such terms, covenants or conditions, shall be held invalid, illegal or unenforceable by any court having jurisdiction, all other terms, covenants and conditions

of this Agreement and their application not adversely affected thereby shall remain in force and effect, *provided* that the remaining valid and enforceable provisions materially retain the essence of the Parties' original bargain.

Section 12.21 Confidentiality.

(a) The Parties will keep confidential all confidential or trade secret information made available to them in connection with this Agreement, to the extent possible, consistent with applicable laws, including the California Public Records Act. Confidential or trade secret information shall be marked or expressly identified as such ("***Confidential Information***").

(b) Notwithstanding the foregoing or any other provision of this Agreement, the Parties acknowledges that Buyer and Seller are subject to disclosure as required by the California Public Records Act, Cal. Govt. Code §§ 6250 et seq. ("***CPRA***") and the Ralph M. Brown Act, Cal. Govt. Code §§ 54950 et seq. ("***Brown Act***").

(c) If a Party ("Receiving Party") receives a request from a Third Party for access to, or inspection, disclosure or copying of, any of the other Party's (the "Supplying Party") confidential data or information ("Disclosure Request"), then the Receiving Party shall provide notice and a copy of the Disclosure Request to the Supplying Party within three (3) Business Days of receipt of the Disclosure Request. Within three (3) Business Days of receipt of such notice, the Supplying Party shall provide notice to the Receiving Party either:

(i) that the Supplying Party believes there are reasonable legal grounds for denying or objecting to the Disclosure Request, and the Supplying Party requests the Receiving Party to deny or object to the Disclosure Request with respect to identified confidential information. In such case, the Receiving Party shall deny the Disclosure Request and the Supplying Party shall defend the denial of the Disclosure Request at its sole cost, and it shall indemnify the Receiving Party for all costs associated with denying or objecting to the Disclosure Request. Such indemnification by the Supplying Party of the Receiving Party shall include all of the Receiving Party's costs reasonably incurred with respect to denial of or objection to the Disclosure Request, including but not limited to costs, penalties, attorney's fees awarded against the Receiving Party and the Receiving Party's attorney's fees; or

(ii) the Receiving Party may grant the Disclosure Request without any liability by the Receiving Party to the Supplying Party.

Section 12.22 Mobile-Sierra. The Parties hereby stipulate and agree that this Agreement was entered into as a result of arm's-length negotiations between the Parties. Further, the Parties believe that, to the extent the sale of Energy under this Agreement is subject to Sections 205 and 206 of the Federal Power Act, 16 U.S.C. Sections 824d and 824e, the rates, terms and conditions of this Agreement are just and reasonable within the meanings of Sections 205 and 206 of the Federal Power Act, and that the rates, terms and conditions of this Agreement will remain so during the Agreement Term. Notwithstanding any provision of this Agreement, the Parties waive all rights to challenge the validity of this Agreement or whether it is just and reasonable for and with

respect to the Agreement Term, under Sections 205 and 206 of the Federal Power Act, and to request the FERC to revise the terms and conditions and the rates or services specified in this Agreement, and hereby agree not to seek, nor support any third party in seeking, to prospectively or retroactively revise the rates, terms or conditions of this Agreement through application or complaint to FERC or any other state or federal agency, board, court or tribunal, related in any manner as to whether such rates, terms or conditions are just and reasonable or in the public interest under the Federal Power Act, absent prior written agreement of the Parties. The Parties also agree that, absent prior agreement in writing by the Parties to a proposed change, the standard of review for changes to any rate, charge, classification, term or condition of this Agreement, whether proposed by a Party (to the extent that any provision of this Section is unenforceable or ineffective as to such Party), a non-party or the FERC acting *sua sponte* shall be the "public interest" application of the "just and reasonable" standard of review that requires FERC to find an "unequivocal public necessity" or "extraordinary circumstances where the public will be severely harmed" to modify a contract, as set forth in *United Gas Pipe Line Co. v. Mobile Gas Service Corp.*, 350 U.S. 332 (1956) and *Federal Power Commission v. Sierra Pacific Power Co.*, 350 U.S. 348 (1956), and clarified by *Morgan Stanley Capital Group, Inc. v. Public Util. Dist. No. 1 of Snohomish*, 554 U.S. 527 at 550-51 (2008) and *NRG Power Marketing, LLC v. Maine Public Utilities Comm'n,* 558 U.S. 165 (2010).

Buyer and Seller were represented by legal counsel during the negotiation and execution of this Agreement and the Parties have executed this Agreement as of the dates set forth below, effective as of the Effective Date.

BUYER:

NORTHERN CALIFORNIA POWER AGENCY

_____

By: Randy S. Howard

Its: General Manager

Date: _____

Approved as to Form:

_____

By: _____

Its: General Counsel

Date: _____

SELLER:

SOUTH FEATHER WATER AND POWER AGENCY

_____

By:_____

Its:_____

Date:_____

Approved as to Form:

_____

By:_____

Its: General Counsel

Date:_____

APPENDIX A
TO POWER PURCHASE AGREEMENT,
DATED AS OF [_____], 20[__]
BETWEEN
NORTHERN CALIFORNIA POWER AGENCY
AND
SOUTH FEATHER WATER AND POWER AGENCY

CONTRACT PRICE

Buyer shall compensate Seller for the Product in accordance with this Appendix A.

For the period beginning on the Initial Delivery Date through 11:59 pm on December 31, 2021, the Contract Price of the Product shall be equal to $35.00/MWh.

For the Delivery Term after 11:59 pm on December 31, 2021, the Contract Price of the Product shall be as described below:

1) Contract Price. The Contract Price of the Product shall be equal to the Fixed Monthly Payment plus the Variable Output Monthly Payment, as further described herein:

    i. The Fixed Monthly Payment ("**Fixed Monthly Payment**") Buyer shall pay to Seller each calendar month during the Delivery Term, subject to the terms of this Agreement, shall be equal to RA Capacity Monthly Payment ("**RA Capacity Monthly Payment**") plus Base Output Monthly Payment, calculated as follows:

        1. RA Capacity Monthly Payment = Facility Monthly Net Qualifying Capacity * RA Capacity Rate

            Where RA Capacity Rate is $6.25 per kW-month

        2. Base Output Monthly Payment

            For each full Contract Year, Buyer shall pay to Seller Six Million Seven Hundred Twenty Six Thousand Seven Hundred Twenty Dollars ($6,726,720.00) ("**Base Output Compensation**") in twelve equal monthly installments ("**Base Output Monthly Payment**"). The Base Output Monthly Payment represents Buyer's prepayment for the initial 192,192.00 MWh of Facility Energy plus Deemed Generated Energy ("**Base Output**") produced by the Facility during each Contract Year. Base Output is assumed to be produced each calendar month as shown in Table A below ("**Monthly Base Output**"):

Table A – Base Output

Calendar Month	Monthly Base Output (MWh)	Base Output Monthly Payment
January	16,016.00	$ 560,560.00
February	16,016.00	$ 560,560.00
March	16,016.00	$ 560,560.00
April	16,016.00	$ 560,560.00
May	16,016.00	$ 560,560.00
June	16,016.00	$ 560,560.00
July	16,016.00	$ 560,560.00
August	16,016.00	$ 560,560.00
September	16,016.00	$ 560,560.00
October	16,016.00	$ 560,560.00
November	16,016.00	$ 560,560.00
December	16,016.00	$ 560,560.00
Total	**192,192.00**	**$ 6,726,720.00**

ii. The Variable Output Monthly Payment ("**Variable Output Monthly Payment**") Buyer shall pay to Seller each calendar month during the Delivery Term, subject to the terms of this Agreement, shall be calculated as follows:

1. Variable Output Monthly Payment

During each full Contract Year, Buyer shall compensate Seller for each MWh of Facility Energy produced in excess of Base Output ("**Variable Output**") multiplied by the Variable Output Rate. For example, if during a full Contract Year the Facility produced 477,369.00 MWh of Facility Energy, Buyer would pay to Seller $9,690,314.46 ((477,369.00 MWh – 192,192.00 MWh) * $33.98/MWh) for Variable Output produced for that full Contract Year. Buyer and Seller acknowledge that actual month Facility production is variable, whereby the amount of Facility Energy produced each calendar month may be greater than, or less than, Monthly Base Output; therefore, Buyer and Seller shall calculate the Variable Output Monthly Payment amount adjusted for a monthly true-up calculation to account for actual monthly Facility Energy production, as follows:

Variable Output Monthly Payment = Facility Monthly Variable Output * Variable Output Rate; where:

a. Variable Output Rate is $33.98 per MWh; and

b. Facility Monthly Variable Output ("**Facility Monthly Variable Output**") is equal to the amount of Facility Energy produced each calendar month that is in excess to the amount of Monthly Base Output anticipated to be produced for the same calendar month, as reflected in Table A of this Appendix A; provided, however, if the amount of Facility Energy produced during a calendar month is less than the amount of Monthly Base Output anticipated to be produced for the same calendar month, as reflected in Table A of this Appendix A, Monthly Variable Output shall be zero MWh, and the amount of Monthly Base Output that is greater than the amount of Facility Energy produced during a calendar month shall be "rolled forward" and added to the amount of Monthly Base Output anticipated to be produced in the next succeeding calendar month ("**Variable Output True-up**"), for the purpose of calculating Facility Monthly Variable Output for the next succeeding calendar month. For the purpose of clarity, the following examples of the Variable Output True Up calculation are provided below:

Variable Output True-Up Example A

Calendar Month	Facility Energy (MWh)	Monthly Base Output (MWh)	Deemed Generated Energy (MWh)	Variable Output True-Up (MWh)	Facility Monthly Variable Output (MWh)	Variable Output Rate ($/MWh)	Facility Output Monthly Payment
January	30,000.00	16,016.00	-	-	13,984.00	$ 33.98	$ 475,176.32
February	15,000.00	16,016.00	-	1,016.00	-	$ 33.98	$ -
March	30,000.00	17,032.00	-	-	12,968.00	$ 33.98	$ 440,652.64
April	30,000.00	16,016.00	-	-	13,984.00	$ 33.98	$ 475,176.32

Variable Output True-Up Example B

Calendar Month	Facility Energy (MWh)	Monthly Base Output (MWh)	Deemed Generated Energy (MWh)	Variable Output True-Up (MWh)	Facility Monthly Variable Output (MWh)	Variable Output Rate ($/MWh)	Facility Output Monthly Payment
January	30,000.00	16,016.00	-	-	13,984.00	$ 33.98	$ 475,176.32
February	15,000.00	16,016.00	-	1,016.00	-	$ 33.98	$ -
March	15,000.00	17,032.00	-	2,032.00	-	$ 33.98	$ -
April	30,000.00	18,048.00	-	-	11,952.00	$ 33.98	$ 406,128.96

Variable Output True-Up Example C

Calendar Month	Facility Energy (MWh)	Monthly Base Output (MWh)	Deemed Generated Energy (MWh)	Variable Output True-Up (MWh)	Facility Monthly Variable Output (MWh)	Variable Output Rate ($/MWh)	Facility Output Monthly Payment
January	30,000.00	16,016.00	-	-	13,984.00	$ 33.98	$ 475,176.32
February	30,000.00	16,016.00	-	-	13,984.00	$ 33.98	$ 475,176.32
March	30,000.00	16,016.00	-	-	13,984.00	$ 33.98	$ 475,176.32
April	30,000.00	16,016.00	-	-	13,984.00	$ 33.98	$ 475,176.32

A final annual true-up credit ("**Annual True-Up Credit**") will be calculated at the end of each Calendar Year and paid by Seller to Buyer to account for any outstanding Variable Output True-Up amount, if any, as follows:

Annual True-Up Credit = Outstanding Variable Output True-Up amount * Variable Output Rate

For the purpose of clarity, an example of the Annual True-Up Credit calculation is provided below:

Annual True-Up Credit Example

Calendar Month	Facility Energy (MWh)	Monthly Base Output (MWh)	Deemed Generated Energy (MWh)	Variable Output True-Up (MWh)	Facility Monthly Variable Output (MWh)	Variable Output Rate ($/MWh)	Facility Output Monthly Payment
November	30,000.00	16,016.00	-	-	13,984.00	$ 33.98	$ 475,176.32
December	15,000.00	16,016.00	-	1,016.00	-	$ 33.98	$ -

Annual True-Up Credit = 1,016.00 MWh * $33.98 = $34,523.68

Notwithstanding the Monthly Variable Output True-Up and Annual True-Up described in this Appendix A, if the Facility produces a total amount of Facility Energy during a Calendar Year that is less than Base Output, Buyer's obligation to pay Seller total Base Output Compensation in a Calendar Year shall not be reduced.

APPENDIX B
TO POWER PURCHASE AGREEMENT,
DATED AS OF [_____], 20[__]
BETWEEN
NORTHERN CALIFORNIA POWER AGENCY
AND
SOUTH FEATHER WATER AND POWER AGECY

FACILITY DESCRIPTION

The Facilities of the South Feather Power Project are located in Butte County on the South Feather river and include:

1. Name of Facility: South Feather Power Project

2. Location:

   Kelly Ridge Powerhouse: 39° 31'54.4"N 121° 29'28.6"W

   Forbestown Powerhouse: 39° 33'03.4"N 121° 16'43.3"W

   Woodleaf Powerhouse: 39° 33'14.0"N 121° 12'15.0"W

   Sly Creek Powerhouse: 39° 34'49.5"N 121° 07'10.1"W

3. Description of Facilities:

Facility Name	Contract Capacity (MW)	CAISO Resource ID	PNode	CEC RPS ID
Forbestown	37.5	FORBST_7_UNIT 1	FORBSTWN_7_B1	N/A
Kelly Ridge	11.0	KELYRG_6_UNIT	KELLYRDG_7_B1	60266
Sly Creek	13.0	SLYCRK_1_UNIT 1	SLYCREEK_7_B1	60267
Woodleaf	60.0	WDLEAF_7_UNIT 1	WOODLEAF_7_B1	N/A

2. Owner: South Feather Water and Power Agency

3. Operator: Seller

4. Scheduling Coordinator: Buyer

4. Point of Interconnection: The Point of Interconnection for each Facility shall mean the point, as set forth in this Appendix B and the Interconnection Agreement, where the Interconnection Facilities connect to the Transmission Providers Transmission System. The Point of Interconnection for each Facility is further described herein:

WOODLEAF POWERHOUSE, SLY CREEK POWERHOUSE, AND FORBESTOWN POWERHOUSE POINTS OF INTERCONNECTION

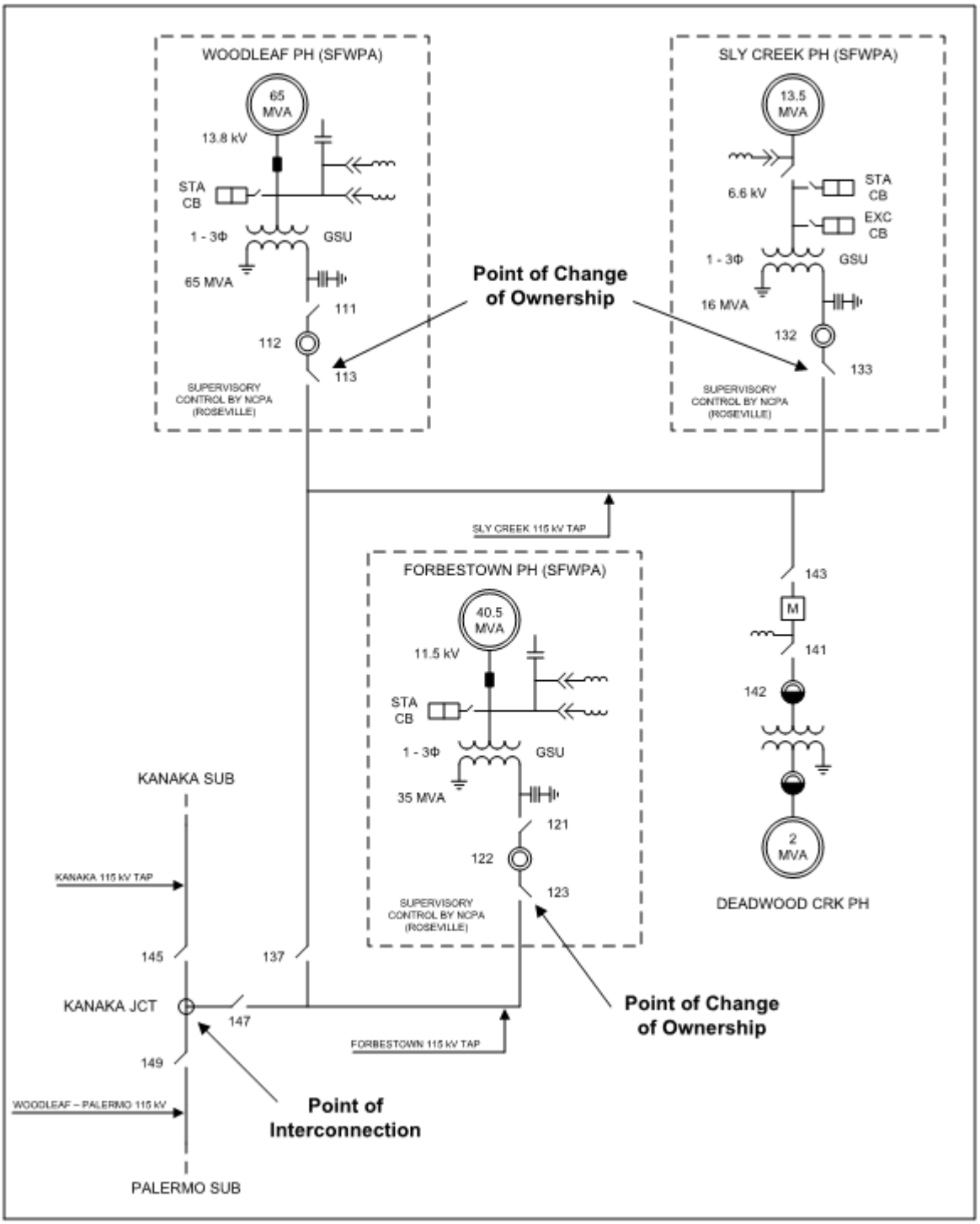


Figure 1. 115 kV Single Line Diagram

KELLY RIDGE POWERHOUSE POINTS OF INTERCONNECTION

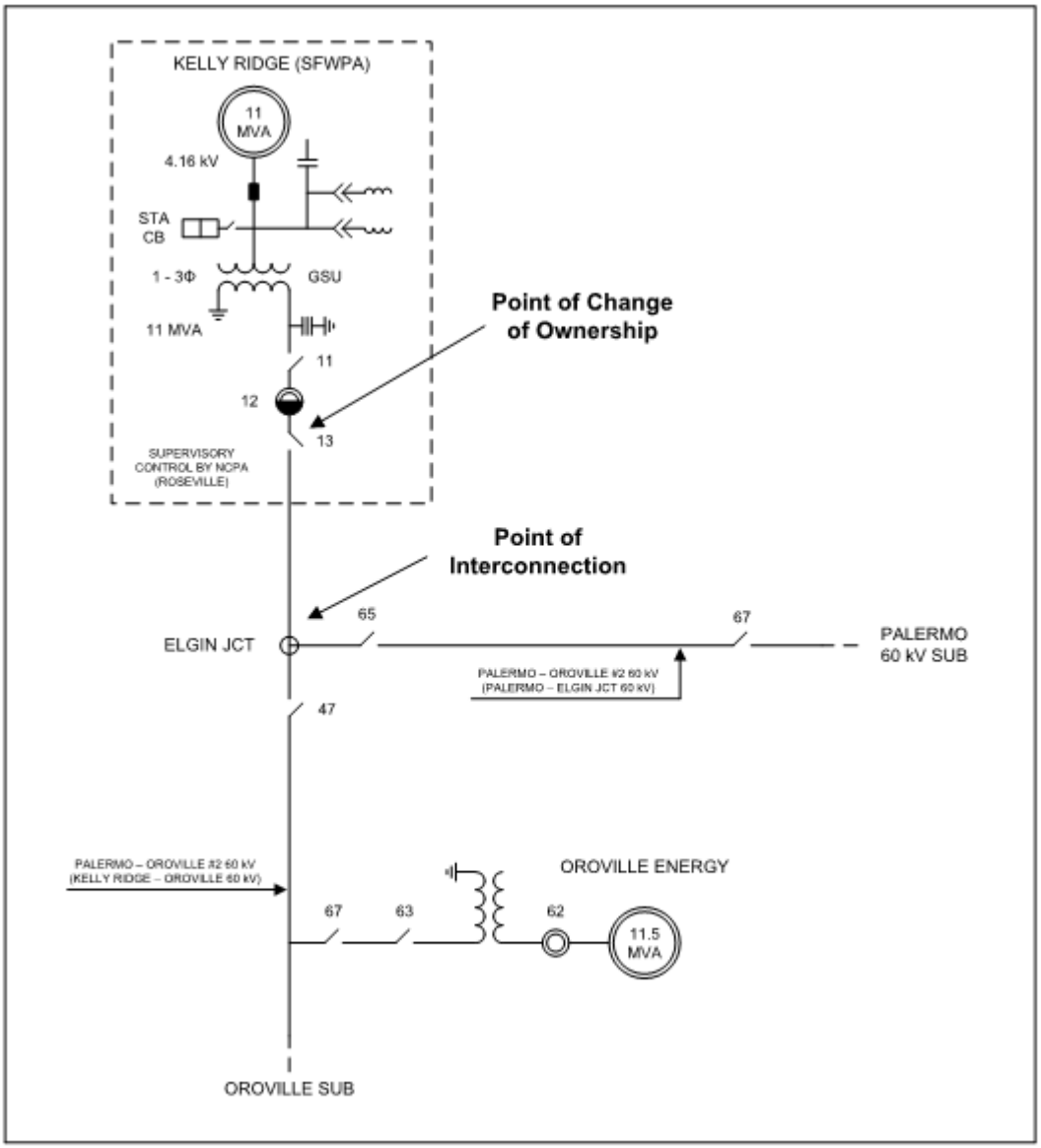


Figure 2. 60 kV Single Line Diagram

APPENDIX C
TO POWER PURCHASE AGREEMENT,
DATED AS OF [_____], 20[__]
BETWEEN
NORTHERN CALIFORNIA POWER AGENCY
AND
SOUTH FEATHER WATER AND POWER AGENCY

SCHEDUING AND OPERATING PROCEDURES

1. Scheduling and Operating Procedures

The Scheduling and operating procedures are separately attached to this Appendix C, and are listed below:

SFPP-PM-101 – Voice and Data Communications

SFPP-PM-102 – Outage Management and Operational Reliability Data

SFPP-PM-104 – Dispatch Center Switching and Clearance Procedure

SFPP-PM-107 – Event Reporting Operating Plan

SFPP-PM-108 – Operating Instructions and Emergency Assistance

SFPP-PM-302 – Voltage Control, Automatic Voltage Regulator and Power System Stabilizer Operations

SFPP-PM-304 – Project Operations and Control

SFPP-PM-401 – Scheduling and Bidding

APPENDIX D
TO POWER PURCHASE AGREEMENT,
DATED AS OF [_____], 20[__]
BETWEEN
NORTHERN CALIFORNIA POWER AGENCY
AND
SOUTH FEATHER WATER AND POWER AGENCY

FORM OF ATTESTATION

_____(Seller)_____ Environmental Attribute Attestation and Bill of Sale

_____ ("Seller") hereby sells, transfers and delivers to Northern California Power Agency ("Buyer") the Environmental Attributes and Environmental Attribute Reporting Rights associated with the generation from the Facility described below:

Facility name and location:
Fuel Type: Capacity (MW):_____ Operational Date:
As applicable: CEC Reg. no. ___ Energy Admin. ID no. ____ Q.F. ID no. ___

Dates	MWhs generated
_____ 20__	_____
_____ 20__	_____
_____ 20__	_____

in the amount of one Environmental Attribute or its equivalent for each MWh generated.

Seller further attests, warrants and represents as follows:

i) the information provided herein is true and correct;

ii) its sale to Buyer is its one and only sale of the Environmental Attributes and associated Environmental Attribute Reporting Rights referenced herein;

iii) the Facility generated and delivered to the grid the Energy in the amount indicated as undifferentiated Energy; and

iv) Seller owns the Facility and each of the Environmental Attributes and Environmental Attribute Reporting Rights associated with the generation of the indicated Energy for delivery to the grid have been generated and sold by the Facility.

This serves as a bill of sale, transferring from Seller to Buyer all of Seller's right, title and interest in and to the Environmental Attributes and Environmental Attribute Reporting Rights associated with the generation of the Energy for delivery to the grid.

Contact Person/telephone: _____

APPENDIX E
TO POWER PURCHASE AGREEMENT,
DATED AS OF [_____], 20[__]
BETWEEN
NORTHERN CALIFORNIA POWER AGENCY
AND
SOUTH FEATHER WATER AND POWER AGENCY

INSURANCE

I. GENERAL REQUIREMENTS

Within ten (10) days after the Effective Date, Seller shall furnish Buyer evidence of commercial automobile liability, commercial general liability, excess liability, and workers' compensation coverage meeting the requirements set forth in this Appendix E from insurers acceptable to Buyer and in a form acceptable to the risk management of Buyer or acceptable to Buyer's agent for this purpose. Such insurance shall be maintained by Seller at Seller's sole cost and expense.

Such insurance shall not limit or qualify the liabilities and obligations of Seller assumed under this Agreement. Buyer shall not by reason of its inclusion under these policies incur liability to the insurance carrier for payment of premium for these policies.

Any insurance carried by Buyer which may be applicable shall be deemed to be excess insurance and Seller's insurance is primary for purposes under this Agreement despite any conflicting provision in Seller's policies to the contrary.

Such insurance shall not be canceled or reduced in coverage or amount without first giving thirty (30) days' prior notice thereof (ten (10) days for non-payment of premium) by registered mail to General Manager, Northern California Power Agency.

Should any portion of the required insurance be on a "Claims Made" policy, Seller shall, at the policy expiration date following completion of work, provide evidence that the "Claims Made" policy has been renewed or replaced with the same limits, terms and conditions of the expiring policy, or that an extended discovery period has been purchased on the expiring policy at least for the contract under which the work was performed.

II. SPECIFIC COVERAGES REQUIRED

A. Commercial Automobile Liability

Seller shall provide Commercial Automobile Liability insurance which shall include coverages for liability arising out of the use of owned (if applicable), non-owned, and hired vehicles for performance of the work by Seller or its officers, agents, or employees, as required, to be licensed under the California or any other applicable state vehicle code. The Commercial Automobile Liability insurance shall have not less than $1,000,000.00 combined single limit per occurrence, with a self-insured retention or deductible of no more than $100,000, and shall apply to all operations of Seller.

The Commercial Automobile Liability policy shall include Buyer, its members, and their officers, agents, and employees while acting within the scope of their employment, as additional insureds with Seller, and shall insure against liability for death, bodily injury, or property damage resulting from the performance of this Agreement by Seller or its officers, agents, or employees. The evidence of insurance shall be a form acceptable to Buyer's risk manager.

B. Commercial General Liability

Seller shall provide Commercial General Liability insurance with Blanket Contractual Liability, Independent Contractors, Broad Form Property Damage, Premises and Operations, Products and Completed Operations, fire, Legal Liability and Personal Injury coverages included. Such insurance shall provide coverage for total limits actually arranged by Seller, but not less than $10,000,000.00 combined single limit per occurrence. Should the policy have an aggregate limit, such aggregate limits should not be less than double the Combined Single Limit. Umbrella or Excess Liability coverages may be used to supplement primary coverages to meet the required limits. Evidence of such coverage shall be a form acceptable to Buyer's risk manager, and shall provide for the following:

1. Include Buyer and its members, and their respective officers, agents, and employees as additional insureds with the Named Insured for the activities and operations of Seller and its officers, agents, or employees under this Agreement.

2. Severability-of-Interest or Cross-Liability Clause such as: "The policy to which this endorsement is attached shall apply separately to each insured against whom a claim is made or suit is brought, except with respect to the limits of the company's liability."

3. A description of the coverages included under the policy.

C. Excess Liability

Seller may use an Umbrella or Excess Liability Coverage to meet coverage limits specified in this Agreement. Seller shall require the carrier for Excess Liability to properly schedule

and to identify the underlying policies on an endorsement to the policy acceptable to Buyer's risk management agent. Such policy shall include, as appropriate, coverage for Commercial General Liability, Commercial Automobile Liability, Employer's Liability, or other applicable insurance coverages.

D. Workers' Compensation/Employer's Liability Insurance

Seller shall provide Workers' Compensation insurance covering all of Seller's employees in accordance with the laws of any state in which the work is to be performed and including Employer's Liability insurance and a Waiver of Subrogation in favor of Buyer. The limit for Employer's Liability coverage shall be not less than $1,000,000.00 each accident and shall be a separate policy if not included with Workers' Compensation coverage. Evidence of such insurance shall be a form of Buyer Special Endorsement of insurance or on an endorsement to the policy acceptable to Buyer's risk management agent. Workers' Compensation/Employer's Liability exposure may be self-insured *provided* that Buyer is furnished with a copy of the certificate issued by the state authorizing Seller to self-insure. Seller shall notify Buyer's risk manager by receipted delivery as soon as possible of the state withdrawing authority to self-insure.

APPENDIX F
TO POWER PURCHASE AGREEMENT,
DATED AS OF [_____], 20[__]
BETWEEN
NORTHERN CALIFORNIA POWER AGENCY
AND
SOUTH FEATHER WATER AND POWER AGENCY

AUTHORIZED REPRESENTATIVES;
BUYER AND SELLER BILLING, NOTIFICATION AND SCHEDULING CONTACT INFORMATION

1. **Authorized Representative.** The initial Authorized Representatives of Buyer and Seller pursuant to Section 14.1 are as follows:

1.1 Buyer:

Northern California Power Agency
c/o: General Manager
651 Commerce Drive
Roseville, CA 95678

Telephone: 916-781-3636
Facsimile: 916-783-7693
Email: _____

1.2 Seller:

RESERVED

2. **Billings.** Billings and payments pursuant to Article IX and Appendix A shall be transmitted to the following addresses:

2.1 If Billing to Buyer:

Northern California Power Agency
Attention: Settlements
Telephone: 916-781-3636
Facsimile: 916-781-4255
Email: settlements@ncpa.com; acctspayable@ncpa.com

2.2 If Payment to Buyer:

Northern California Power Agency
Attention: Accounts Payable

Telephone: 916-781-4211
Facsimile: 916-781-4255
Email: Acctspayable@ncpa.com

2.3 If Payment or Billing to Seller:

RESERVED

3. **Notices.** Unless otherwise specified by Buyer all notices (other than Scheduling notices, curtailment notices, and Deemed Generated Energy notices):

If to Buyer:

Northern California Power Agency
Attention: General Counsel
Telephone: 916-781-3636
Facsimile: 916-783-7693
Email: _____

If to Seller:

RESERVED

4. **Schedulers.** Unless otherwise specified by Buyer, all notices related to Scheduling of the Facility shall be sent to the following address:

If to Buyer:

Northern California Power Agency

Pre-scheduling: Generation schedules are to be provided to NCPA Pre-Scheduling contacts.

Name	Phone	Email
NCPA Preschedulers	916-786-0123	Preschedulers@ncpa.com
	916-786-0124	
Facsimile:	916-781-4239	

Schedule Coordination: NCPA Schedule Coordinator contacts.

Name	Phone	Email
NCPA SC	916-781-4237	SC2@ncpa.com
Facsimile:	916-781-4226	

Outage Coordination: All Planned and/or Forced Outages of generation facilities are to be provided to NCPA Dispatch and NCPA SC.

Name	Phone	Email
NCPA Dispatch	916-786-3518	Dispatch@ncpa.com
NCPA SC	916-781-4237	SC2@ncpa.com
Facsimile:	916-781-4226	

If to Seller:

RESERVED

5. **Curtailments.** All notices related to curtailments of the Facility pursuant to Section 6.5 shall be sent to the following address:

If to Buyer:

Northern California Power Agency
(see above)

If to Seller:

RESERVED

6. **Deemed Generated Energy.** Unless otherwise specified by Buyer, all notices related to calculations of Deemed Generated Energy shall be sent to the following address:

If to Buyer:

Northern California Power Agency
Attention: Settlements
Telephone: 916-781-3636
Facsimile: 916-781-4255
Email: settlements@ncpa.com

If to Seller:

RESERVED

Either Party may update its contact information in this Appendix F by delivering a notice to the other Party pursuant to Section 12.2 of the Agreement, and such change shall not be considered to be an amendment purchase to Section 12.11 of the Agreement.

COUNCIL COMMUNICATION

CC #: 1755
File #: 0900-03

Title:	60kV Overhead Conductor Replacement - Union Pacific Railroad Wireline Crossing Agreement
Contact:	Austin Kurth 916-774-5661 akurth@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.5.

RECOMMENDATION TO COUNCIL

Staff recommends City Council adopt a resolution to authorize the City Manager to execute the attached Wireline Crossing Agreement (Crossing Agreement) with Union Pacific Railroad (UPRR) for overhead conductor replacement.

BACKGROUND

Roseville Electric Utility (RE) is replacing the overhead 60kV conductors at the railroad wireline crossing near Industrial Substation to improve system reliability. RE owns and operates several of these overhead and underground wireline railroad crossings. Many of these wireline crossings were built several decades ago, and neither RE or UPRR have any documentation of existing wireline crossing agreements, which is the case at this location. This new Wireline Crossing Agreement will enable staff to coordinate with UPRR regarding wireline crossing operation and maintenance at this location as required, including the replacement of the existing 60kV overhead conductor.

FISCAL IMPACT

The fiscal impact of authorizing this agreement is $5,000. Funds are available in the Electric Department FY2021-22 capital improvement project budget.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. Approval of a Wireline Crossing Agreement meets the above criteria and is not subject to CEQA. No additional environmental review is required.

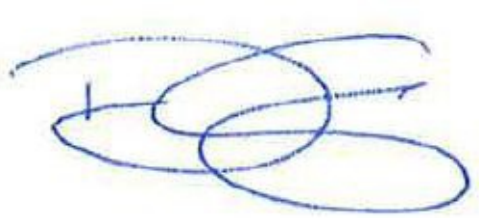
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal F - Invest in well-planned infrastructure and growth

Respectfully Submitted,

Austin Kurth, Power Engineer

Michelle Bertolino, Electric Utility Director



_____

Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution 21-434

Union Pacific Wireline Crossing Agreement Only

RESOLUTION NO. 21-434

APPROVING A WIRELINE CROSSING AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND UNION PACIFIC RAILROAD COMPANY, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE

WHEREAS, a Wireline Crossing Agreement to replace the overhead 60kV conductors at the railroad wireline crossing near Industrial Substation, by and between the City of Roseville and Union Pacific Railroad Company, has been reviewed by the City Council; and

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Roseville that said Wireline Crossing Agreement is hereby approved and that the City Manager is authorized to execute it on behalf of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville this____day of _____, 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

May 28, 2021
Folder: 03274-50

AUSTIN KURTH
CITY OF ROSEVILLE
2090 HILLTOP CIRCLE
ROSEVILLE, CA 95747

RE: Proposed Construction of One (1) Overhead Transmission Powerline Wireline Crossing at Mile Post 109.19 on the Valley Subdivision at or near Roseville, Placer County, California

Attached is an original of the agreement covering your use of the Railroad Company's right of way. Please print two copies, execute on your behalf and return ALL DOCUMENTS in one mailed packaged with a check for any payments required, as shown below to 1400 Douglas Street, Omaha, NE 68179-1690, Attn: Daniel Peters.

An original copy of the fully-executed document will be returned to you, when approved and processed by the Railroad Company. Also, please provide a resolution or other authorization for the party executing the documents, *if signature authorization is required by your Entity.*

- Payment in the amount of **Five Thousand Dollars ($5,000.00)** is due and payable to Union Pacific Railroad Company upon your execution of the agreement. Please include your payment, **with Folder No. 03274-50 noted on that document.** If you require formal billing, you may consider this letter as a formal bill and that 94-6001323 is this Corporation's correct Federal Taxpayer Identification Number.

- Railroad Protective Liability Insurance (RPLI) may be obtained from any insurance company which offers such coverage. Union Pacific has also worked with a national broker, Marsh USA, to make available RPLI to you or your contractor. You can find additional information, premium quotes, and application forms at (uprr.marsh.com).

If we have not received the executed documents within six months from the date of this letter, this proposed offer of an agreement is withdrawn and becomes null and void.

If you have any questions, please contact me at dcpeters02@up.com.

Sincerely,

Daniel Peters
Senior Manager - Real Estate

WIRELINE CROSSING
AGREEMENT

Mile Post: 109.19, Valley Subdivision
Location: Roseville, Placer County, California

THIS AGREEMENT ("Agreement") is made and entered into as of May 28, 2021, ("Effective Date") by and between **UNION PACIFIC RAILROAD COMPANY**, a Delaware corporation, ("Licensor") and **CITY OF ROSEVILLE**, to be addressed at 2090 Hilltop Circle, Roseville, California 95747 ("Licensee").

IT IS MUTUALLY AGREED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:

Article 1. LICENSOR GRANTS RIGHT.

A. In consideration of the license fee to be paid by Licensee set forth below and in further consideration of the covenants and agreements to be performed by Licensee, Licensor hereby grants to Licensee the right to construct and thereafter, during the term hereof, maintain and operate one (1) overhead transmission powerline wireline crossing only, including any appurtenances required for the operation of said wireline (collectively, "Licensee's Facilities") across Licensor's real property, trackage, or other facilities located in Roseville, Placer County, State of California ("Railroad Property"). The specific specifications and limited purpose for Licensee's Facilities on, along, across and under Railroad Property are described in and shown on the Print and Specifications dated April 23, 2021, attached hereto as Exhibit A and made a part hereof.

B. Licensee represents and warrants that Licensee's Facilities will (i) only be used for one (1) overhead transmission powerline wireline crossing, and (ii) not be used for any other purpose, whether such use is currently technologically possible, or whether such use may come into existence during the life of this Agreement.

C. Licensee acknowledges that if it or its contractor provides Licensor with digital imagery depicting Licensee's Facilities ("Digital Imagery"), Licensee authorizes Licensor to use the Digital Imagery in preparing Exhibit A. Licensee represents and warrants that through a license or otherwise, it has the right to use the Digital Imagery and to permit Licensor to use the Digital Imagery in said manner.

Article 2. LICENSE FEE.

Upon execution of this Agreement, the Licensee shall pay to the Licensor a one-time License Fee of **Five Thousand Dollars ($5,000.00).**

Article 3. TERM.

This Agreement shall take effect as of the Effective Date first herein written and shall continue in full force and effect until terminated as provided in the "TERMINATION; REMOVAL OF LICENSEE'S FACILITIES" Section of **Exhibit B**.

Article 4. LICENSEE'S COMPLIANCE WITH GENERAL TERMS.

Licensee represents and warrants that all work on Licensee's Facilities performed by Licensee or its contractors will strictly comply with all terms and conditions set forth herein, including the General Terms and Conditions, attached hereto as Exhibit B and made a part hereof.

Article 5. INSURANCE.

A. During the term of this Agreement, Licensee shall fully comply or cause its contractor(s) to fully comply with the insurance requirements described in **Exhibit C**, attached hereto and made a part hereof. Upon request only, Licensee shall send copies of all insurance documentation (e.g., certificates, endorsements, etc.) to Licensor at the address listed in the "NOTICES" Section of this Agreement.

B. If Licensee is subject to statute(s) limiting its insurance liability and/or limiting its ability to obtain insurance in compliance with **Exhibit C** of this Agreement, those statutes shall apply.

Article 6. DEFINITION OF LICENSEE.

For purposes of this Agreement, all references in this Agreement to Licensee will include Licensee's contractors, subcontractors, officers, agents and employees, and others acting under its or their authority (collectively, a "Contractor"). If a Contractor is hired by Licensee to perform any work on Licensee's Facilities (including initial construction and subsequent relocation, maintenance, and/or repair work), then Licensee shall provide a copy of this Agreement to its Contractor(s) and require its Contractor(s) to comply with all terms and conditions of this Agreement, including the indemnification requirements set forth in the "INDEMNITY" Section of **Exhibit B**. Licensee shall require any Contractor to release, defend, and indemnify Licensor to the same extent and under the same terms and conditions as Licensee is required to release, defend, and indemnify Licensor herein.

Article 7. ATTORNEYS' FEES, EXPENSES, AND COSTS.

If litigation or other court action or similar adjudicatory proceeding is undertaken by Licensee or Licensor to enforce its rights under this Agreement, all fees, costs, and expenses, including, without limitation, reasonable attorneys' fees and court costs, of the prevailing Party in such action, suit, or proceeding shall be reimbursed or paid by the Party against whose interest the judgment or decision is rendered. The provisions of this Article shall survive the termination of this Agreement.

Article 8. WAIVER OF BREACH.

The waiver by Licensor of the breach of any condition, covenant or agreement herein contained to be kept, observed and performed by Licensee shall in no way impair the right of Licensor to avail itself of any remedy for any subsequent breach thereof.

Article 9. ASSIGNMENT.

A. Licensee shall not assign this Agreement, in whole or in part, or any rights herein granted, without the written consent of Licensor, which must be requested in writing by Licensee. Any assignment or attempted transfer of this Agreement or any of the rights herein granted, whether voluntary, by operation of law, or otherwise, without Licensor's written consent, will be absolutely void and may result in Licensor's termination of this Agreement pursuant to the "TERMINATION; REMOVAL OF LICENSEE'S FACILITIES" Section of **Exhibit B.**

B. Upon Licensor's written consent to any assignment, this Agreement will be binding upon and inure to the benefit of the parties thereto, successors, heirs, and assigns, executors, and administrators.

Article 10. SEVERABILITY.

Any provision of this Agreement which is determined by a court of competent jurisdiction to be invalid or unenforceable shall be invalid or unenforceable only to the extent of such determination, which shall not invalidate or otherwise render ineffective any other provision of this Agreement.

Article 11. NOTICES.

Except Licensee's commencement of work notice(s) required under Exhibit B, all other notices required by this Agreement must be in writing, and (i) personally served upon the business address listed below ("Notice Address"), (ii) sent overnight via express delivery by a nationally recognized overnight delivery service such as Federal Express Corporation or United Parcel Service to the Notice Address, or (iii) by certified mail, return receipt requested to the Notice Address. Overnight express delivery notices will be deemed to be given upon receipt. Certified mail notices will be deemed to be given three (3) days after deposit with the United States Postal Service.

If to Licensor: Union Pacific Railroad Company
Attn: Analyst – Real Estate Utilities (03274-50)
1400 Douglas Street, MS 1690
Omaha, Nebraska 68179

If to Licensee: CITY OF ROSEVILLE
2090 Hilltop Circle
Roseville, California 95747

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the date first herein written.

UNION PACIFIC RAILROAD COMPANY	**CITY OF ROSEVILLE**
By: _____	By: _____
Daniel Peters *Senior Manager*	Name Printed: _____
	Title: _____

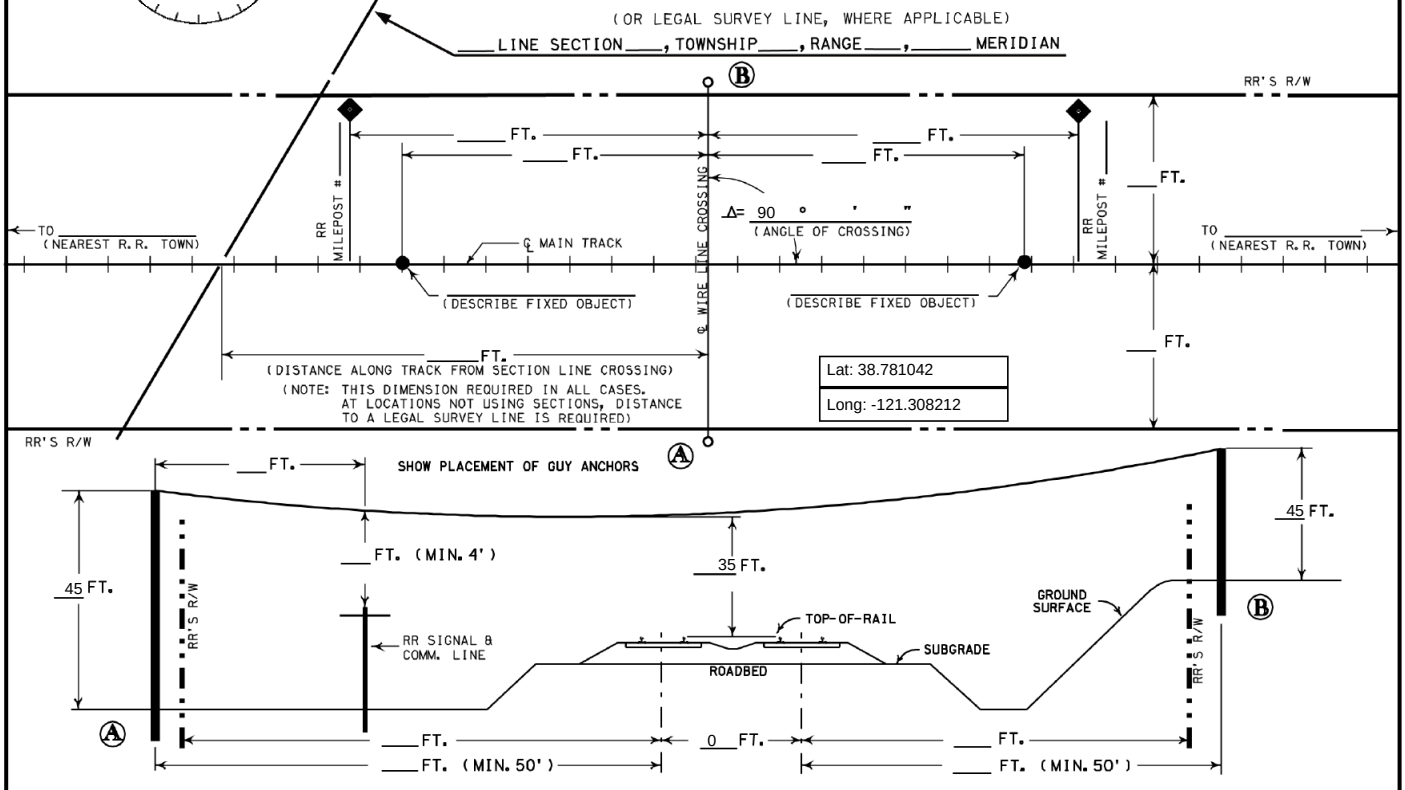
PLACE ARROW INDICATING NORTH DIRECTION RELATIVE TO CROSSING

OVERHEAD WIRELINE CROSSING OVER 750 VOLTS

FORM DR-0404-H
REV 10-26-2007
www.uprr.com

NOTE: ALL AVAILABLE DIMENSIONS MUST BE FILLED IN TO EXPEDITE THIS APPLICATION.

NO SCALE



CIRCUITS TO BE CARRIED ON PROPOSED WIRELINE

NO. OF CIRCUITS	VOLTAGE TO GROUND(KV)	VOLTAGE TO VOLTAGE(KV)	PHASES	NO. OF WIRES	GAUGE	MATERIAL	SOLID OR STRANDED	HEIGHT
1	35	60	3	3	666	ACSS	STRANDED	35

NOTES :

A) DISTRIBUTION LINE TRANSMISSION LINE
B) IS THERE A SIGNAL OR COMMUNICATION POLELINE NEAR THE TRACKS? NO
C) MAXIMUM GROUND CURRENT AT FEED: 1200 AMPS. AT LOAD: 1200 AMPS.
D) WHAT TYPE OF FACILITY WILL LINE BE SERVING? ELECTRIC SUBSTATION
E) IF A NEW POWER SUBSTATION IS TO BE BUILT WITHIN 1/2 MILE OF RR, WHAT IS MAX:
OPERATING CURRENT TO GROUND?_____ AMPS: RESISTANCE TO GROUND?_____ OHMS;
FAULT CURRENT TO GROUND?_____ AMPS.
F) GROUND WIRE: SIZE 0 ; MATERIAL N/A ; SOLID OR STRANDED SOLID .
G) CROSSING SPAN: LENGTH 203 FT.; NORMAL CONDUCTOR SAG 61 IN. AT 250 °F.
H) ADJOINING SPANS: LENGTH_____FT.; NORMAL CONDUCTOR SAG_____IN. AT_____°F.
LENGTH_____FT.; NORMAL CONDUCTOR SAG_____IN. AT_____°F.
I) POLE 1: TIMBER_____ LENGTH 59 FT. DEPTH OF SETTING 27 FT.
HEIGHT ABOVE GROUND 59 FT.
CLASS OR BUTT AND TOP DIMENSIONS 1
POLE 2: TIMBER_____ LENGTH 59 FT. DEPTH OF SETTING 26 FT.
HEIGHT ABOVE GROUND 59 FT.
CLASS OR BUTT AND TOP DIMENSIONS 1
(IF STEEL TOWERS ARE EMPLOYED, FURNISH DETAIL DRAWINGS)
J) HEAD GUYS: NUMBER ON EACH POLE_____; SIZE OR STRENGTH_____; LEAD_____.
K) SIDE GUYS: NUMBER EACH WAY_____; SIZE OR STRENGTH_____; LEAD_____.
L) CROSSARMS: SINGLE OR DOUBLE_____; MATERIAL_____; SIZE_____ BY_____.
M) INSULATORS: PIN OR SUSPENSION SUSPENSION ; MANUFACTURER'S AND CATALOGUE NO. HPS 511006120
N) CONDUCTOR ATTACHMENT: TIES OR CLAMPS CLAMPS
O) APPLICANT HAS CONTACTED 1-800-336-9193, U.P. COMMUNICATION DEPARTMENT, AND HAS DETERMINED FIBER OPTIC CABLE _____ EXIST IN VICINITY OF WORK TO BE PERFORMED.
TICKET NO._____
P) IF POWER LINE PARALLELS TRACK WITHIN 1/2 MILE, INCLUDE DIAGRAM SHOWING SPACING AND CONFIGURATION OF WIRES INCLUDING SHIELD WIRES.

EXHIBIT "A"

(FOR RAILROAD USE ONLY - DO NOT WRITE IN THIS BOX)

UNION PACIFIC RAILROAD CO.

(SUBDIVISION)

M. P._____ E. S._____

OVERHEAD WIRELINE CROSSING

ROSEVILLE (NEAREST RR STATION) PLACER (COUNTY) CA (STATE)

FOR CITY OF ROSEVILLE (APPLICANT)

RR FILE NO. 0327450 DATE 04/23/2021

WARNING

IN ALL OCCASIONS, U. P. COMMUNICATIONS DEPARTMENT MUST BE CONTACTED IN ADVANCE OF ANY WORK TO DETERMINE EXISTENCE AND LOCATION OF FIBER OPTIC CABLE. PHONE : 1- 800-336-9193

Form Approved, AVP-Law
Updated 051918

EXHIBIT B

GENERAL TERMS AND CONDITIONS

Section 1. LIMITATION AND SUBORDINATION OF RIGHTS GRANTED.

A. The foregoing grant is subject and subordinate to the prior and continuing right and obligation of Licensor to use and maintain its entire property including the right and power of Licensor to construct, maintain, repair, renew, use, operate, change, modify or relocate railroad tracks, signal, communication, fiber optics, or other wirelines, pipelines and other facilities upon, along or across any or all parts of its property, all or any of which may be freely done at any time or times by Licensor without liability to Licensee or to any other party for compensation or damages.

B. The foregoing grant is also subject to all outstanding superior rights (including those in favor of licensees and lessees of Railroad Property) and the right of Licensor to renew and extend the same, and is made without covenant of title or for quiet enjoyment. It shall be Licensee's sole obligation to obtain such additional permission, license and grants necessary on account of any such existing rights.

Section 2. ENGINEERING REQUIREMENTS; PERMITS.

A. Licensee's Facilities will be designed, constructed, operated, maintained, repaired, renewed, modified, reconstructed, removed, or abandoned in place on Railroad Property by Licensee or its contractor to Licensor's satisfaction and in strict conformity with: (i) Licensor's current engineering standards and specifications, including those for aerial marker balls, shoring and cribbing to protect Licensor's railroad operations and facilities ("UP Specifications"), except for variances approved in advance in writing by Licensor's Assistant Vice President Engineering – Design or its authorized representative ("UP Engineering Representative"); (ii) such other additional safety standards as Licensor, in its sole discretion, elects to require, including, without limitation, American Railway Engineering and Maintenance-of-Way Association ("AREMA") standards and guidelines (collectively, "UP Additional Requirements"); and (iii) all applicable laws, rules, and regulations, including any applicable Federal Railroad Administration, Federal Energy Regulatory Commission, and Federal Aviation Administration regulations and enactments (collectively, "Laws"). If there is any conflict between UP Specifications, UP Additional Requirements, and Laws, the most restrictive will apply.

B. If Licensee's Facilities will be located underground, Licensee shall keep the soil over Licensee's Facilities thoroughly compacted, and maintain the grade over and around Licensee's Facilities even with the surface of the adjacent ground.

C. Licensee shall not transmit electric current from Licensee's Facilities at a difference of potential in excess of the voltage indicated on **Exhibit A**. If the voltage indicated is in excess of seven hundred fifty volts (750V), and Licensee's Facilities will be buried at any location outside of track ballast or roadbed on Railroad Property, Licensee shall install metallic conduit, or non-metallic conduit encased in a minimum of three inches (3") of concrete with a minimum of four feet (4') of ground cover the entire length of Licensee's Facilities. Any of Licensee's Facilities buried by removal of soil shall have, at a depth of one foot (1') beneath the surface of the ground directly above Licensee's Facilities, with a six inch (6") wide warning tape labeled "Danger-High Voltage" or equivalent wording. Any of Licensee's Facilities encased in conduit, jacked, or bored under Railroad Property must be identified with warning signs ("Warning Signs") at each edge of Railroad Property, to be installed and properly maintained at

Licensee's cost and expense. Licensee shall not utilize Warning Signs in lieu of the warning tape where portions of the casing are installed by direct burial.

D. If needed, Licensee shall secure, at Licensee's sole cost and expense, any and all necessary permits required to perform any work on Licensee's Facilities.

Section 3. NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES.

A. Licensee and its contractors are strictly prohibited from commencing any work associated with Licensee's Facilities without Licensor's written approval that the work will be in strict compliance with the "ENGINEERING REQUIREMENTS; PERMITS" Section of this **Exhibit B**. Upon Licensor's approval, Licensee shall contact both of Licensor's field representatives ("Licensor's Field Representatives") at least ten (10) days before commencement of any work on Licensee's Facilities.

B. Licensee shall not commence any work until: (1) Licensor has determined whether flagging or other special protective or safety measures ("Safety Measures") are required for performance of the work pursuant to the "FLAGGING" Section of this **Exhibit B** and provided Licensee written authorization to commence work; and (2) Licensee has complied with the "PROTECTION OF FIBER OPTIC CABLE SYSTEMS" Section of this **Exhibit B**.

C. If, at any time, an emergency arises involving Licensee's Facilities, Licensee or its contractor shall immediately contact Licensor's Response Management Communications Center at (888) 877-7267.

Section 4. FLAGGING.

A. Following Licensee's notice to Licensor's Field Representatives required under the "NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES" Section of this **Exhibit B**, Licensor shall inform Licensee if Safety Measures are required for performance of the work by Licensee or its contractor on Railroad Property. If Safety Measures are required, no work of any kind may be performed by Licensee or its contractor(s) until arrangements for the Safety Measures have been made and scheduled. If no Safety Measures are required, Licensor will give Licensee written authorization to commence work.

B. If any Safety Measures are performed or provided by Licensor, including but not limited to flagging, Licensor shall bill Licensee for such expenses incurred by Licensor, unless Licensor and a federal, state, or local governmental entity have agreed that Licensor is to bill such expenses to the federal, state, or local governmental entity. Additional information regarding the submission of such expenses by Licensor and payment thereof by Licensee can be found in the "LICENSEE'S PAYMENT OF EXPENSES" Section of this **Exhibit B**. If Licensor performs any Safety Measures, Licensee agrees that Licensee is not relieved of any of responsibilities or liabilities set forth in this Agreement.

C. For flagging, the rate of pay per hour for each flagger will be the prevailing hourly rate in effect for an eight-hour day for the class of flagmen used during regularly assigned hours and overtime in accordance with Labor Agreements and Schedules in effect at the time the work is performed. In addition to the cost of such labor, a composite charge for vacation, holiday, health and welfare, supplemental sickness, Railroad Retirement and unemployment compensation, supplemental pension, Employees Liability and Property Damage, and Administration will be included, computed on actual payroll. The composite charge will be the prevailing composite charge in effect at the time the work is performed. One and one-half times the current hourly rate is paid for overtime, Saturdays and Sundays, and two and one-half times current hourly rate for holidays. Wage rates are subject to change, at any time, by law or by

agreement between Licensor and its employees, and may be retroactive as a result of negotiations or a ruling of an authorized governmental agency. Additional charges on labor are also subject to change. If the wage rate or additional charges are changed, Licensee (or the governmental entity, as applicable) shall pay on the basis of the new rates and charges.

D. Reimbursement to Licensor will be required covering the full eight-hour day during which any flagger is furnished, unless the flagger can be assigned to other railroad work during a portion of such day, in which event reimbursement will not be required for the portion of the day during which the flagger is engaged in other railroad work. Reimbursement will also be required for any day not actually worked by the flaggers following the flaggers' assignment to work on the project for which Licensor is required to pay the flaggers and which could not reasonably be avoided by Licensor by assignment of such flaggers to other work, even though Licensee may not be working during such time. When it becomes necessary for Licensor to bulletin and assign an employee to a flagging position in compliance with union collective bargaining agreements, Licensee must provide Licensor a minimum of five (5) days notice prior to the cessation of the need for a flagger. If five (5) days notice of cessation is not given, Licensee will still be required to pay flagging charges for the days the flagger was scheduled, even though flagging is no longer required for that period. An additional ten (10) days notice must then be given to Licensor if flagging services are needed again after such five day cessation notice has been given to Licensor.

Section 5. SAFETY.

A. Safety of personnel, property, rail operations and the public is of paramount importance in the prosecution of any work on Railroad Property performed by Licensee or its contractor, and takes precedence over any work on Licensee's Facilities to be performed by Licensee or its contractors. Licensee shall be responsible for initiating, maintaining and supervising all safety operations and programs in connection with any work on Licensee's Facilities. Licensor and its contractor shall, at a minimum comply, with Licensor's then current safety standards located at the below web address ("Licensor's Safety Standards") to ensure uniformity with the safety standards followed by Licensor's own forces. As a part of Licensee's safety responsibilities, Licensee shall notify Licensor if it determines that any of Licensor's Safety Standards are contrary to good safety practices. Licensee and its contractor shall furnish copies of Licensor's Safety Standards to each of its employees before they enter Railroad Property found at the link below.

Union Pacific Current Safety Requirements

B. Licensee shall keep the job site on Railroad Property free from safety and health hazards and ensure that their employees are competent and adequately trained in all safety and health aspects of the work.

C. Licensee represents and warrants that all parts of Licensee's Facilities within and outside of the limits of Railroad Property will not interfere whatsoever with the constant, continuous, and uninterrupted use of the tracks, property, and facilities of Licensor, and nothing shall be done or suffered to be done by Licensee at any time that would in any manner impair the safety thereof. Licensee shall take all suitable precaution to prevent interference (by induction, leakage of electricity, or otherwise) with the operation of the signal, communication lines or other installations or facilities of Licensor or of its tenants. If, at any time, the operation or maintenance of Licensee's Facilities results in any electrostatic effects which Licensor deems undesirable or harmful, or causes interference with the operation of the signal, communication lines or other installations or facilities, as now existing or which may hereafter be provided by Licensor and/or its tenants, Licensee shall, at the sole cost and expense of Licensee, immediately modify or take action as may be necessary to eliminate such interference.

D. Licensor's operations and work performed by Licensor’s personnel may cause delays in Licensee's or its contractor's work on Licensee's Facilities. Licensee accepts this risk and agrees that Licensor shall have no liability to Licensee or any other person or entity for any such delays. Licensee must coordinate any work on Railroad Property by Licensee or any third party with Licensor's Field Representatives in strict compliance with the "NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES" Section of this **Exhibit B**.

E. Licensor shall have the right, if it so elects, to provide any support it deems necessary for the safety of Licensor's operations and trackage during Licensee's or its contractor's construction, maintenance, repair, renewal, modification, relocation, reconstruction, or removal of Licensee's Facilities. In the event Licensor provides such support, Licensor shall invoice Licensee, and Licensee shall pay Licensor as set forth in the "LICENSEE'S PAYMENT OF EXPENSES" Section of this **Exhibit B**.

F. Licensee may use unmanned aircraft systems ("UAS") to inspect Licensee's Facilities only upon the prior authorization from and under the direction of Licensor's Field Representatives. Licensee represents and warrants that its use of UAS on Railroad Property will comply with Licensor's then-current Unmanned Aerial Systems Policy and all applicable laws, rules and regulations, including any applicable Federal Aviation Administration regulations and enactments pertaining to UAS.

Section 6. PROTECTION OF FIBER OPTIC CABLE SYSTEMS.

Fiber optic cable systems may be buried on Railroad Property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. In addition to the notifications required under the "NOTICE OF COMMENCEMENT OF WORK; EMERGENCIES" Section of this **Exhibit B**, Licensee shall telephone Licensor during normal business hours (7:00 a.m. to 9:00 p.m. Central Time, Monday through Friday, except for holidays) at 1-800-336-9193 (also a 24-hour, 7-day number for emergency calls) to determine if fiber optic cable is buried anywhere on Railroad Property to be used by Licensee. If it is, Licensee shall telephone the telecommunications company(ies) involved, and arrange for a cable locator, make arrangements for relocation or other protection of the fiber optic cable, all at Licensee’s expense, and will not commence any work on Railroad Property until all such protection or relocation has been completed.

Section 7. LICENSEE'S PAYMENT OF EXPENSES.

A. Licensee shall bear the entire cost and expense of the design, construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities.

B. Licensee shall fully pay for all materials joined, affixed to and labor performed on Railroad Property in connection with the construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, and shall not permit or suffer any mechanic’s or materialman’s lien of any kind or nature to be enforced against the property for any work done or materials furnished thereon at the instance or request or on behalf of Licensee. Licensee shall promptly pay or discharge all taxes, charges, and assessments levied upon, in respect to, or on account of Licensee's Facilities, to prevent the same from becoming a charge or lien upon any property of Licensor, and so that the taxes, charges, and assessments levied upon or in respect to such property shall not be increased because of the location, construction, or maintenance of Licensee's Facilities or any improvement, appliance, or fixture connected therewith placed upon such property, or on account of Licensee’s interest therein. Where such tax, charge, or assessment may not be separately made or assessed to Licensee but shall be included in the assessment of the property of Licensor, then Licensee shall pay to Licensor an equitable proportion of such taxes determined by the value of Licensee’s property upon

property of Licensor as compared with the entire value of such property.

C. As set forth in the "FLAGGING" Section of this **Exhibit B**, Licensor shall have the right, if it so elects, to provide any Safety Measures Licensor deems necessary for the safety of Licensor's operations and trackage during Licensee's or its contractor's construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, including, but not limited to supervision, inspection, and flagging services. In the event Licensor provides such Safety Measures, Licensor shall submit an itemized invoice to Licensee's notice recipient listed in the "NOTICES" Article of this Agreement. Licensee shall pay to Licensor the total amount listed on such invoice within thirty (30) days of Licensee's receipt of such invoice.

Section 8. MODIFICATIONS TO LICENSEE'S FACILITIES.

A. This grant is subject to Licensor's safe and efficient operation of its railroad, and continued use and improvement of Railroad Property (collectively, "Railroad's Use"). Accordingly, Licensee shall, at its sole cost and expense, modify, reconstruct, repair, renew, revise, relocate, or remove (individually, "Modification", or collectively, "Modifications") all or any portion of Licensee's Facilities as Licensor may designate or identify, in its sole discretion, (i) in the furtherance of Railroad's Use, or (ii) as is necessary to ensure safe and reliable maintenance and operation of the facilities of Licensor and/or its tenants because of interference from Licensee's Facilities.

B. Upon any Modification of all or any portion of Licensee's Facilities to another location on Railroad Property, Licensor and Licensee shall execute a Supplemental Agreement to this Wireline Agreement to document the Modification(s) to Licensee's Facilities on Railroad Property. If the Modifications result in Licensee's Facilities moving off of Railroad Property, this Agreement will terminate upon Licensee's completion of such Modification(s) and all requirements contained within the "TERMINATION; REMOVAL OF LICENSEE'S FACILITIES" Section of this **Exhibit B**. Any such Modification(s) off of Railroad Property will not release Licensee from any liability or other obligation of Licensee arising prior to and upon completion of any such Modifications to the Licensee's Facilities.

Section 9. RESTORATION OF RAILROAD PROPERTY.

In the event Licensee, in any manner moves or disturbs any property of Licensor in connection with the construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities, then, Licensee shall, as soon as possible and at Licensee's sole cost and expense, restore Licensor's property to the same condition as the same were before such property was moved or disturbed.

Section 10. INDEMNITY.

A. Definitions. As used in this Section:

1. "Licensor" includes Licensor, its affiliates, its and their officers, directors, agents and employees, and other railroad companies using Railroad Property at or near the location of Licensee's installation and their officers, directors, agents, and employees.

2. "Licensee" includes Licensee and its agents, contractors, subcontractors, sub-subcontractors, employees, officers, and directors, or any other person or entity acting on its behalf or under its control.

3. "Loss" includes claims, suits, taxes, loss, damages (including punitive damages, statutory damages, and exemplary damages), costs, charges, assessments, judgments, settlements, liens, demands, actions, causes of action, fines, penalties, interest, and expenses of any nature, including court costs, reasonable attorneys' fees and expenses, investigation costs, and appeal expenses.

B. Licensee shall release, defend, indemnify, and hold harmless Licensor from and against any and all Loss, even if groundless, fraudulent, or false, that directly or indirectly arises out of or is related to Licensee's construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, removal, presence, use, or operation of Licensee's Facilities, including, but not limited to, any actual or alleged:

1. Bodily harm or personal injury (including any emotional injury or disease) to, or the death of, any person(s), including, but not limited to, Licensee, Licensor, any telecommunications company, or the agents, contractors, subcontractors, sub-subcontractors, or employees of the foregoing;

2. Damage to or the disturbance, loss, movement, or destruction of Railroad Property, including loss of use and diminution in value, including, but not limited to, any telecommunications system(s) or fiber optic cable(s) on or near Railroad Property, any property of Licensee or Licensor, or any property in the care, custody, or control of Licensee or Licensor;

3. Removal of person(s) from Railroad Property;

4. Any delays or interference with track or Railroad's Use caused by Licensee's activity(ies) on Railroad Property, including without limitation the construction, maintenance, modification, reconstruction, repair, renewal, revision, relocation, or removal of Licensee's Facilities or any part thereof, any activities, labor, materials, equipment, or machinery in conjunction therewith;

5. Right(s) or interest(s) granted pursuant to this Agreement;

6. Electrical interference or other types of interference created or caused by or escaping from Licensee's Facilities;

7. Licensee's breach of this Agreement or failure to comply with its provisions, including, but not limited to, any violation or breach by Licensee of any representations and warranties Licensee has made in this Agreement; and

8. Violation by Licensee of any law, statute, ordinance, governmental administrative order, rule, or regulation, including without limitation all applicable Federal Railroad Administration regulations.

C. THE FOREGOING OBLIGATIONS SHALL APPLY TO THE FULLEST EXTENT PERMITTED BY LAW FOR THE BENEFIT OF LICENSOR TO LOSSES CAUSED BY, ARISING FROM, RELATING TO, OR RESULTING FROM, IN WHOLE OR IN PART, THE NEGLIGENCE OF LICENSOR, AND SUCH NEGLIGENCE OF LICENSOR SHALL NOT LIMIT, DIMINISH, OR PRECLUDE LICENSEE'S OBLIGATIONS TO LICENSOR IN ANY RESPECT. NOTWITHSTANDING THE FOREGOING, SUCH OBLIGATION TO INDEMNIFY LICENSOR SHALL NOT APPLY TO THE EXTENT THE LOSS IS CAUSED BY THE SOLE, ACTIVE AND DIRECT NEGLIGENCE, GROSS

NEGLIGENCE, OR WILLFUL MISCONDUCT OF LICENSOR AS DETERMINED IN A FINAL JUDGMENT BY A COURT OF COMPETENT JURISDICTION.

Section 11. TERMINATION; REMOVAL OF LICENSEE'S FACILITIES.

A. If Licensee does not use the right herein granted on Licensee's Facilities for one (1) year, or if Licensee continues in default in the performance of any provision of this Agreement for a period of thirty (30) days after written notice from Licensor to Licensee specifying such default, Licensor may, at its sole discretion, terminate this Agreement by written notice to Licensee at the address listed in the "NOTICES" Article of this Agreement. This Agreement will not terminate until Licensee complies with Paragraphs "C" and "D" of this Section found below.

B. In addition to the provisions of Paragraph "A" above, this Agreement may be terminated by written notice given by either party, without cause, upon thirty (30) days written notice to the non-terminating party at the address listed in the "NOTICES" Article of this Agreement. This Agreement will not terminate until Licensee complies with Paragraphs "C" and "D" of this Section found below.

C. Prior to the effective date of any termination described in this Section, Licensee shall submit an application to Licensor's online at this link, for Licensee's removal, or if applicable, abandonment in place of Licensee's Facilities located underground on Railroad Property ("Removal/Abandonment Work"). Upon the UP Engineering Representative's approval of Licensee's application for the Removal/Abandonment Work, Licensor and Licensee shall execute a separate consent document that will govern Licensee's performance of the Removal/Abandonment Work from those portions of Railroad Property not occupied by roadbed and/or trackage ("Consent Document"). Licensee shall then restore the impacted Railroad Property to the same or reasonably similar condition as it was prior to Licensee's installation of Licensee's Facilities.
For purposes of this Section, Licensee's (i) performance of the Removal/Abandonment Work, and (ii) restoration work will hereinafter be collectively referred to as the "Restoration Work".

D. Following Licensee's completion of the Restoration Work, Licensee shall provide a written certification letter to Licensor at the address listed in the "NOTICES" Article of this Agreement which certifies that the Restoration Work has been completed in accordance with the Consent Document. Licensee shall report to governmental authorities, as required by law, and notify Licensor immediately if any environmental contamination is discovered during Licensee's performance of the Restoration Work. Upon discovery, the Licensee shall initiate any and all removal, remedial and restoration actions that are necessary to restore the property to its original, uncontaminated condition. Licensee shall provide written certification to Licensor at the address listed in the "NOTICES" Article of this Agreement that environmental contamination has been remediated and the property has been restored in accordance with Licensor's requirements. Upon Licensor's receipt of Licensee's restoration completion certifications, this Agreement will terminate.

E. In the event that Licensee fails to complete any of the Restoration Work, Licensor may, but is not obligated, to perform the Restoration Work. Any such work actually performed by Licensor will be at the cost and expense of Licensee. In the event that Licensor performs any of the Restoration Work, Licensee shall release Licensor from any and all Loss (defined in the "INDEMNITY" Section of this **Exhibit B**) arising out of or related to Licensor's performance of the Restoration Work.

F. Termination of this Agreement for any reason will not affect any of rights or obligations of the parties which may have accrued, or liabilities or Loss (defined in the "INDEMNITY" Section of this **Exhibit B)**, accrued or otherwise, which may have arisen prior to such termination.

Approved: Insurance Group
Created: 5/19/18
Last Modified: 05/19/18
Form Approved, AVP-Law

EXHIBIT C

INSURANCE REQUIREMENTS

In accordance with Article 5 of this Agreement, Licensee shall (1) procure and maintain at its sole cost and expense, or (2) require its Contractor(s) to procure and maintain, at their sole cost and expense, the following insurance coverage:

A. Commercial General Liability Insurance. Commercial general liability (CGL) with a limit of not less than $2,000,000 each occurrence and an aggregate limit of not less than $4,000,000. CGL insurance must be written on ISO occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage).

The policy must also contain the following endorsement, WHICH MUST BE STATED ON THE CERTIFICATE OF INSURANCE:

- "Contractual Liability Railroads" ISO form CG 24 17 10 01 (or a substitute form providing equivalent coverage) showing "Union Pacific Railroad Company Property" as the Designated Job Site.

B. Business Automobile Coverage Insurance. Business auto coverage written on ISO form CA 00 01 10 01 (or a substitute form providing equivalent liability coverage) with a limit of not less $2,000,000 for each accident, and coverage must include liability arising out of any auto (including owned, hired, and non-owned autos).

The policy must contain the following endorsements, WHICH MUST BE STATED ON THE CERTIFICATE OF INSURANCE:

- "Coverage For Certain Operations In Connection With Railroads" ISO form CA 20 70 10 01 (or a substitute form providing equivalent coverage) showing "Union Pacific Property" as the Designated Job Site.

C. Workers' Compensation and Employers' Liability Insurance. Coverage must include but not be limited to:

- Licensee's statutory liability under the workers' compensation laws of the state(s) affected by this Agreement.

- Employers' Liability (Part B) with limits of at least $500,000 each accident, $500,000 disease policy limit $500,000 each employee.

If Licensee is self-insured, evidence of state approval and excess workers' compensation coverage must be provided. Coverage must include liability arising out of the U. S. Longshoremen's and Harbor Workers' Act, the Jones Act, and the Outer Continental Shelf Land Act, if applicable.

D. **Railroad Protective Liability Insurance**. Licensee must maintain for the duration of work "Railroad Protective Liability" insurance written on ISO occurrence form CG 00 35 12 04 (or a substitute form providing equivalent coverage) on behalf of Licensor only as named insured, with a limit of not less than $2,000,000 per occurrence and an aggregate of $6,000,000. The definition of "JOB LOCATION" and "WORK" on the declaration page of the policy shall refer to this Agreement and shall describe all WORK or OPERATIONS performed under this Agreement. Notwithstanding the foregoing, Licensee does not need Railroad Protective Liability Insurance after its initial construction work is complete and all excess materials have been removed from Licensor's property; PROVIDED, however, that Licensee shall procure such coverage for any subsequent maintenance, repair, renewal, modification, reconstruction, or removal work on Licensee's Facilities.

The definition of "JOB LOCATION" and "WORK" on the declaration page of the policy shall refer to this Agreement and shall describe all WORK or OPERATIONS performed under this Agreement.

E. **Umbrella or Excess Insurance**. If Licensee utilizes umbrella or excess policies, and these policies must "follow form" and afford no less coverage than the primary policy.

Other Requirements

F. All policy(ies) required above (except worker's compensation and employers' liability) must include Licensor as "Additional Insured" using ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage). The coverage provided to Licensor as additional insured shall, to the extent provided under ISO Additional Insured Endorsement CG 20 26, and CA 20 48 provide coverage for Licensor's negligence whether sole or partial, active or passive, and shall not be limited by Licensee's liability under the indemnity provisions of this Agreement.

G. Punitive damages exclusion, if any, must be deleted (and the deletion indicated on the certificate of insurance), unless (a) insurance coverage may not lawfully be obtained for any punitive damages that may arise under this Agreement, or (b) all punitive damages are prohibited by all states in which this Agreement will be performed.

H. Licensee waives all rights of recovery, and its insurers also waive all rights of subrogation of damages against Licensor and its agents, officers, directors and employees for damages covered by the workers' compensation and employers' liability or commercial umbrella or excess liability obtained by Licensee required in this Agreement, where permitted by law. This waiver must be stated on the certificate of insurance.

I. All insurance policies must be written by a reputable insurance company acceptable to Railroad or with a current Best's Insurance Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the work is to be performed.

J. The fact that insurance is obtained by Licensee or by Licensor on behalf of Licensee will not be deemed to release or diminish the liability of Licensee, including, without limitation, liability under the indemnity provisions of this Agreement. Damages recoverable by Licensor from Licensee or any third party will not be limited by the amount of the required insurance coverage.

COUNCIL COMMUNICATION

CC #: 1752
File #: 0800-05

Title:	Verizon Cellular Site at 2005 Hilltop Circle - Lease Agreement and Memorandum of Lease Agreement
Contact:	Karl Grover 916-774-5145 kgrover@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.6.

RECOMMENDATION TO COUNCIL

Staff recommends City Council authorize the City Manager to execute a Lease Agreement as well as the corresponding Memorandum of Lease Agreement, with Sacramento-Valley Limited Partnership dba Verizon Wireless, for the cellular site located at 2005 Hilltop Circle.

BACKGROUND

The current Verizon cellular site located on top of the Corporation Yard Administrative building's roof provides limited coverage in and around City buildings. The current cellular system is outdated and needs to be upgraded in order to improve coverage and performance for both City employees and Corporation Yard visitors.

FISCAL IMPACT

There is no fiscal impact to the City as Verizon will design, upgrade and maintain the new system at no charge.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. An agreement with Verizon to upgrade its site at the City's Corporation Yard Administrative building meets the above criteria and is not subject to CEQA. No additional environmental review is required.

CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

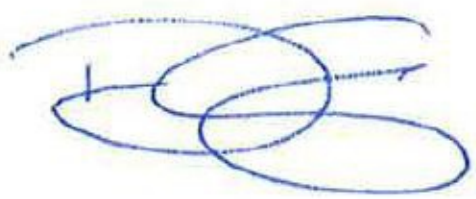
Goal C: Maintain a Safe & Healthy Community

Goal F: Invest in Well-Planned Infrastructure and Growth

Respectfully Submitted,

Karl Grover, IT Program Manager

Hong Sae, Chief Information Officer



_____

Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution 21-430

Verizon Lease Agreement

Verizon Memorandum of Lease Agreement

RESOLUTION NO. 21-430

APPROVING A LEASE AGREEMENT AND MEMORANDUM OF LEASE AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND SACRAMENTO-VALLEY LIMITED PARTNERSHIP DBA VERIZON WIRELESS, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE

WHEREAS, a Lease Agreement, by and between the City of Roseville and Sacramento-Valley Limited Partnership dba Verizon Wireless (the "parties"), has been reviewed by the Council; and

WHEREAS, the corresponding Memorandum of Lease Agreement, by and between the parties, has also been reviewed by the Council.

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Roseville that said Lease Agreement and Memorandum of Lease Agreement are hereby approved and that the City Manager is authorized to execute them on behalf of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville this____day of _____, 20_, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

LEASE AGREEMENT

This Lease Agreement (the "Agreement") made this _____ day of _____, 2021, between the City of Roseville, a California municipal corporation, whose principal place of business is 316 Vernon Street, #300, Roseville, CA 95678, hereinafter designated LESSOR, and Sacramento-Valley Limited Partnership d/b/a Verizon Wireless with its principal offices at One Verizon Way, Mail Stop 4AW100, Basking Ridge, New Jersey 07920 (telephone number 866-862-4404), hereinafter designated LESSEE. LESSOR and LESSEE are at times collectively referred to hereinafter as the "Parties" or individually as the "Party."

WITNESSETH

In consideration of the mutual covenants contained herein and intending to be legally bound hereby, the Parties hereto agree as follows:

1. PREMISES. LESSOR hereby leases to LESSEE approximately 121 square feet on the roof ("Rooftop Space") of the building ("Building") located at 2005 Hilltop Circle, Roseville, Placer County, State of California 95747, APN: 473-110-011-000 and 473-110-012-000, (the Building and such real property are hereinafter sometimes collectively referred to as the "Property"), for the installation, operation and maintenance of communications equipment; approximately 22 square feet of additional space on the roof of the Building sufficient for the installation, operation and maintenance of antennas ("Antenna Space"); together with such additional space within the Building and on the roof of the Building for the installation, operation and maintenance of wires, cables, conduits and pipes (the "Cabling Space") running between and among the Rooftop Space and Antenna Space and to all necessary electrical and telephone utility sources located within the Building or on the Property; together with the non-exclusive right of ingress and egress from a public right-of-way, as more fully described in Paragraph 2 below, over the Property and in and through the Building to and from the Premises (as hereinafter defined) for the purpose of installation, operation and maintenance of LESSEE's communications facility. The Rooftop Space, Antenna Space and Cabling Space are hereinafter collectively referred to as the "Premises" and are as shown on Exhibit "A" attached hereto. References to "Verizon Wireless" in Exhibit "A" shall refer to LESSEE. In the event there are not sufficient electric and telephone, cable or fiber utility sources located within the Building or on the Property, LESSOR agrees to grant LESSEE or the local utility provider the right to install such utilities on, over and/or under the Property and through the Building necessary for LESSEE to operate its communications facility, provided the location of such utilities shall be as reasonably designated by LESSOR.

2. ACCESS. LESSOR agrees to provide LESSEE, its employees and/or agents access to the Premises twenty-four hours a day, seven days a week for the purpose of design, construction, installation, upgrading, maintenance and repair of the communications equipment. LESSEE shall provide at least twenty-four (24) hours' advance written notice to LESSOR prior to accessing the Premises. Except in the event of an emergency in LESSEE's reasonable determination in which event LESSEE shall notify LESSOR as soon as reasonably practicable, LESSEE's access to the Premises shall occur during LESSOR's normal business hours, 8:00 am – 5:00 pm, Monday through Friday. Any access by LESSEE outside of normal business hours must be supervised by authorized employees or agents to LESSOR. Contact information for access is requested via email to buildingmaintrequests@roseville.ca.us. In the event of an emergency, LESSOR shall receive notice of such access via phone to 916-774-5743 which is staffed during business and non-business hours.

3. CONDITION OF PROPERTY. LESSOR shall deliver the Premises to LESSEE in a condition ready for LESSEE's construction of its improvements and clean and free of debris. LESSOR represents and warrants to LESSEE that as of the Effective Date and continuing throughout the Term (as hereinafter defined): (a) the Building (including without limitation the roof, foundations, exterior walls, interior load bearing walls, and utility systems) is (i) in good condition, structurally sound, and free of any leakage; and (ii) the Property and Building are in compliance with all Laws (as defined in Paragraph 23 below), including any applicable building codes, regulations, or ordinances which may exist with regard to the Building, or any part thereof; and (b) the Property is free of all lead-based paint, asbestos or other hazardous substances, as such term may be defined under any applicable federal, state or local law. If a breach of the representations and warranties contained in this Paragraph 3 is discovered at any time during the Term, LESSOR shall, promptly after receipt of written notice from LESSEE setting forth a description of such non-compliance, rectify same at LESSOR's expense.

4. INITIAL TERM; CONSIDERATION.

This Agreement shall be effective as of the date of execution by both Parties (the "Effective Date"), provided, however, the initial term shall be for 5 years and shall commence on the first day of the month after LESSEE commences installation of the equipment on the Premises ("Commencement Date"). LESSOR and LESSEE agree that they shall acknowledge in writing the Commencement Date.

In consideration for the rights granted herein, the Property will receive the benefits of wireless communications arising from operation of the communications facility. The design, construction, equipment, installation and maintenance of the communications facility shall be at LESSEE's sole cost.

5. ELECTRICAL. LESSOR shall, at all times during the Term, provide electrical service and telephone service access within the Premises. If permitted by the local utility company servicing the Premises, LESSEE shall furnish and install an electrical meter at the Premises for the measurement of electrical power used by LESSEE's installation. In the alternative, if permitted by the local utility company servicing the Premises, LESSEE shall furnish and install an electrical sub-meter at the Premises for the measurement of electrical power used by LESSEE's installation. In the event such sub-meter is installed, the LESSEE shall pay the utility directly for its power consumption, if billed by the utility, and if not billed by the utility, then the LESSOR shall read LESSEE's sub-meter on a monthly basis and provide LESSEE with an invoice for LESSEE's power consumption on an annual basis. Specifically, after the expiration of each calendar year, LESSOR shall determine LESSEE's actual electrical power consumption and resulting charges for the immediately preceding calendar year based on reading of the LESSEE's sub-meter on a monthly basis and the electricity bills received by LESSOR throughout such calendar year. Each invoice shall reflect charges only for LESSEE's power consumption based on the average kilowatt hour rate actually paid by LESSOR to the utility for electricity, without mark up or profit. All invoices for power consumption shall be sent by LESSOR to LESSEE at Verizon Wireless, M/S 3846, P.O. Box 2375, Spokane, Washington 99210-2375, shall be provided to LESSEE within (90 days following the conclusion of each calendar year (the "Invoice Period"), and shall be accompanied by copies of the electricity bills received by LESSOR during the subject calendar year and documentation of the sub-meter readings applicable to such calendar year. If LESSOR fails to deliver an invoice to LESSEE within the Invoice Period, LESSOR waives any right to collect any electrical charges from LESSEE for the subject calendar year. LESSEE shall pay each annual power consumption charge within 45 days after receipt of the invoice from LESSOR.

LESSEE shall be permitted at any time during the Term, to install, maintain and/or provide access to and use of, as necessary (during any power interruption at the Premises), a temporary power

source, and all related equipment and appurtenances within the Premises, or elsewhere on the Property in such locations as reasonably approved by LESSOR. LESSEE shall have the right to install conduits connecting the temporary power source and related appurtenances to the Premises.

6. EXTENSIONS. This Agreement shall automatically be extended for 4 additional 5-year extension terms unless LESSEE terminates it at the end of the then current term by giving LESSOR written notice of the intent to terminate at least 6 months prior to the end of the then current term; provided, however, LESSOR may terminate this Agreement at any time after the second 5-year extension term by giving LESSEE at least 12 months prior written notice. The initial term and all extensions shall be collectively referred to herein as the "Term".

7. USE; GOVERNMENTAL APPROVALS. LESSEE shall use the Premises for the purpose of constructing, maintaining, repairing and operating a communications facility and uses incidental thereto. LESSEE shall have the right to replace, repair, add or otherwise modify its utilities, equipment, antennas and/or conduits or any portion thereof and the frequencies over which the equipment operates, whether the equipment, antennas, conduits or frequencies are specified or not on any exhibit attached hereto, during the Term. It is understood and agreed that LESSEE's ability to use the Premises is contingent upon its obtaining after the execution date of this Agreement all of the certificates, permits and other approvals (collectively the "Governmental Approvals") that may be required by any Federal, State or Local authorities as well as a satisfactory building structural analysis which will permit LESSEE use of the Premises as set forth above. LESSOR shall cooperate with LESSEE in its effort to obtain such approvals and shall take no action which would adversely affect the status of the Property with respect to the proposed use thereof by LESSEE. In the event that (i) any of such applications for such Governmental Approvals should be finally rejected; (ii) any Governmental Approval issued to LESSEE is canceled, expires, lapses, or is otherwise withdrawn or terminated by governmental authority; and (iii) LESSEE determines that such Governmental Approvals may not be obtained in a timely manner, LESSEE shall have the right to terminate this Agreement. Notice of LESSEE's exercise of its right to terminate shall be given to LESSOR in accordance with the notice provisions set forth in Paragraph 18 and shall be effective upon the mailing of such notice by LESSEE, or upon such later date as designated by LESSEE. All rentals paid to said termination date shall be retained by LESSOR. Upon such termination, this Agreement shall be of no further force or effect except to the extent of the representations, warranties and indemnities made by each Party to the other hereunder. Otherwise, the LESSEE shall have no further obligations for the payment of rent to LESSOR.

8. INDEMNIFICATION. Subject to Paragraph 9, below, each Party shall indemnify and hold the other harmless against any claim of liability or loss from personal injury or property damage resulting from or arising out of the negligence or willful misconduct of the indemnifying Party, its employees, contractors or agents, except to the extent such claims or damages may be due to or caused by the negligence or willful misconduct of the other Party, or its employees, contractors or agents.

9. INSURANCE.

a. The Parties hereby waive and release any and all rights of action for negligence against the other which may hereafter arise on account of damage to the Premises or to the Property, resulting from any fire, or other casualty of the kind covered by standard fire insurance policies with extended coverage, regardless of whether or not, or in what amounts, such insurance is now or hereafter carried by the Parties, or either of them. These waivers and releases shall apply between the Parties and they shall also apply to any claims under or through either Party as a result of any asserted

right of subrogation. All such policies of insurance obtained by either Party concerning the Premises or the Property shall waive the insurer's right of subrogation against the other Party.

b. LESSOR and LESSEE each agree that at its own cost and expense, each will maintain commercial general liability insurance with limits of $2,000,000 per occurrence for bodily injury (including death) and for damage or destruction to property. LESSOR and LESSEE each agree that it will include the other Party as an additional insured as their interest may appear under this Agreement.

10. LIMITATION OF LIABILITY. Except for indemnification pursuant to Paragraphs 8 and 22, neither Party shall be liable to the other for any lost revenue, lost profits, loss of technology, rights or services, incidental, punitive, indirect, special or consequential damages, loss of data, or interruption or loss of use of service, even if advised of the possibility of such damages, whether under theory of contract, tort (including negligence), strict liability or otherwise.

11. Intentionally deleted.

12. INTERFERENCE. LESSEE agrees to install equipment of the type and frequency which will not cause harmful interference which is measurable in accordance with then existing industry standards to any equipment of LESSOR or other lessees of the Property which existed on the Property prior to the date this Agreement is executed by the Parties. In the event any after-installed LESSEE's equipment causes such interference, and after LESSOR has notified LESSEE in writing of such interference, LESSEE will take all commercially reasonable steps necessary to begin within twenty-four (24) hours of receipt of written notice to correct and eliminate the interference within 72 hours, including but not limited to, at LESSEE's option, powering down such equipment and later powering up such equipment for intermittent testing. In no event will LESSOR be entitled to terminate this Agreement or relocate the equipment as long as LESSEE is making a good faith effort to remedy the interference issue. LESSOR agrees that LESSOR and/or any other tenants of the Property who currently have or in the future take possession of the Property will be permitted to install only such equipment that is of the type and frequency which will not cause harmful interference which is measurable in accordance with then existing industry standards to the then existing equipment of LESSEE. The Parties acknowledge that there will not be an adequate remedy at law for noncompliance with the provisions of this Paragraph and therefore, either Party shall have the right to equitable remedies, such as, without limitation, injunctive relief and specific performance.

13. REMOVAL AT END OF TERM. LESSEE shall, upon expiration of the Term, or within 90 days after any earlier termination of the Agreement, remove its equipment, conduits, fixtures and all personal property and restore the Premises to its original condition, reasonable wear and tear and casualty damage excepted. LESSOR acknowledges that all of the equipment, conduits, fixtures and personal property of LESSEE shall remain the personal property of LESSEE and LESSEE shall have the right to remove the same at any time during the Term, whether or not said items are considered fixtures and attachments to real property under applicable laws. If such time for removal causes LESSEE to remain on the Premises after termination of this Agreement, LESSEE shall pay rent at the then existing monthly rate until such time as the removal of the communications facility is completed.

14. Intentionally deleted.

15. RIGHTS UPON SALE. Should LESSOR, at any time during the Term decide (i) to sell or transfer all or any part of the Property or the Building thereon to a purchaser other than LESSEE, or (ii)

to grant to a third party by easement or other legal instrument an interest in and to that portion of the Building and or Property occupied by LESSEE, or a larger portion thereof, for the purpose of operating and maintaining communications facilities or the management thereof, such sale or grant of an easement or interest therein shall be under and subject to this Agreement and any such purchaser or transferee shall recognize LESSEE's rights hereunder under the terms of this Agreement. In the event that LESSOR completes any such sale, transfer, or grant described in this paragraph without executing an assignment of this Agreement whereby the third party agrees in writing to assume all obligations of LESSOR under this Agreement, then LESSOR shall not be released from its obligations to LESSEE under this Agreement, and LESSEE shall have the right to look to LESSOR and the third party for the full performance of this Agreement.

16. QUIET ENJOYMENT. LESSOR covenants that LESSEE, on paying the rent and performing the covenants herein, shall peaceably and quietly have, hold and enjoy the Premises.

17. ASSIGNMENT. This Agreement may be sold, assigned or transferred by the LESSEE without any approval or consent of the LESSOR to the LESSEE's principal, affiliates, subsidiaries of its principal or to any entity which acquires all or substantially all of LESSEE's assets in the market defined by the FCC in which the Property is located by reason of a merger, acquisition or other business reorganization. As to other parties, this Agreement may not be sold, assigned or transferred without the written consent of LESSOR, which consent will not be unreasonably withheld, delayed or conditioned.

18. NOTICES. All notices hereunder must be in writing and shall be deemed validly given if sent by certified mail, return receipt requested or by commercial courier, provided the courier's regular business is delivery service and provided further that it guarantees delivery to the addressee by the end of the next business day following the courier's receipt from the sender, addressed as follows (or any other address that the Party to be notified may have designated to the sender by like notice):

LESSOR: City of Roseville
316 Vernon Street, Suite 300
Roseville, CA 95678

LESSEE: Sacramento-Valley Limited Partnership d/b/a Verizon Wireless
180 Washington Valley Road
Bedminster, New Jersey 07921
Attention: Network Real Estate

Notice shall be effective upon actual receipt or refusal as shown on the receipt obtained pursuant to the foregoing.

19. RECORDING. LESSOR agrees to execute a Memorandum of this Agreement which LESSEE may record with the appropriate recording officer. The date set forth in the Memorandum of Lease is for recording purposes only and bears no reference to commencement of either the Term or rent payments.

20. DEFAULT. In the event there is a breach by a Party with respect to any of the provisions of this Agreement or its obligations under it, the non-breaching Party shall give the breaching Party written notice of such breach. After receipt of such written notice, the breaching Party shall have 30 days in which to cure any breach, provided the breaching Party shall have such extended period as may

be required beyond the 30 days if the breaching Party commences the cure within the 30-day period and thereafter continuously and diligently pursues the cure to completion. The non-breaching Party may not maintain any action or effect any remedies for default against the breaching Party unless and until the breaching Party has failed to cure the breach within the time periods provided in this Paragraph.

21. REMEDIES. In the event of a default by either Party with respect to a material provision of this Agreement, without limiting the non-defaulting Party in the exercise of any right or remedy which the non-defaulting Party may have by reason of such default, the non-defaulting Party may terminate the Agreement and/or pursue any remedy now or hereafter available to the non-defaulting Party under the Laws or judicial decisions of the state in which the Premises are located. Further, upon a default, the non-defaulting Party may at its option (but without obligation to do so), perform the defaulting Party's duty or obligation on the defaulting Party's behalf, including but not limited to the obtaining of reasonably required insurance policies. The costs and expenses of any such performance by the non-defaulting Party shall be due and payable by the defaulting Party upon invoice therefor.

22. ENVIRONMENTAL.

a. LESSOR will be responsible for all obligations of compliance with any and all environmental and industrial hygiene laws, including any regulations, guidelines, standards, or policies of any governmental authorities regulating or imposing standards of liability or standards of conduct with regard to any environmental or industrial hygiene conditions or concerns as may now or at any time hereafter be in effect, that are or were in any way related to activity now conducted in, on, or in any way related to the Building or Property, unless such conditions or concerns are caused by the specific activities of LESSEE in the Premises.

b. LESSOR shall hold LESSEE harmless and indemnify LESSEE from and assume all duties, responsibility and liability at LESSOR's sole cost and expense, for all duties, responsibilities, and liability (for payment of penalties, sanctions, forfeitures, losses, costs, or damages) and for responding to any action, notice, claim, order, summons, citation, directive, litigation, investigation or proceeding which is in any way related to: a) failure to comply with any environmental or industrial hygiene law, including without limitation any regulations, guidelines, standards, or policies of any governmental authorities regulating or imposing standards of liability or standards of conduct with regard to any environmental or industrial hygiene concerns or conditions as may now or at any time hereafter be in effect, unless such non-compliance results from conditions caused by LESSEE; and b) any environmental or industrial hygiene conditions arising out of or in any way related to the condition of the Building or Property or activities conducted thereon, unless such environmental conditions are caused by LESSEE.

c. LESSEE shall hold LESSOR harmless and indemnify LESSOR from and assume all duties, responsibility and liability at LESSEE's sole cost and expense, for all duties, responsibilities, and liability (for payment of penalties, sanctions, forfeitures, losses, costs, or damages) and for responding to any action, notice, claim, order, summons, citation, directive, litigation, investigation or proceeding which is in any way related to: a) failure to comply with any environmental or industrial hygiene law, including without limitation any regulations, guidelines, standards, or policies of any governmental authorities regulating or imposing standards of liability or standards of conduct with regard to any environmental or industrial hygiene concerns or conditions as may now or at any time hereafter be in effect, to the extent that such non-compliance results from conditions caused by LESSEE; and b) any environmental or industrial hygiene conditions arising out of or in any way related to the condition of

the Property or activities conducted thereon, to the extent that such environmental conditions are caused by LESSEE.

23. CASUALTY. In the event of damage by fire or other casualty to the Building or Premises that cannot reasonably be expected to be repaired within 45 days following same or, if the Property is damaged by fire or other casualty so that such damage may reasonably be expected to disrupt LESSEE's operations at the Premises for more than 45 days, then LESSEE may, at any time following such fire or other casualty, provided LESSOR has not completed the restoration required to permit LESSEE to resume its operation at the Premises, terminate this Agreement upon 15 days prior written notice to LESSOR. Any such notice of termination shall cause this Agreement to expire with the same force and effect as though the date set forth in such notice were the date originally set as the expiration date of this Agreement and the Parties shall make an appropriate adjustment, as of such termination date, with respect to payments due to the other under this Agreement. Notwithstanding the foregoing, the rent shall abate during the period of repair following such fire or other casualty in proportion to the degree to which LESSEE's use of the Premises is impaired.

24. APPLICABLE LAWS. During the Term, LESSOR shall maintain the Property, the Building, Building systems, common areas of the Building, and all structural elements of the Premises in compliance with all applicable laws, rules, regulations, ordinances, directives, covenants, easements, zoning and land use regulations, and restrictions of record, permits, building codes, and the requirements of any applicable fire insurance underwriter or rating bureau, now in effect or which may hereafter come into effect (including, without limitation, the Americans with Disabilities Act and laws regulating hazardous substances) (collectively "Laws"). LESSEE shall, in respect to the condition of the Premises and at LESSEE's sole cost and expense, comply with (a) all Laws relating solely to LESSEE's specific and unique nature of use of the Premises; and (b) all building codes requiring modifications to the Premises due to the improvements being made by LESSEE in the Premises. It shall be LESSOR's obligation to comply with all Laws relating to the Building in general, without regard to specific use (including, without limitation, modifications required to enable LESSEE to obtain all necessary building permits).

25. MISCELLANEOUS. This Agreement contains all agreements, promises and understandings between the LESSOR and the LESSEE regarding this transaction, and no oral agreement, promises or understandings shall be binding upon either the LESSOR or the LESSEE in any dispute, controversy or proceeding. This Agreement may not be amended or varied except in a writing signed by all parties. This Agreement shall extend to and bind the heirs, personal representatives, successors and assigns hereto. The failure of either party to insist upon strict performance of any of the terms or conditions of this Agreement or to exercise any of its rights hereunder shall not waive such rights and such party shall have the right to enforce such rights at any time. This Agreement and the performance thereof shall be governed interpreted, construed and regulated by the laws of the state in which the Premises is located without reference to its choice of law rules.

Remainder of page left intentionally blank.

IN WITNESS WHEREOF, the Parties hereto have set their hands and affixed their respective seals the day and year first above written.

LESSOR: City of Roseville

By: _____

Its: _____

Date: _____

LESSEE: Sacramento-Valley Limited Partnership
d/b/a Verizon Wireless
By AirTouch Cellular Inc., Its General Partner

By: Scott Stewart

Name: Scott Stewart

Title: Director-Network

Date: 9/3/21

EXHIBIT "A"
LEGAL DESCRIPTION

Main Parcel:

Real property in the City of Roseville, County of Placer, State of California, described as follows:

LOT 12 OF HILLTOP INDUSTRIAL PARK, IN THE CITY OF ROSEVILLE, AS PER MAP THEREOF FILED JANUARY 11, 1982, IN BOOK "N" OF MAPS, PAGE 48, PLACER COUNTY RECORDS.

APN: 473-110-012-000

Access Parcel:

Real property in the City of Roseville, County of Placer, State of California, described as follows:

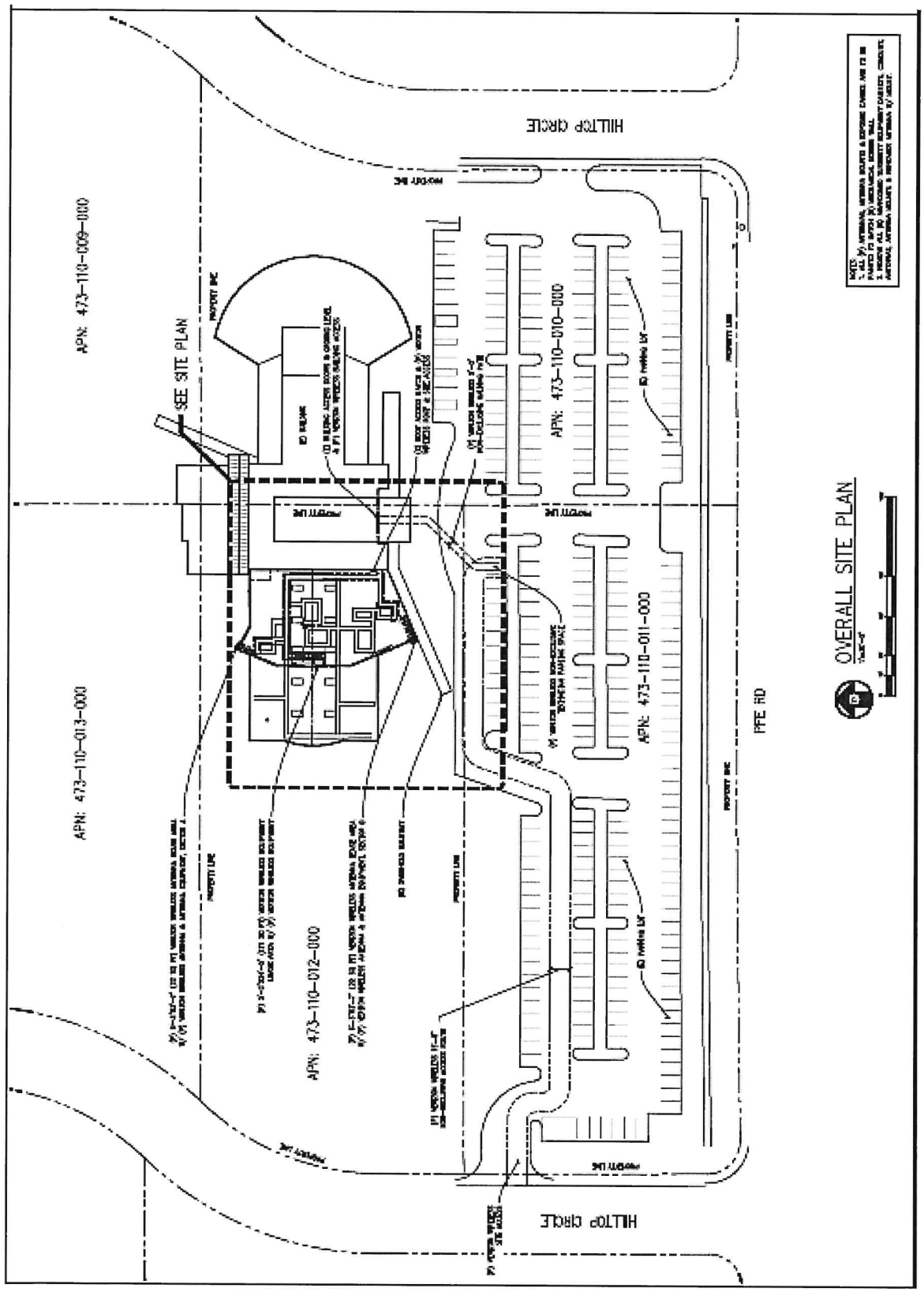
LOT 11 OF HILLTOP INDUSTRIAL PARK, IN THE CITY OF ROSEVILLE, AS PER MAP THEREOF FILED JANUARY 11, 1982, IN BOOK "N" OF MAPS, PAGE 48, PLACER COUNTY RECORDS.

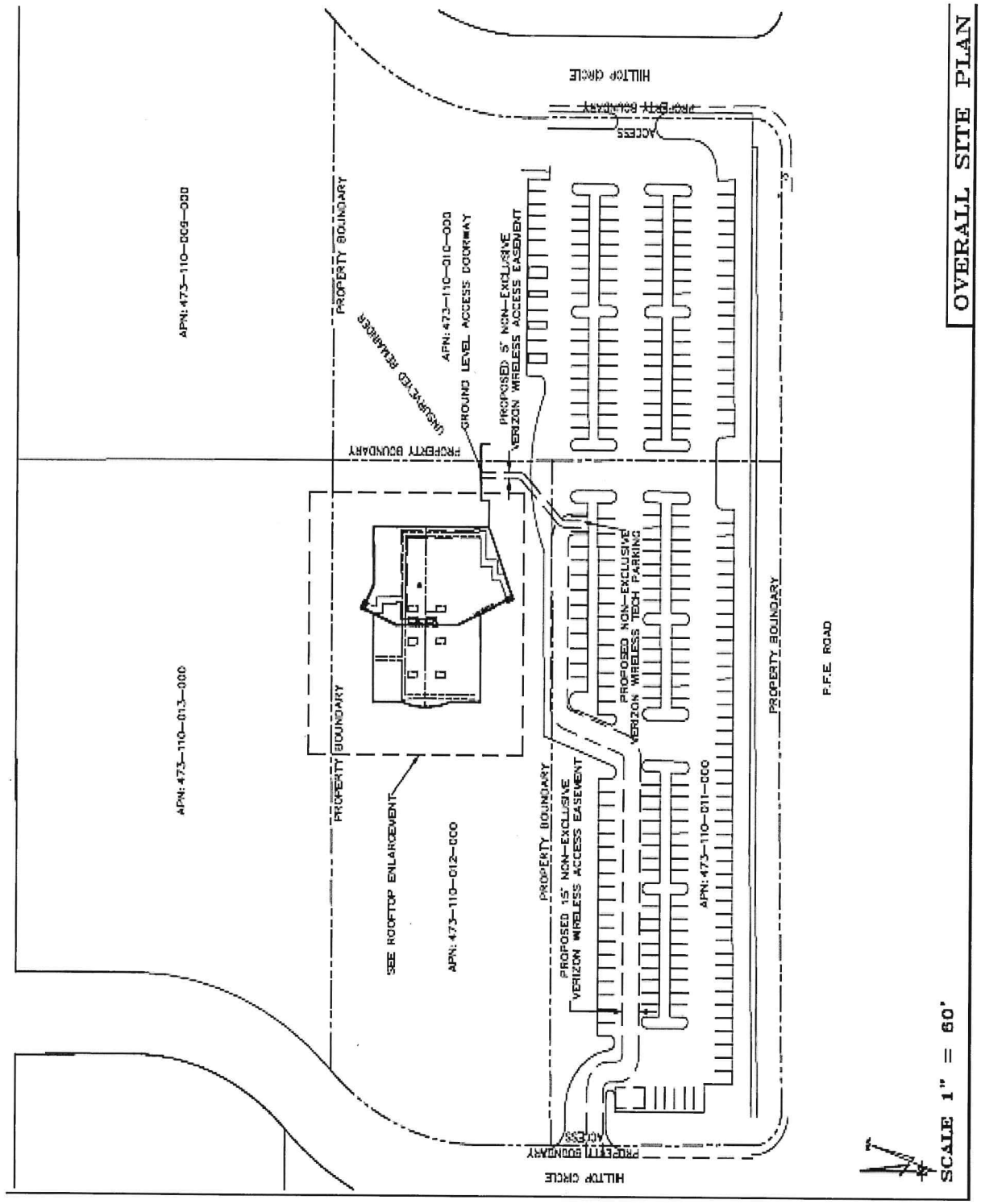
APN: 473-110-011-000

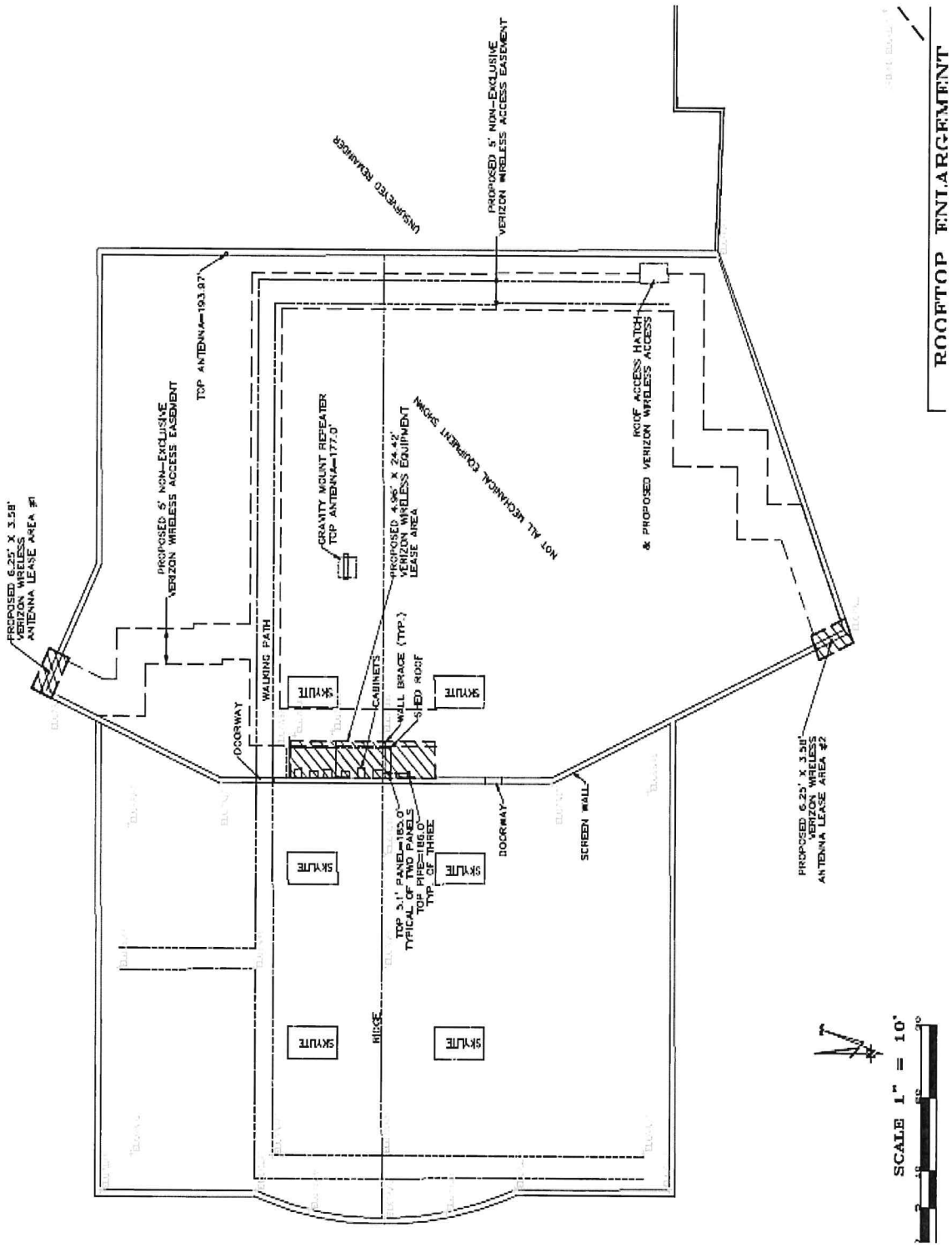
EXHIBIT "A"

SITE PLAN OF ROOFTOP SPACE, ANTENNA SPACE AND CABLING SPACE

(See attached)


OVERALL SITE PLAN
HILLTOP CIRCLE
HILLTOP CIRCLE
PFE RD
APN: 473-110-009-000
APN: 473-110-013-000
APN: 473-110-012-000
APN: 473-110-010-000
APN: 473-110-011-000
SEE SITE PLAN


OVERALL SITE PLAN
SCALE 1" = 60'
HILLTOP CIRCLE
HILLTOP CIRCLE
F.F.E. ROAD
PROPERTY BOUNDARY
PROPERTY BOUNDARY
PROPERTY BOUNDARY
PROPERTY BOUNDARY
PROPERTY BOUNDARY
ACCESS
ACCESS
PROPOSED 15' NON-EXCLUSIVE VERIZON WIRELESS ACCESS EASEMENT
PROPOSED NON-EXCLUSIVE VERIZON WIRELESS TECH PARKING
PROPOSED 5' NON-EXCLUSIVE VERIZON WIRELESS ACCESS EASEMENT
GROUND LEVEL ACCESS DOORWAY
UNSURFACED REMAINDER
SEE ROOFTOP ENLARGEMENT
APN: 473-110-009-000
APN: 473-110-013-000
APN: 473-110-012-000
APN: 473-110-010-000
APN: 473-110-011-000


ROOFTOP ENLARGEMENT
PROPOSED 5' NON-EXCLUSIVE VERIZON WIRELESS ACCESS EASEMENT
UNSCREENED REMAINDER
TOP ANTENNA=193.92'
PROPOSED 5' NON-EXCLUSIVE VERIZON WIRELESS ACCESS EASEMENT
GRAVITY MOUNT REPEATER TOP ANTENNA=177.0'
PROPOSED 6.25' X 3.58' VERIZON WIRELESS ANTENNA LEASE AREA #1
NOT ALL MECHANICAL EQUIPMENT SHOWN
PROPOSED 4.96' X 24.42' VERIZON WIRELESS EQUIPMENT LEASE AREA
ROOF ACCESS HATCH & PROPOSED VERIZON WIRELESS ACCESS
WALKING PATH
CABINETS
WALL BRACE (TYP.)
SHED ROOF
DOORWAY
SKYLITE
TOP 3.1' PANEL=183.0' TYPICAL OF TWO PANELS TOP PIPE=186.0' TYP. OF THREE
DOORWAY
SCREEN WALL
RIDGE
PROPOSED 6.25' X 3.58' VERIZON WIRELESS ANTENNA LEASE AREA #2
SCALE 1" = 10'

FILED FOR RECORD AT REQUEST OF
AND WHEN RECORDED RETURN TO:
Tock & Corl, PLLC
Attn: S. Ward
17502 Marine Drive
Stanwood, WA 98292

Space above this line is for Recorder's use.

Memorandum of Lease Agreement

Grantor:	City of Roseville, a California municipal corporation
Grantee:	Sacramento-Valley Limited Partnership d/b/a Verizon Wireless
Legal Description:	Lots 11 and 12 of Hilltop Industrial Park, City of Roseville, County of Placer, State of California **Official legal description attached as Exhibit "A"**
Assessor's Tax Parcel ID#:	473-110-011-000 & 473-110-012-000
Reference # (if applicable):	N/A

MEMORANDUM OF LEASE AGREEMENT

THIS MEMORANDUM OF LEASE AGREEMENT evidences that a Lease Agreement ("Agreement") was entered into as of _____, 2021, by and between the City of Roseville, a California municipal corporation ("Lessor"), and Sacramento-Valley Limited Partnership d/b/a Verizon Wireless ("Lessee"), for certain real property located at 2005 Hilltop Circle, Roseville, Placer County, State of California 95747, APNs: 473-110-011-000 and 473-110-012-000, within the property of Lessor which is described in Exhibit "A" attached hereto ("Legal Description"), together with a right of access and to install and maintain utilities, for an initial term of five (5) years commencing as provided for in the Agreement, which term is subject to Lessee's rights to extend the term of the Agreement as provided in the Agreement.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, Lessor and Lessee have duly executed this Memorandum of Lease Agreement as of the day and year last below written.

LESSOR: City of Roseville, a California municipal corporation

By: _____

Name: _____

Title: _____

Date: _____

LESSEE: Sacramento-Valley Limited Partnership d/b/a Verizon Wireless
By AirTouch Cellular Inc., Its General Partner

By: Scott Stewart

Name: Scott Stewart

Title: Director Network

Date: 9/3/21

Exhibit "A" – Legal Description

California All-Purpose Acknowledgment

Pursuant to SB 1050 (Chapter 197, Statutes of 2014), Civil Code section 1189 has been amended to provide that any certificate of acknowledgment taken within the State of California shall be in the following form:

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Alameda)

On Sept. 3, 2021 before me, A. R. Kruse Ludtke, Notary Public, personally
(Insert name and title of officer)
appeared Scott Stewart who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

Witness my hand and official seal.

(Signature) (Seal)

A. R. KRUSE-LUDTKE
Notary Public - California
Alameda County
Commission # 2278403
My Comm. Expires Mar 22, 2023

California All-Purpose Acknowledgment

Pursuant to SB 1050 (Chapter 197, Statutes of 2014), Civil Code section 1189 has been amended to provide that any certificate of acknowledgment taken within the State of California shall be in the following form:

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
)
County of _____)

On _____ before me, _____, personally
(Insert name and title of officer)
appeared _____ who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

Witness my hand and official seal.

_____ (Seal)
(Signature)

EXHIBIT "A"
Legal Description

Main Parcel:

Real property in the City of Roseville, County of Placer, State of California, described as follows:

LOT 12 OF HILLTOP INDUSTRIAL PARK, IN THE CITY OF ROSEVILLE, AS PER MAP THEREOF FILED JANUARY 11, 1982, IN BOOK "N" OF MAPS, PAGE 48, PLACER COUNTY RECORDS.

APN: 473-110-012-000

Access Parcel:

Real property in the City of Roseville, County of Placer, State of California, described as follows:

LOT 11 OF HILLTOP INDUSTRIAL PARK, IN THE CITY OF ROSEVILLE, AS PER MAP THEREOF FILED JANUARY 11, 1982, IN BOOK "N" OF MAPS, PAGE 48, PLACER COUNTY RECORDS.

APN: 473-110-011-000

COUNCIL COMMUNICATION

CC #: 1749
File #: 0200

Title:	Budget Development and Management System Support - Professional Services Agreement
Contact:	Scott Pettingell 916-746-1306 spettingell@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.7.

RECOMMENDATION TO COUNCIL

Staff recommends City Council adopt a resolution authorizing the City Manager to execute a professional services agreement by and between the City of Roseville and CherryRoad Technologies Inc. for budget development and management system support.

BACKGROUND

The City has been in agreement with CherryRoad for as-needed extended support of the City's Oracle-based budget development and management system (Oracle Planning and Budgeting Cloud Services (PBCS) since the system went live in January 2020. The existing agreement with CherryRoad will expire shortly. Staff recommends entering into a new professional services agreement with CherryRoad for ongoing as-needed system support and enhancements based on their specialized knowledge of the City's budget development system. Since CherryRoad was the original implementer of the City's budget development system, they have the technical expertise and background to provide continuity of system support and efficiently implement system adjustments and improvements.

The scope of work in this agreement will include assisting in the day-to-day management of the system, improving reporting, establishing real-time financial dashboards, implementing automated and more accurate fund summaries, incorporating approval workflow into PBCS, improving long-term forecasting and budget monitoring, improving the position budgeting process, and streamlining processes currently managed via email and Excel forms.

The initial term of the agreement will be for three years and a not-to-exceed amount of $86,000 in year one, $50,000 in year two, and $50,000 in year three. The agreement also includes an option to renew the agreement for two additional years if needed.

FISCAL IMPACT

There are adequate funds included in the Finance Department's Fiscal Year (FY) 2021-22 budget

to fund the first year of the recommended agreement. No additional General Fund resources are required, and funding for future years will be provided through the City's annual budget process, subject to City Council approval.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) only applies to projects which have the potential to cause a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. (CEQA Guidelines §15061(b)(3)).

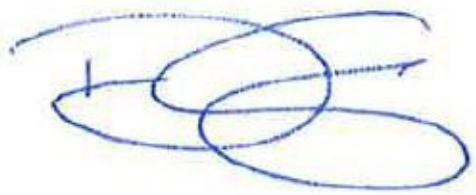
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal A - Remain fiscally responsible in a changing world

Respectfully Submitted,

Scott Pettingell, Budget Manager

Dennis Kauffman, Assistant City Manager/Chief Financial Officer



Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution 21-428

Agreement

RESOLUTION NO. 21-428

APPROVING A PROFESSIONAL SERVICES AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND CHERRYROAD TECHNOLOGIES INC., AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE

WHEREAS, a professional services agreement for application support for Oracle planning and budgeting cloud services, by and between the City of Roseville and CherryRoad Technologies Inc., has been reviewed by the City Council; and

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Roseville that said professional services agreement is hereby approved and that the City Manager is authorized to execute it on behalf of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville this____day of _____, 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

PROFESSIONAL SERVICES AGREEMENT

Application Support for Oracle Planning and Budgeting Cloud Service

THIS AGREEMENT is made and entered into this____day of_____, 2021,by and between the City of Roseville, a municipal corporation ("CITY"), and CherryRoad Technologies Inc., a Florida corporation ("CONSULTANT"); and

W I T N E S S E T H:

WHEREAS, CITY desires professional services consisting of application support for Oracle Planning and Budgeting Cloud Service; and

WHEREAS, CONSULTANT has prepared a proposal dated August 23, 2021, which describes the scope of work to be performed by CONSULTANT, the budget for the work, and the schedule for performance of the work; and

WHEREAS, CONSULTANT is qualified and experienced to provide such professional services.

NOW, THEREFORE, the parties agree as follows:

1. Term. The term of this Agreement shall commence upon execution by both parties and expire on October 5, 2024. The City Manager may, in his or her discretion, elect to extend the Agreementin one (1) year increments for up to an additional two (2) years by giving CONSULTANT thirty (30) days advance written notice of each optional one (1) year renewal. Such extensions shall bememorialized by a written amendment to this Agreement.

2. Services. CONSULTANT shall perform, at the direction of CITY, the scope of services as described in EXHIBIT "A," attached hereto and incorporated herein by this reference (the "Services").

3. Compensation. For its Services provided hereunder, CONSULTANT shall be compensated on a time and expense basis in accordance with the hourly rates as described in EXHIBIT "A". Any proposed increase in the effective rates for future services must be preceded by at least a 90-day written notice to the contracting department. Total compensation shall not exceed one hundred eighty-six thousand dollars ($186,000) for the initial term. Total compensation for optional renewal years of this Agreement shall not exceed fifty thousand dollars per year ($50,000). Adjustment to the total compensation per year shall require a written amendment to this Agreement, subject to approval by the City Council.

CONSULTANT shall submit one monthly invoice for its services. Such invoices shall be delineated by task, the person performing the services, and the hourly rate, which shall be stated in time increments of not greater than one tenth (1/10) hours. CITY shall pay invoices within thirty (30) days after receipt, if the Services specified in the invoice have been satisfactorily completed in the CITY's reasonable determination.

4. Indemnification. To the fullest extent allowed by law, CONSULTANT shall defend, indemnify, and save and hold harmless CITY, its officers, agents, employees and volunteers from any claims, suits or actions of every name, kind and description brought forth, or on account of, injuries to or death of any person (including but not limited to workers and the public), or damage to property, resulting from or arising out of CONSULTANT's willful misconduct or negligent act or omission while engaged in the performance of obligations or

exercise of rights created by this Agreement The parties intend that this provision shall be broadly construed.

Any indemnification obligation for infringement shall not be applicable to the extent the infringement is attributable to the acts or omissions of the CITY including, without limitation, materials, specifications, or products provided by the CITY, modifications made by the CITY to any of the Services delivered by CONSULTANT or if the CITY uses Services in a manner not intended by this Agreement.

For the avoidance of doubt, in any litigation between CITY and CONSULTANT, each party shall be responsible for its own legal fees.

CONSULTANT agrees to defend and indemnify CITY if, despite the parties intent and practice, any venue, agency, or court with competent jurisdiction determines that CONSULTANT and/or any of its agents, officers, employees, volunteers, independent contractors, or subcontractors, are characterized as employee(s) of CITY.

CONSULTANT's responsibility for such defense and indemnity obligations shall survive the termination or completion of this Agreement for the full period of time allowed by law. The defense and indemnity obligations of this Agreement are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained in this Agreement.

5. Insurance. CONSULTANT agrees to continuously maintain, in full force and effect, the following minimum policies of insurance during the term of this Agreement.

COVERAGE	LIMITS OF LIABILITY
Workers' Compensation	Statutory
Commercial General Liability	$1,000,000 each occurrence $2,000,000 aggregate Personal Injury: $1,000,000 each occurrence

	$2,000,000 aggregate
Automobile Liability	$1,000,000 combined single limit
Professional Liability (errors and omissions)	$1,000,000 per claim $2,000,000 aggregate

a. Form. CONSULTANT shall submit a certificate evidencing such coverage for the period covered by this Agreement in a form satisfactory to Risk Management and the City Attorney, prior to undertaking any work hereunder. Any insurance written on a claims made basis is subject to the approval of Risk Management and the City Attorney.

b. Additional Insureds. CONSULTANT shall also provide a separate endorsement form or section of the policy showing CITY, its officers, agents, employees and volunteers as additional insureds for each type of coverage, except for Workers' Compensation and Professional Liability. Such insurance shall specifically cover the contractual liability of CONSULTANT. The additional insured coverage under the CONSULTANT's policy shall be primary and noncontributory, as evidenced by a separate endorsement or section of the policy, and shall not seek contribution from CITY's insurance or self-insurance. In addition, the additional insured coverage shall be at least as broad as the Insurance Services Office ("ISO") CG 20 01 Endorsement. Any available insurance proceeds in excess of the specified minimum insurance coverage requirements and limits shall be available to the additional insureds. Furthermore, the requirements for coverage and limits shall be: (1) the minimum coverage and limits specified in this Agreement; or (2) the full coverage and maximum limits of any insurance proceeds available to the named insureds, whichever is greater.

c. Cancellation/Modification. CONSULTANT shall provide ten (10) days written notice to CITY prior to cancellation or modification of any insurance required by this Agreement.

d. Umbrella/Excess Insurance. The limits of insurance required in this Agreement may be satisfied by a combination of primary and excess insurance. Any excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and noncontributory basis for the benefit of CITY (if agreed to in a written contract) before CITY's own insurance shall be called upon to protect it as a named insured.

e. Subcontractors. CONSULTANT agrees to include in its contracts with all subcontractors all applicable requirements and provisions of this Agreement, including the indemnity and insurance requirements, to the extent they apply to the scope of the subcontractor's work.

Furthermore, CONSULTANT shall require its subcontractors to agree to be bound to CONSULTANT and CITY in the same manner and to the same extent as CONSULTANT is bound to CITY under this Agreement. Additionally, CONSULTANT shall obligate its subcontractors to comply with these same provisions with respect to any tertiary subcontractor, regardless of tier. A copy of CITY's indemnity and insurance provisions will be furnished to the subcontractor or tertiary subcontractor upon request.

f. Self-Insured Retentions. All self-insured retentions ("SIR") must be disclosed to Risk Management for approval and shall not reduce the limits of liability. Policies containing any SIR provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named insured or CITY. CITY reserves the right to obtain a full certified copy of any insurance policy and endorsements. The failure to exercise this right shall not constitute a waiver of such right.

g. Waiver of Subrogation. CONSULTANT hereby agrees to waive subrogation which any insurer of CONSULTANT may acquire from CONSULTANT by virtue of the payment of any loss under a Workers Compensation, Commercial General Liability or

Automobile Liability policy. All Workers Compensation, Commercial General Liability and Automobile Liability policies shall be endorsed with a waiver of subrogation in favor of CITY, its officers, agents, employees and volunteers for all worked performed by CONSULTANT, its employees, agents and subcontractors.

h. Liability/Remedies. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve CONSULTANT of liability in excess of such coverage, nor shall it preclude CITY from taking such other actions as are available to it under any other provisions of this Agreement or law.

6. Records. CONSULTANT and its subcontractors shall maintain all files and records relating to the services performed hereunder during the term of this Agreement and for a period of not less than one (1) year after the date of termination or expiration. Provided, however, that in the event of litigation or settlement of claims arising from the performance of this Agreement, CONSULTANT and its subcontractors shall maintain all files and records until such litigation, appeals or claims are resolved. Duly authorized representatives of CITY shall have right of access during normal business hours and after reasonable advance notice to CONSULTANT's and subcontractors' files and records relating to the services performed hereunder, and may review and copy the files and records at appropriate stages during performance of the services and during the one (1) year period following termination or expiration of this Agreement. CONSULTANT shall include this provisions in its contracts with all subcontractors. Unless required to be disclosed by law, the CITY agrees to keep all files and records confidential and shall not disclose to any third party.

7. Time is of the Essence. Time is of the essence of this Agreement.

8. Compliance with Laws. CONSULTANT shall comply with all federal, state and local laws, ordinances and policies as may be applicable to the performance of Services

underthis Agreement.

9. Ability to Perform. CONSULTANT agrees and represents that it has the time, ability and professional expertise to perform the Services required under this Agreement.

10. Governing Agreement. In the event of any conflict between this Agreement and its EXHIBITS, the provisions of this Agreement shall govern. In the event of any conflict between any of the EXHIBITS, the provisions of the first in order of attachment shall govern.

11. Assignment. CONSULTANT is employed to perform unique personal services. CONSULTANT shall not assign this Agreement without the prior written consent of CITY, which consent shall not be unreasonably withheld. CONSULTANT shall not employ or otherwise incur any obligation to pay other specialists or experts for services in connection with this Agreement, without prior written consent of CITY, which consent shall not be unreasonably withheld.

12. Independent Contractor. CONSULTANT, inclusive of its agents, officers, employees, volunteers, independent contractors, and subcontractors, shall act as an independent contractor, and covenants and agrees that it will conduct itself consistent with such status, that it will neither hold itself out as, nor claim to be, an officer or employee of CITY by reason of this Agreement.

CONSULTANT and CITY agree that: (a) CONSULTANT is free from the control and direction of CITY in connection with the performance of the work; (b) CONSULTANT is providing services directly to CITY; (c) CONSULTANT has and will maintain at all relevant times a business license; (d) CONSULTANT maintains a business location that is separate from CITY; (e) CONSULTANT is customarily engaged in an independently established business of the same nature as that involved in the work performed hereunder; (f) CONSULTANT actually contracts with other businesses to provide the same or similar services and maintains a clientele

without restrictions from CITY; (g) CONSULTANT advertises and holds itself out to the public as available to provide the same or similar services; (h) CONSULTANT provides its own tools, vehicles, and equipment to perform the services; (i) CONSULTANT has negotiated its own rates; (j) CONSULTANT set its own hours and location of work in accomplishing CITY's on-call needs; and (k) CONSULTANT has the right to control the manner and means of accomplishing the result desired and exercises its own expert independent judgement.

13. Representations and Warranties. CONSULTANT warrants that it has not employed or retained any company or person, other than a bona fide employee working for CONSULTANT, to solicit or secure this Agreement, and that it has not paid or agreed to pay any company or person, other than a bona fide employee, any fee, commission, percentage, brokerage fee, gift or any other consideration, contingent upon or resulting from the award or making of this Agreement. For breach or violation of this warranty, CITY shall have the right to terminate as void this Agreement, without liability, or, in its discretion, to deduct from the Agreement price or consideration, or otherwise recover, the full amount of such fee, commission, percentage, brokerage fee, gift or contingent fee.

14. Successors in Interest. This Agreement shall be binding upon the heirs, successors, executors, administrators and assigns of the respective parties hereto.

15. Copyright, Ownership and Use of Materials. All tangible material ("Material") created or delivered and paid for by the CITY pursuant to this Agreement is considered a work made for hire under the Copyright Act. To the extent such Material does not qualify as a work made for hire, CONSULTANT hereby assigns to CITY all right, title, and interest, including but not limited toall copyrights, in all Material created by CONSULTANT in its performance under this Agreement and for which payment has been made by the CITY. Material includes the Services outlined in Exhibit A and attached hereto, and all written and other tangible

expressions, including but not limited to, drawings (including computer aided drawings), papers, documents, reports, surveys, renderings, exhibits, sketches, maps, models, prints, paintings or photographs, in any and all media or formats in which such materials have been created or are maintained. All Material furnished by CONSULTANT and for which payment has been made by the CITY, is,and shall remain, the property of CITY.

CONSULTANT will retain ownership of all intellectual property, knowledge, techniques, procedures, know-how, methodologies, routines, templates and methods which have been developed by CONSULTANT in its regular course of business and not for specific use in performance of this Agreement and used in the provision of services ("Consultant Tools"). CONSULTANT shall grant the CITY, upon each payment, a perpetual, irrevocable, non-assignable, non-exclusive license to that Consultant Tool that CONSULTANT embeds in or provides with any Materials or that are otherwise used in connection with the Services and paid for by the CITY.

CONSULTANT shall execute any documents reasonably necessary to effectuate such assignment. In the event that CONSULTANT uses, employs, designates, or retains any person or entity who is not an employee of CONSULTANT, to perform any work required of it pursuant to this Agreement, CONSULTANT shall require said person or entity to execute an agreement containing the preceding paragraph.

16. Termination of Agreement. The City may terminate this Agreement without cause by giving CONSULTANT ten (10) days advance written notice from the City Manager. CONSULTANT may terminate this Agreement without cause by giving CITY thirty (30) days advance written notice. In the event of termination, CITY shall compensate CONSULTANT for reasonable Services performed as of the date of termination, upon therelease to CITY of all

Material hereunder, in any and all media or formats in which such materials have been created or are maintained. CITY retains the right to receive and use any MATERIAL, if there is a good faith dispute regarding the amount to be paid.

17. Attorney's Fees; Venue; Governing Law. If either party commences any legal action against the other party arising out of this Agreement or the performance hereof, the prevailing party in such action shall be entitled to recover its reasonable litigation expenses, including but not limited to, court costs, expert witness fees, discovery expenses, and attorney's fees. Any action arising out of this Agreement shall be brought in Placer County, California, or the nearest federal court to Placer County, California, regardless of where else venue may lie. This Agreement shall be governed by and construed inaccordance with the laws of the State of California.

18. Modification. This Agreement and each provision contained herein may be waived, amended, supplemented or eliminated only by mutual written agreement of the parties.

19. Severability. If any of the provisions contained in this Agreement are for any reason held invalid or unenforceable, such holding shall not affect the remaining provisions or the validity and enforceability of the Agreement as a whole.

20. Notices. Any notices to parties required by this Agreement shall be delivered personally or mailed, U.S. first class postage prepaid, addressed as follows:

CITY OF ROSEVILLE	CONSULTANT
Scott Pettingell, Budget Manager 311 Vernon Street Roseville, CA 95678	Barbara Robinson, Administrator 6 Upper Pond Road, 2nd floor Parsippany, NJ 07054

Either party may amend its address for notice by giving notice to the other party in writing.

21. Integrated Agreement. This is an integrated agreement and contains all of the terms, considerations, understanding and promises of the parties. It shall be read as a whole.

22. NOTWITHSTANDING ANYTHING CONTAINED IN THIS AGREEMENT TO THE CONTRARY, IN NO EVENT SHALL EITHER PARTY BE RESPONSIBLE FOR SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, EXEMPLARY OR PUNITIVE DAMAGES OF ANY KIND OR NATURE, REGARDLESS OF WHETHER SUCH LIABILITY ARISES IN TORT, CONTRACT, BREACH OF WARRANTY OR OTHERWISE. ANY LIABILITY INCURRED BY CONSULTANT IN CONNECTION WITH THE SERVICES UNDER THIS AGREEMENT SHALL BE LIMITED TO TWO TIMES THE VALUE OF THIS AGREEMENT.

23. CONSULTANT WARRANTS THAT (A) ALL SERVICES PERFORMED BY OR ON BEHALF OF CONSULTANT IN CONNECTION WITH THIS AGREEMENT SHALL BE PERFORMED IN A COMPETENT, PROFESSIONAL AND WORKMANLIKE MANNER, AND SHALL BE OF INDUSTRY STANDARD QUALITY; (B) ALL SERVIVCES PERFORMED SHALL COMPLY WITH APPLICABLE LAWS; AND (C) ALL SERVICES PERFORMED SHALL BE PROVIDED IN ACCORDANCE WITH AND SHALL CONFORM IN ALL MATERIAL RESPECTS TO ANY SPECIFICATIONS AND REQUIREMENTS SET FORTH IN THIS AGREEMENT AND ANY APPLICABLE STATEMENT OF WORK.

ANY WARRANTIES CONTAINED HEREIN ARE CONSULTANT'S SOLE AND EXCLUSIVE WARRANTIES. CONSULTANT AFFIRMATIVELY EXCLUDES ANY AND ALL OTHER WARRANTIES, CONDITIONS, OR REPRESENTATIONS (EXPRESS OR IMPLIED, ORAL OR WRITTEN), WITH RESPECT TO THE SERVICES PROVIDED INCLUDING ANY AND ALL IMPLIED WARRANTIES OR CONDITIONS OF TITLE, MERCHANTABILITY, OR FITNESS OR SUITABILITY FOR ANY PURPOSE (WHETHER ARISING BY LAW OR BY REASON OF CUSTOM OF THE TRADE.

IN WITNESS WHEREOF, the City of Roseville, a municipal corporation, has authorized the execution of this Agreement in duplicate by its City Manager and attested to by its City Clerk under the authority of Resolution No._____, adopted by the Council of the City of Roseville on the____day of_____, 2021, and CONSULTANT has caused this Agreement to be executed.

[SIGNATURES ON FOLLOWING PAGE]

CITY OF ROSEVILLE, a
municipal corporation

BY:_____
DOMINICK CASEY
City Manager

ATTEST:

CHERRYROAD TECHNOLOGIES INC.,
a Florida corporation

BY: Nicholas Visco
its: Chief Financial Officer

and

BY: Jeremy Gulbas - CEO
its:

BY:_____

SONIA OROZCO
City Clerk

APPROVED AS TO FORM:

BY:_____

MICHELLE SHEIDENBERGER
City Attorney

APPROVED AS TO SUBSTANCE:

BY:_____

DENNIS KAUFFMAN
Chief Financial Officer/
Assistant City Manager

CherryRoad technologies

CherryRoad Technologies Inc.
6 Upper Pond Road
2nd Floor
Parsippany, New Jersey 07054

TEL: 973-402-7802
FAX: 973-402-7808
www.cherryroad.com

August 23, 2021

Scott Pettingell, Budget Manager
City of Roseville
311 Vernon Street
Roseville, CA 95678

Re: Quote for Application Support for the Oracle Planning and Budgeting Cloud Service (PBCS)

Dear Mr. Pettingell:

CherryRoad is pleased to submit this quote to the City of Roseville (the City) for the Application Support for the Oracle Planning and Budgeting Cloud Service (PBCS). We are eager to continue our partnership with the City supporting the City's Oracle budgeting solution. It is our intention to deliver the quality of services that the City has come to expect from CherryRoad and to ensure the success of this engagement.

Below is a high-level scope of the engagement:

- **Contract Term**
  - Three-year term with two, one-year renewals
- **Contract Identified Resources**
  - Ron Perez, a CherryRoad employee will engage for 80% of the hours of the contract
- **Contract Hourly Rate**
  - $145.00
- **Contract Maximum Spend**
  - Year 1: $86,000
  - Year 2: $50,000
  - Year 3: $50,000
  - Year 4: TBD
  - Year 5: TBD
- **Contract Type**
  - Not to Exceed

Contact Information

CherryRoad Contact Information	
Contact Authorized to Negotiate a Contract	**Contact for General Proposal Information**
Jeremy Gulban Chief Executive Officer **CherryRoad Technologies Inc.** 6 Upper Pond Road, 2nd Floor Parsippany, New Jersey 07054 P: 973-541-4278 / F: 973-402-7808 JGulban@cherryroad.com www.cherryroad.com	Robert Cockrum Senior Sales Executive **CherryRoad Technologies Inc.** 8950 Cal Center Drive, Suite 348 Sacramento, CA 95826 P: 916-715-6504 / F: 916-379-5514 RCockrum@cherryroad.com www.cherryroad.com

If you should wish to discuss any aspect of our proposal, please contact **Robert Cockrum**, Senior Sales Executive, directly by phone at 916-715-6504 or by email at RCockrum@cherryroad.com.

CherryRoad values this opportunity to partner with the City to ensure the success of this engagement.

Sincerely,

Jeremy Gulban
Chief Executive Officer
CherryRoad Technologies Inc.
6 Upper Pond Road, 2nd Floor
Parsippany, New Jersey 07054
P: 973-541-4278
F: 973-402-7808
JGulban@cherryroad.com

COUNCIL COMMUNICATION

CC #: 1747
File #: 0400-04-09

Title:	Prairie Town Way Improvement Plans - Notice of Completion
Contact:	Danny Jacobo 916-223-7486 djjacobo@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.8.

RECOMMENDATION TO COUNCIL

Staff recommends that the City Council adopt the attached resolution accepting Improvement Plans for Prairie Town Way, CWJ # 190493, as complete and authorizing the City Engineer to execute the Notice of Completion.

BACKGROUND

The Engineering Division has made a final inspection of the above project and has found the roadway infrastructure work complete in accordance with the improvement plans and City Specifications.

FISCAL IMPACT

The actions requested as part of this action have no impact on the City's General Fund. Construction costs were paid by the developer.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. Approval of a Notice of Completion meets the above criteria and is not subject to CEQA. No additional environmental review is required.

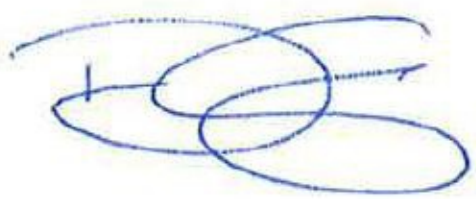
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal F - Invest in well-planned infrastructure and growth

Respectfully Submitted,

Danny Jacobo, Construction Inspector

Mike Isom, Development Services Director



Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution 21-427

NOC Document

Exhibit A

Final MAp

RESOLUTION NO. 21-427

RESOLUTION OF THE COUNCIL OF THE CITY OF ROSEVILLE ACCEPTING THE PUBLIC WORK KNOWN AS Improvement Plans for Prairie Town Way PROJECT, APPROVING THE "NOTICE OF COMPLETION", AND AUTHORIZING AND DIRECTING THE CITY ENGINEER TO EXECUTE SAID NOTICE ON BEHALF OF THE CITY OF ROSEVILLE, THEREFORE, AND ACCEPTING A PORTION OF THE DEDICATIONS OFFERED ON THE RECORDED MAP OF THE SUBDIVISION.

BE IT RESOLVED by the Council of the City of Roseville as follows:

1. The "Notice of Completion" on file in the City Clerk's Department relative to that public work known as the Improvement Plans for Prairie Town Way is hereby approved and the public work accepted.

2. A portion of the right-of-way and easements offered for dedication on the final map of Improvement Plans for Prairie Town Way recorded in Book BB of Maps, Page 24 , in the office of the recorder of Placer County, is hereby accepted by the City in part as said dedications relates to the improvement plan set known as
3. The City Engineer is hereby authorized and directed to execute said Notice on behalf of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville, this 20 day of October, 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____

MAYOR

ATTEST:

_____

CITY CLERK

RECORDING REQUESTED BY AND WHEN
RECORDED MAIL TO:

CITY CLERK
CITY OF ROSEVILLE
311 VERNON STREET
ROSEVILLE, CA 95678

Exempt from recording fees
Pursuant to Gov't Code §27383

NOTICE OF COMPLETION

NOTICE IS HEREBY GIVEN that the public work of improvement known as the _____ Project was completed and accepted by the City of Roseville on _____. The location is situated in the City of Roseville, County of Placer, State of California and is indicated on the attached map, marked as Exhibit "A" and incorporated herein by this reference. The real property herein described is owned by the City of Roseville, 311 Vernon Street, Roseville CA 95678.

The direct/general contractor on said project was _____.

The surety on said project was _____

_____.

_____

City of Roseville
Owner

ATTEST:

_____
Sonia Orozco, City Clerk

State of California)
County of Placer)

I,_____, being first duly sworn, depose and say: I am the _____ of the City of Roseville, a municipal corporation in the State of California, owner of the property described in the above Notice. I am duly authorized to make this verification for and on behalf of the City of Roseville. I have read the Notice of Completion and know its contents and the facts stated therein are true.

_____

City of Roseville

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Placer)

Subscribed and sworn to (or affirmed) before me on this _____ day of _____,

20___, _____

proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

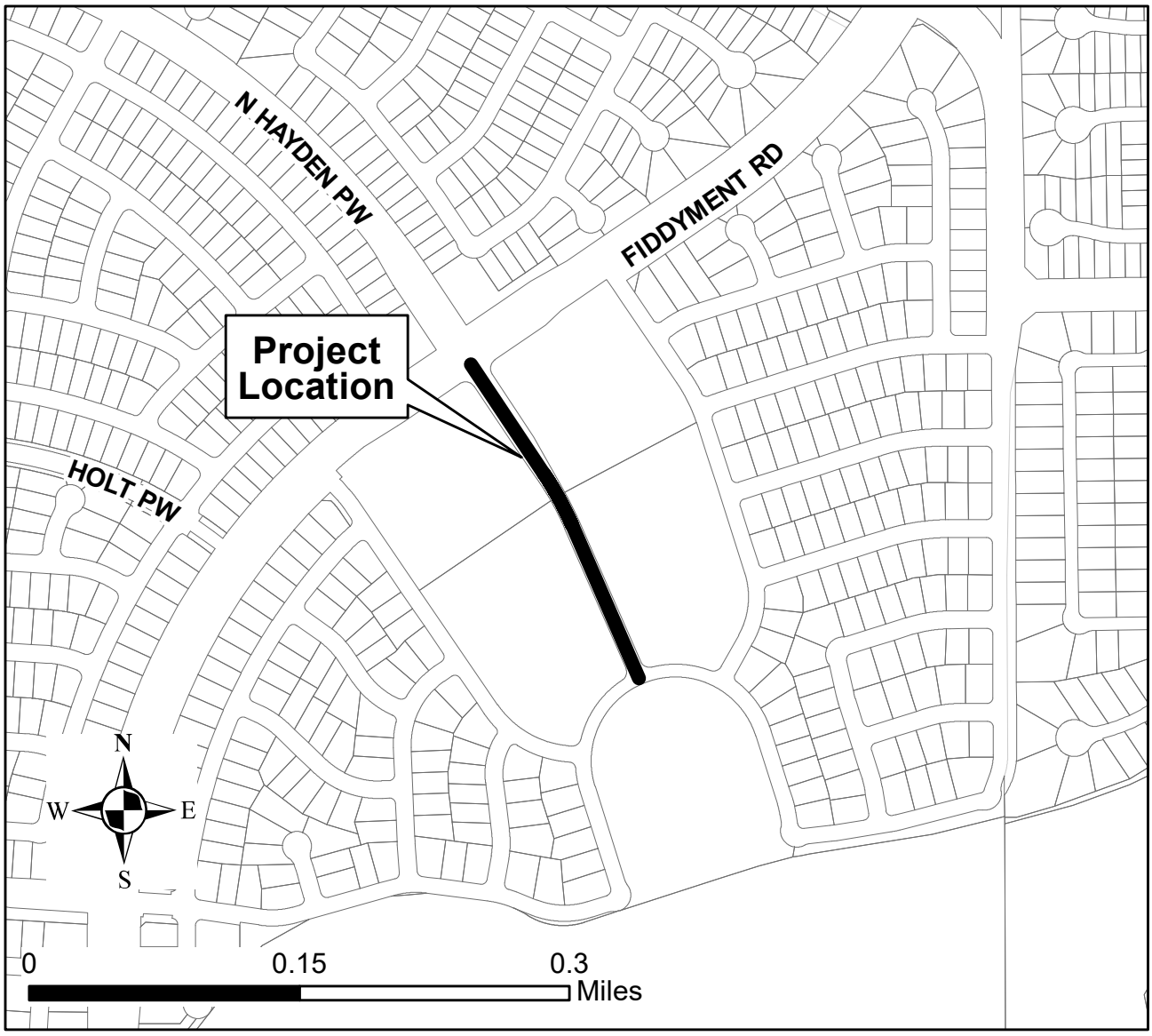
_____

Place Notary Seal and/or Stamp Above

Signature of Notary Public

EXHIBIT A

City of Roseville
Prairie Town Way



FINAL MAP OF
FIDDYMENT RANCH PHASE 2
LARGE LOT SUBDIVISION
SUBDIVISION NO. 03-11

A RESUBDIVISION OF THE DESIGNATED REMAINDER AS SHOWN ON THE FINAL MAP OF FIDDYMENT RANCH PHASE 1 AND AS ADJUSTED BY THAT CERTIFICATE OF COMPLIANCE RECORDED AS DOCUMENT No. 2006-0054208, OFFICIAL RECORDS, ALL OF SECTION 13, T.11 N., R.5 E., M.D.B.&M., AND A PORTION OF THE WEST 1/2 OF SECTION 18, T. 11 N., R. 6 E., M.D.B.&M.

CITY OF ROSEVILLE COUNTY OF PLACER STATE OF CALIFORNIA

JULY 2006

WOOD RODGERS
ENGINEERING • MAPPING • PLANNING • SURVEYING
3301 C St., Bldg. 100-B Tel 916.341.7760
Sacramento, CA 95816 Fax 916.341.7767

OWNER'S STATEMENT

THE UNDERSIGNED HEREBY CERTIFY THAT THEY ARE THE ONLY PERSONS HAVING ANY RECORD TITLE INTEREST IN THE LANDS SUBDIVIDED HEREON, HEREBY CONSENT TO THE PREPERATION AND RECORDING OF THIS FINAL MAP OF, "FIDDYMENT RANCH PHASE 2 LARGE LOT SUBDIVISION" AND OFFER FOR DEDICATION AND DO HEREBY DEDICATE AS PUBLIC RIGHTS-OF-WAY AND AS PUBLIC UTILITY EASEMENT THE PARKWAY, BOULEVARD, DRIVE, ROAD AND WAY AND DO HEREBY OFFER FOR DEDICATION AND DO HEREBY DEDICATE FOR SPECFIC PURPOSES THE FOLLOWING:

A. PUBLIC EASEMENTS FOR INSTALLATION AND MAINTENANCE OF, BUT NOT LIMITED TO, ELECTROLIERS, TRAFFIC CONTROL APPURTENANCES, WATER, SEWER, DRAINAGE AND GAS PIPES, AND FOR UNDERGROUND WIRES AND CONDUITS FOR ELECTRICAL, TELEPHONE AND TELEVISION SERVICES, TOGETHER WITH WITH ANY AND ALL APPURTENANCES PERTAINING THERETO ON, OVER, UNDER AND ACROSS THOSE STRIPS OF LAND THIRTY FIVE FEET (35'), TWENTY FIVE FEET (25'), TWELVE AND ONE- HALF FEET (12.5') AND TEN FEET (10') IN WIDTH AND CONTIGUOUS TO THE PARKWAY, BOULEVARD, DRIVE, ROAD AND WAY SHOWN HEREON AND DESIGNATED "P.U.E." (PUBLIC UTILITY EASEMENT), AND P.E. (PEDESTRIAN EASEMENT)

AND DO ALSO IRREVOCABLY OFFER FOR DEDICATION:

B. LOTS 22 AND 27 IN FEE TO THE CITY OF ROSEVILLE FOR PUBLIC PARKS.

C. LOTS 17 AND 18 IN FEE TO THE CITY OF ROSEVILLE FOR OPEN SPACE AS PARK PRESERVES.

D. LOT 21 IN FEE TO THE CITY OF ROSEVILLE AS A WELL SITE.

E. LOT 20 IN FEE TO THE CITY OF ROSEVILLE AS A COMMUNITY GARDEN.

F. LOT 28 IS RESERVED FOR FUTURE DEDICATION AS SCHOOL SITES.

G. AS RIGHT-OF-WAY AND P.U.E. THE STRIPS OF LAND DESIGNATED AS IRREVOCABLE OFFER OF DEDICATION. (I.O.D./ R/W)

ROSEVILLE/FIDDYMENT LAND VENTURE L.L.C.

A DELAWARE LIMITED LIABILITY COMPANY

BY: SIGNATURE AT FIDDYMENT, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY, MEMBER
BY: SIGNATURE PROPERTIES, INC., A CALIFORNIA CORPORATION, MANAGER

BY: _____ NAME: _____
MICHAEL J. GHIELMETTI, PRESIDENT TITLE: JAMES C. GHIELMETTI - C.E.O.

NOTARY'S ACKNOWLEDGMENT

STATE OF CALIFORNIA }
COUNTY OF PLACER } SS

ON THE 7th DAY OF JULY, 2006, BEFORE ME, RUTH STAMOS, A NOTARY PUBLIC IN AND FOR SAID STATE, PERSONALLY APPEARED, MICHAEL J. GHIELMETTI AND JAMES C. GHIELMETTI ☒ PERSONALLY KNOWN TO ME OR PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/~~ARE~~ SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT ~~HE/SHE~~/THEY EXECUTED THE SAME IN ~~HIS/HER~~/THEIR AUTHORIZED CAPACITY(IES) AND THAT BY ~~HIS/HER~~/THEIR SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S) OR THE ENTITY ON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND: Ruth Stamos
PRINTED NAME: RUTH STAMOS
MY PRINCIPAL PLACE OF BUSINESS IS THE COUNTY OF: PLACER
MY COMMISSION EXPIRES: 01/10/2008
MY COMMISSION NO.: 1457360

CITY CLERK'S STATEMENT

I HEREBY CERTIFY THAT THE CITY COUNCIL, CITY OF ROSEVILLE HAS APPROVED THIS FINAL MAP OF FIDDYMENT RANCH PHASE 2 LARGE LOT SUBDIVISION AND HAS ACCEPTED ON BEHALF OF THE PUBLIC, SUBJECT TO IMPROVEMENT, THE RIGHTS-OF-WAY AND EASEMENTS OFFERED HEREON FOR DEDICATION. THE CITY COUNCIL HAS REJECTED AT THIS TIME, BUT RESERVES THE RIGHT TO ACCEPT AT A LATER DATE, ON BEHALF OF THE PUBLIC ALL IRREVOCABLE OFFERS OF LAND AND RIGHTS-OF-WAY OFFERED HEREON, IN ACCORDANCE WITH THE TERMS OF THAT OFFER.

07-19-06
DATED

Audrey Byrnes
ASST. CITY CLERK, CITY OF ROSEVILLE

BY: _____
DEPUTY

NOTARY'S ACKNOWLEDGMENT

STATE OF CALIFORNIA }
COUNTY OF Placer } SS

ON THE 25 DAY OF July, 2006, BEFORE ME, Audrey Byrnes, A NOTARY PUBLIC IN AND FOR SAID STATE, PERSONALLY APPEARED, Rob Jensen ☒ PERSONALLY KNOWN TO ME OR PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(~~S~~) WHOSE NAME(~~S~~) IS/~~ARE~~ SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/~~SHE~~/~~THEY~~ EXECUTED THE SAME IN HIS/~~HER~~/~~THEIR~~ AUTHORIZED CAPACITY(~~IES~~) AND THAT BY HIS/~~HER~~/~~THEIR~~ SIGNATURE(~~S~~) ON THE INSTRUMENT THE PERSON(~~S~~) OR THE ENTITY ON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND: Audrey Byrnes
PRINTED NAME: Audrey Byrnes
MY PRINCIPAL PLACE OF BUSINESS IS THE COUNTY OF: Placer
MY COMMISSION EXPIRES: 03-12-2009
MY COMMISSION NO.: 1558257

TRUSTEE/BENEFICIARY STATEMENTS

SEE SHEET TWO FOR TRUSTEE AND BENEFICIARY'S STATEMENTS.

SURVEYOR'S STATEMENT

THIS FINAL MAP OF FIDDYMENT RANCH PHASE 2 LARGE LOT WAS PREPARED BY ME OR UNDER MY DIRECTION AND WAS BASED UPON A FIELD SURVEY IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCES AT THE REQUEST OF ROSEVILLE/FIDDYMENT LAND VENTURE L.L.C. IN JANUARY, 2004. I HEREBY STATE THAT THIS FINAL MAP SUBSTANTIALLY CONFORMS TO THE APPROVED OR CONDITIONALLY APPROVED TENTATIVE MAP. ALL MONUMENTS SHOWN HEREON ARE OF THE CHARACTER AND WILL OCCUPY THE POSITIONS INDICATED AND WILL BE SET BY JULY 1, 2007, AND THAT THE MONUMENTS ARE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED.

LICENSED LAND SURVEYOR DOUGLAS R. OWYANG No. 6046 Exp. 6-30-07 STATE OF CALIFORNIA

DOUGLAS R. OWYANG
P.L.S. 6046 EXP. 06-30-07
WOOD RODGERS, INC.
July 5, 2006
DATE

CITY ENGINEER'S STATEMENT

I HEREBY STATE THAT I HAVE EXAMINED THIS FINAL MAP OF FIDDYMENT RANCH PHASE 2 LARGE LOT SUBDIVISION AND FIND IT TO BE SUBSTANTIALLY THE SAME AS THE TENTATIVE MAP ON FILE AND ANY APPROVED ALTERATIONS THEREOF; THAT ALL PROVISIONS OF THE SUBDIVISION MAP ACT AND ALL APPLICABLE CITY ORDINANCES HAVE BEEN COMPLIED WITH.

DATE 7-25-06
ROB JENSEN
CITY ENGINEER, CITY OF ROSEVILLE
R.C.E. #53343 EXPIRATION DATE 6/30/07

I HEREBY STATE THAT I AM SATISFIED THAT THIS FINAL MAP OF FIDDYMENT RANCH PHASE 2 LARGE LOT SUBDIVISION IS TECHNICALLY CORRECT.

FOR ROB JENSEN, CITY ENGINEER, CITY OF ROSEVILLE

DATE: 7/18/06
ROBERT H. BLASER, P.E.
R.C.E. #30232 EXPIRATION DATE 3/31/08

RECORDER'S STATEMENT

FILED THIS 28th DAY OF July, 2006, AT 15:17 P. M. O'CLOCK IN BOOK BB OF MAPS, AT PAGE 24, IN THE OFFICE OF THE PLACER COUNTY RECORDER.
RECORDED AT THE REQUEST OF WOOD RODGERS, INC.

FILE NO. 2006-0081097
FEE $ 68.00

JIM McCAULEY
JIM McCAULEY
PLACER COUNTY
RECORDER

BY: _____
DEPUTY

TRUSTEES STATEMENT

AMERICAN SECURITIES COMPANY, A CALIFORNIA CORPORATION, AS TRUSTEE UNDER DEED OF TRUST RECORDED ON FEBRUARY 10, 2004, IN THE OFFICE OF THE PLACER COUNTY RECORDER UNDER RECORDER'S SERIAL NUMBER 2004–0013989, HEREBY CONSENTS TO THE PREPARATION AND RECORDATION OF THIS MAP.

BY: _____ BY: _____

PRINT: Lisa Z. Schaeffer PRINT: Amy C. Rizzo

TITLE: SVP TITLE: AVP

NOTARY'S ACKNOWLEDGMENT

STATE OF CALIFORNIA)
COUNTY OF Contra Costa) SS

ON THE 10th DAY OF July, 2006, BEFORE ME, Kathy J. Parsons, A NOTARY PUBLIC IN AND FOR SAID STATE, PERSONALLY APPEARED, Lisa Z. Schaeffer & Amy C. Rizzo

☑ PERSONALLY KNOWN TO ME OR PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) ~~IS~~/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT ~~HE/SHE~~/THEY EXECUTED THE SAME IN ~~HIS/HER~~/THEIR AUTHORIZED CAPACITY(IES) AND THAT BY ~~HIS/HER~~/THEIR SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S) OR THE ENTITY ON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND: _____

PRINTED NAME: KATHY J. PARSONS

MY PRINCIPAL PLACE OF BUSINESS IS THE COUNTY OF: Contra Costa

MY COMMISSION EXPIRES: May 25, 2008

MY COMMISSION NO.: 1491846

LEGEND

O	DIMENSION POINT
⊕	FOUND SECTION CORNER AS DESCRIBED ON SHEET 5
⊞	FOUND 1/4 CORNER AS DESCRIBED ON SHEET 5
⊠	FOUND 1/16 CORNER AS DESCRIBED ON SHEET 5
◎	SET BRASS DISK STAMPED L.S. 6046 IN STANDARD CITY OF ROSEVILLE MONUMENT BOX PER CITY STANDARD DWG. ST–36
○	SET 5/8" REBAR W/ PLASTIC CAP STAMPED L.S. 6046
◉	FOUND BRASS DISK STAMPED L.S. 6046 IN STANDARD CITY OF ROSEVILLE MONUMENT BOX PER CITY STANDARD DWG. ST–36
●	FOUND 5/8" REBAR W/ PLASTIC CAP STAMPED L.S. 6046
( )	RECORD INFORMATION PER REFERENCE
(R)	RADIAL LINE
OS	OPEN SPACE
O.A.	OVERALL DIMENSION
P.U.E.	PUBLIC UTILITY EASEMENT
P.E.	PEDESTRIAN EASEMENT
P.C.R.	PLACER COUNTY OFFICIAL RECORDS
I.O.D.	IRREVOCABLE OFFER OF DEDICATION

REFERENCES

(1) Book 8 Surveys Page 4
(2) Book 1 Surveys Page 15
(3) Book 13 Surveys Page 18
(4) Book 26 Parcel Maps Page 93
(5) Book W Maps Page 377
(6) Book 8 Surveys Page 106
(7) Book 9 Surveys Page 56
(8) Book 17 Parcel Maps Page 102
(9) Book 8 Surveys Page 5
(10) Book S Maps Page 58
(11) Book X Maps Page 97
(12) Book AA Maps Page 10
(13) LOT LINE ADJUSTMENT DOCUMENT No. 2006–0054208, P.C.R.
(14) LOT LINE ADJUSTMENT DOCUMENT No. 2006–0045172, P.C.R.

NOTES

1. THE TOTAL AREA FOR THIS SUBDIVISION IS 1217± ACRES GROSS, CONSISTING OF 37 LOTS.
2. THE LAND SHOWN HEREON BEING OF ALL OF SECTION 13 AND A PORTION OF SECTION 24, T. 11 N., R. 5 E., M.D.M. AND A PORTION OF SECTIONS 18 AND 19, T. 11 N., R. 6 E. M.D.M. IS HEREBY MERGED AND RESUBDIVIDED PER GOVERNMENT CODE, SECTION 66499.20 1/2.
3. A PRELIMINARY SOILS REPORT WAS PREPARED BY WALLACE–KUHL AND ASSOCIATES DATED FEBRUARY 18, 2004, FILE NO. 5877.01. A COPY OF THIS REPORT IS AVAILABLE FOR PUBLIC INSPECTION AT THE CITY OF ROSEVILLE ENGINEERING DEPARTMENT.
4. THIS PROPERTY IS SUBJECT TO THE CITY OF ROSEVILLE TREE PRESERVATION ORDINANCE NO. 2294, CHAPTER 16.10, TITLE 16 OF THE ROSEVILLE MUNICIPAL CODE.
5. ALL DISTANCES SHOWN HEREON ARE IN FEET AND DECIMAL PARTS THEREOF.
6. ALL CURVES ARE DIMENSIONED WITH RADIUS, DELTA, ARC LENGTH, CHORD BEARING AND CHORD DISTANCE. CHORD DISTANCES MAY CONTAIN SOME ROUNDING ERROR.
7. C.C.& R.'S WHICH AFFECT THIS FINAL MAP HAVE BEEN RECORDED AS DOCUMENT No. 2005–0091545, P.C.R. AND AMENDED BY A DECLARATION OF ANNEXATION RECORDED AS DOCUMENT No. 2006–0081098, P.C.R., AND AS DOCUMENT NO. 2006–0081099 P.C.R.

CERTIFICATE FOR PUBLIC DEDICATION OF LAND

PURSUANT TO SECTION 66477.5 OF THE SUBDIVISION MAP ACT, THE CITY OF ROSEVILLE SHALL RECONVEY LOTS 20 AND 21 TO THE SUBDIVIDER NAMED BELOW IF A DETERMINATION IS MADE THAT THE SAME PUBLIC PURPOSE FOR WHICH THE FEE DEDICATION WAS REQUIRED DOES NOT EXIST, EXCEPT FOR ALL OR ANY PORTION OF THE PROPERTY THAT IS REQUIRED FOR THAT SAME PUBLIC PURPOSE OR FOR PUBLIC UTILITIES.

SUBDIVIDER: ROSEVILLE/FIDDYMENT LAND VENTURE L.L.C.,
A DELAWARE LIMITED LIABILITY COMPANY
BY: SIGNATURE AT FIDDYMENT, LLC.,
A CALIFORNIA LIMITED LIABILITY COMPANY, MEMBER
SIGNATURE PROPERTIES, INC.,
A CALIFORNIA CORPORATION, MANAGER
ADDRESS: 1322 BLUE OAKS BOULEVARD, SUITE 100
ROSEVILLE, CA 95678

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE EAST LINE OF THE NORTHEAST QUARTER OF SECTION 24, T. 11 N., R. 5 E., M.D.M., TAKEN AS NORTH 00°26'58" WEST PER THE MAP OF SUN CITY ROSEVILLE LARGE LOT SUBDIVISION ON FILE IN THE OFFICE OF THE PLACER COUNTY RECORDER IN BOOK "S" OF MAPS AT PAGE 58.

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION
SUBDIVISION NO. 03-11

A RESUBDIVISION OF THE DESIGNATED REMAINDER AS SHOWN ON THE FINAL MAP OF FIDDYMENT RANCH PHASE 1 AND AS ADJUSTED BY THAT CERTIFICATE OF COMPLIANCE RECORDED AS DOCUMENT No. 2006-0054208, OFFICIAL RECORDS, ALL OF SECTION 13, T.11 N., R.5 E., M.D.B.&M., AND A PORTION OF THE WEST 1/2 OF SECTION 18, T. 11 N., R. 6 E., M.D.B.&M.

CITY OF ROSEVILLE COUNTY OF PLACER STATE OF CALIFORNIA

JULY 2006

WOOD RODGERS
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3301 C St., Bldg. 100-B Tel 916.341.7760
Sacramento, CA 95816 Fax 916.341.7767

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

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CROCKER RANCH NORTH "X" MAPS 97

LOT 1 "S" MAPS 58

FOUND 1 1/4" BRASS DISC IN MONUMENT WELL NO I.D. S 20°18'58"E 0.12' OF CENTER 1/4 CORNER, SECTION 18. (WITNESS CORNER PER AA B.M.10 NOT FOUND)

EXISTING FIDDYMENT ROAD (PRESCRIPTIVE USE)

HIGHWAY EASEMENT TO PLACER COUNTY PER 1673 O.R. 641

N88°56'05"E 50.00' 1/4 COR TO WITNESS CORNER MONUMENT

(WEST 39.45 ch)(GLO) (N88°56'19"E 2614.35')(3) N88°56'05"E 2614.34'(12)

(N00°14'10"W 5303.87')(3,5) 5303.02'(12) N00°14'10"W 2654.65'(12) 2648.37'(12)

(N00°30'46"W 1322.02')(1) (N00°30'58"W 1321.94')(4,10) N00°30'23"W 1246.30'(12) 956.87'(12) 75.57' (12) N89°05'09"E 619.49'(12)

269.43' (12) 255.90' (12)

HIGHWAY EASEMENT TO PLACER COUNTY PER 2090 O.R. 149

N89°06'28"E 2616.10'

N89°05'09"E 2617.42'(12) N89°04'55"E 2617.68'(4) N89°05'10"E 2617.42'(10) (N89°05'07"E 2617.51')(1)

1472.16' (12)

BASIS OF BEARINGS N00°26'58"W 1322.94'(12)

N00°27'05"W 2523.07'(12)

(1322.92')(4)

PG&E POLE LINE EASEMENT (UNSPECIFIED WIDTH) PER BOOK 272 O.R. PAGE 211 & DOC. No. 2005-0139567

45' SEWER EASEMENT TO CITY OF ROSEVILLE PER D.N. 2001-0094357

45' SEWER EASEMENT TO CITY OF ROSEVILLE PERP D.N. 2001-0079231

50' SEWER EASEMENT TO CITY OF ROSEVILLE PER D.N. 2001-0079231

50' SEWER EASEMENT TO THE CITY OF ROSEVILLE PER D.N. 2001-0074684

PHILLIPS ROAD (PRESCRIPTIVE)

R. 6 E. R. 5 E.

PLACER COUNTY CITY OF ROSEVILLE

(EAST 80 ch)(GLO) N89°26'37"E 5266.44'(12)

N00°12'49"W 2644.65'(12) (NORTH 40 ch)(GLO) (S00°11'33"W 2644.66') (9)

N00°13'02"W 2644.64'(12) (NORTH 40 ch)(GLO) (S00°11'33"W 2644.67')(8,9)

N00°16'24"W 1323.78'(12) (N00°06'49"E 1323.78')(6)

92.49'

675.25' (12) N00°16'56"W 1323.77' (12)

3203.25' N00°16'56"W 2647.55'(12) 3971.32'(12) (N00°06'49"W 2647.57')(6)

N89°28'27"E 5282.21'(12) (S89°51'30"W 5280.63')(2)

5252.21'(12)

LOT NUMBER	WEST ROSEVILLE SPECIFIC PLAN PCL NO.
1	F-54
2	F-20
3	F-34
4	F-55
5	F-85
6	F-6
7	F-7
8	F-8
9	F-9
10	F-10
11	F-11
12	F-12
13	F-13
14	F-14
15	F-15
16	F-16
17	F-84
18	F-83

LOT NUMBER	WEST ROSEVILLE SPECIFIC PLAN PCL NO.
19	F-19
20	F-81
21	F-66
22	F-52
23	F-25
24	F-26
25	F-32
26	F-33
27	F-50
28	F-70
29	F-80
30	F-51
31	F-71
32	F-90
33	F-91
34	F-93
35	F-92
36	F-95
37	F-94

BOUNDARY DETAIL/SHEET INDEX

SCALE:1"=600'

0 300 600 1200

LEGEND (THIS SHEET ONLY)

- Found section corner as described in monument notes
- Found 1/4 corner as described in monument notes
- Found 1/16 corner as described in monument notes
- GLO General Land Office
- (6) Record data; see Sheet 4

FINAL MAP OF
FIDDYMENT RANCH PHASE 2
LARGE LOT SUBDIVISION
SUBDIVISION NO. 03-11

A RESUBDIVISION OF THE DESIGNATED REMAINDER AS SHOWN ON THE FINAL MAP OF FIDDYMENT RANCH PHASE 1 AND AS ADJUSTED BY THAT CERTIFICATE OF COMPLIANCE RECORDED AS DOCUMENT No. 2006-0054208, OFFICIAL RECORDS, ALL OF SECTION 13, T.11 N., R.5 E., M.D.B.&M., AND A PORTION OF THE WEST 1/2 OF SECTION 18, T. 11 N., R. 6 E., M.D.B.&M.

CITY OF ROSEVILLE COUNTY OF PLACER STATE OF CALIFORNIA

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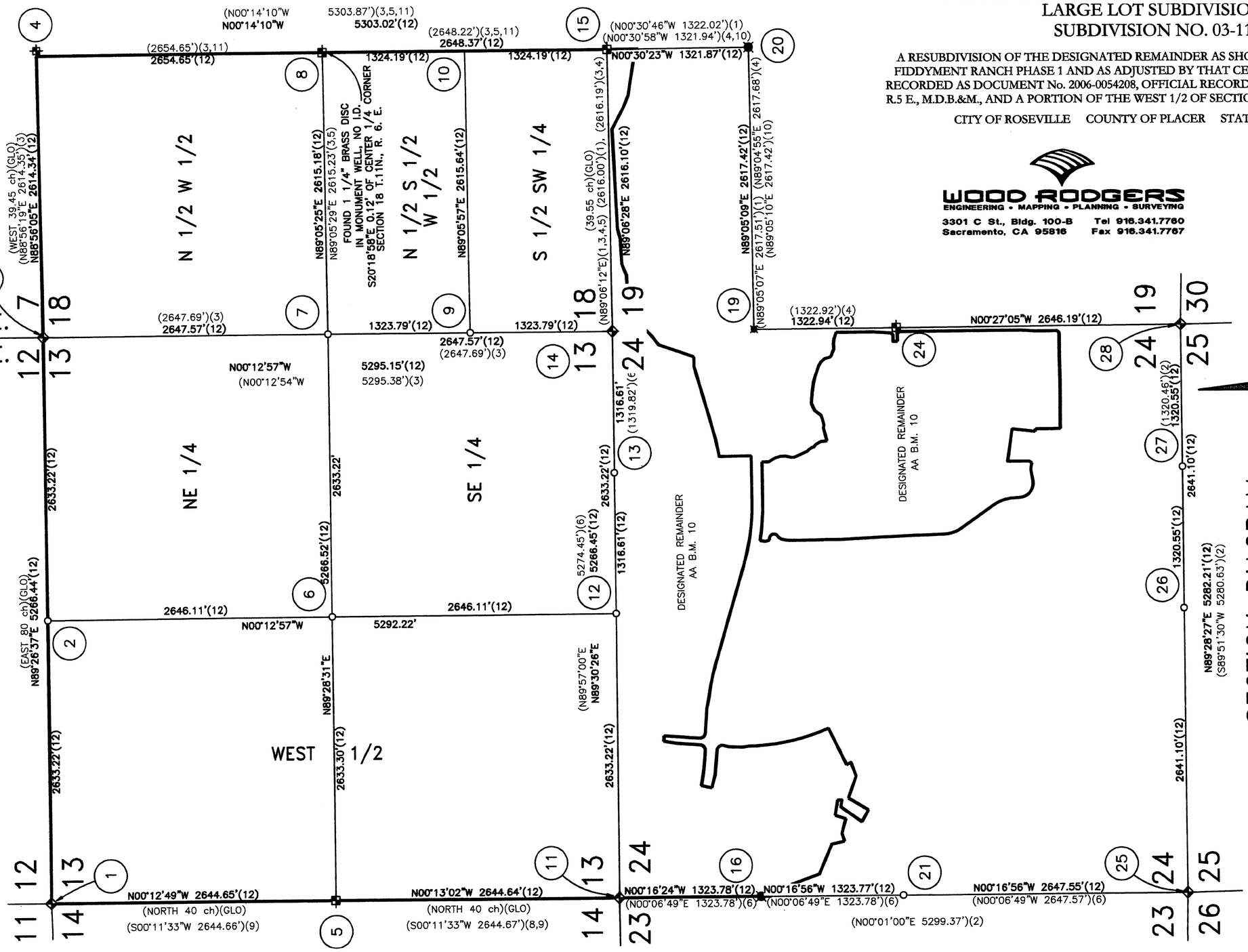


SECTION DIAGRAM

SCALE:1"=600'
0 300 600 1200

LEGEND (THIS SHEET ONLY)

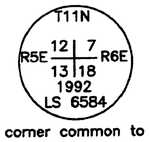
- Found section corner as described in monument notes
- Found 1/4 corner as described in monument notes
- Found 1/16 corner as described in monument notes
- Calculated point; nothing found or set
- (21) Monument note number; see Sheet 5

MONUMENT DESCRIPTIONS

1. Found 3/4" diameter rebar tagged RCE 7083 per Book 1 Surveys Page 67. Accepted as northwest corner Section 13, T11N, R5E.

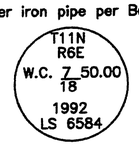
2. Calculated position for 1/4 corner common to Sections 12 and 13; nothing found or set.

3. Found 2" diameter iron pipe per Book 13 Surveys Page 18 with 2" diameter brass disk stamped:



Accepted as section corner common to Sections 12 and 13 T11N R5E and Sections 7 and 18 T11N R6E.

4. Found 2" diameter iron pipe per Book 13 Surveys Page 18 with 2" diameter brass disk stamped:



Accepted as being on north line of Section 18. The position for the north quarter corner of Section 18 was established on the section line 50.00 feet westerly from this monument.

5. Found 2-1/2" diameter capped iron pipe per Book 17 Parcel Maps Page 102, stamped:

Accepted as west 1/4 corner of Section 13.

6. Calculated position for center 1/4 corner of Section 13. Nothing found or set.

7. Calculated position for east 1/4 corner of Section 13 established by single proportionate measurement. Nothing found or set.

8. Found 2" diameter brass disk in standard City of Roseville monument well not stamped:

Accepted as Center 1/4 of Section 18.

9. Calculated position for South 1/16 Corner common to Sections 13 and 18, established by single proportionate measurement. Nothing found or set.

10. Calculated position of Center South 1/16 Corner Section 18 established by single proportionate measurement. Nothing found or set.

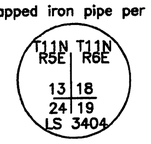
11. Found 1-1/2" diameter iron pipe per Book 17 Parcel Maps Page 102 with 2" diameter brass disk stamped:

Accepted as Southwest Corner of Section 13.

12. Calculated position of south 1/4 corner Section 13 established by single proportionate measurement. Nothing found or set.

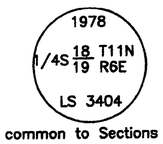
13. Calculated position of East 1/16 corner common to Sections 13 and 24 established by single proportionate measurement. Nothing found or set.

14. Found 2" diameter capped iron pipe per Book 8 Surveys Page 5 stamped:



Accepted as section corner common to Sections 13 and 24, T11N, R5E and Sections 18 and 19, T11N, R6E.

15. Found 2" diameter capped iron pipe per Book 8 Surveys Page 5, stamped:



Accepted as 1/4 corner common to Sections 18 and 19, T11N, R6E.

16. Found 1-1/4" diameter iron pipe per Book 8 Surveys Page 106 with 2" diameter brass disk stamped:

Accepted as North 1/16 Corner common to Sections 23 and 24, T11N, R5E.

19. 2-1/2" brass disc in standard City of Roseville monument well, set per AA BM 10, stamped:

Accepted as North 1/16 Corner common to Section 24 T11N, R5E and Section 19, T11N, R6E.

20. 2-1/2" brass disc in standard City of Roseville monument well, set per AA BM 10, stamped:

Accepted as Center North 1/16 Corner of Section 19, T11N, R5E.

21. Calculated position for 1/4 Corner common to Sections 23 and 24 established by single proportionate measurement. Nothing found or set.

24. Found 3" diameter brass disk in monument well per Book 8 Surveys Page 5, stamped:

Accepted as 1/4 corner common to Section 24, T11N, R5E and Section 19, T11N, R6E.

25. Found 1-1/2" diameter brass disk in concrete per Book 8 Surveys Page 106, stamped (incorrectly):

Accepted as Section Corner common to Sections 23,24,25 and 26, T11N, R5E.

26. Calculated position of South 1/4 Corner Section 24, T11N, R5E, established by single proportionate measurement. Nothing found or set.

27. Calculated position of East 1/16 Corner Sections 24 and 25, T11N, R5E, established by single proportionate measurement. Nothing found or set.

28. 2-1/2" diameter brass disk in standard City of Roseville monument well set per AA BM 10, stamped:

Accepted as Section corner common to Sections 24 and 25, T11N, R5E and Sections 19 and 30, T11N, R6E.

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION

SUBDIVISION NO. 03-11

A RESUBDIVISION OF THE DESIGNATED REMAINDER AS SHOWN ON THE FINAL MAP OF FIDDYMENT RANCH PHASE 1 AND AS ADJUSTED BY THAT CERTIFICATE OF COMPLIANCE RECORDED AS DOCUMENT No. 2006-0054208, OFFICIAL RECORDS, ALL OF SECTION 13, T.11 N., R.5 E., M.D.B.&M., AND A PORTION OF THE WEST 1/2 OF SECTION 18, T. 11 N., R. 6 E., M.D.B.&M.

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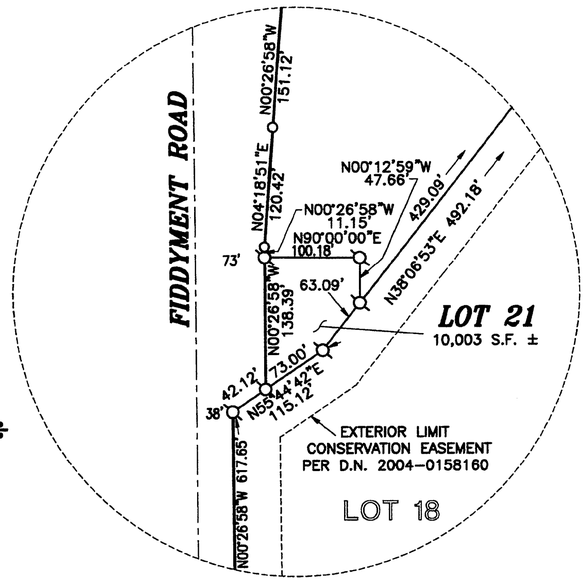
0 100 200 400
SCALE:1"=200'

CURVE TABLE THIS SHEET ONLY

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD DISTANCE
C1	R=2090'	17°04'40"	L=622.95'	CB=N82°22'31"W	CD=620.65'
C2	R=2060'	00°36'04"	L=21.61'	CB=N85°50'53"W	CD=21.61'
C3	R=2000'	07°00'47"	L=244.80'	CB=N82°38'31"W	CD=244.65'
C4	R=50'	90°00'00"	L=78.54'	CB=N41°08'55"W	CD=70.71'
C5	R=2090'	09°51'38"	L=359.69'	CB=N85°59'02"W	CD=359.24'
C6	R=50'	90°00'00"	L=78.54'	CB=N48°51'05"E	CD=70.71'
C7	R=1950'	07°00'47"	L=238.68'	CB=N82°38'32"W	CD=238.53'
C8	R=2040'	09°51'38"	L=351.08'	CB=N85°59'02"W	CD=350.65'
C9	R=2040'	07°13'02"	L=256.97'	CB=N77°26'42"W	CD=256.80'

LINE TABLE THIS SHEET ONLY

#	BEARING	DISTANCE
T1	N86°08'55"W	173.35'
T2	N03°51'05"E	443.64'
T3	N86°08'55"W	75.50'
T4	N03°51'05"E	372.96'



DETAIL A-A
N.T.S.

SEE SHEET 13

DESIGNATED REMAINDER

SEE DETAIL '13-A' ON SHEET 13

781.37'
N88°47'27"E 806.41'(OA)

EXTERIOR LIMIT CONSERVATION EASEMENT PER D.N. 2004-0158160 (50' OFFSET FROM LOTLINE OR R/W)

N75°15'02"W 554.80'
N79°30'56"W 111.33'
N74°51'00"W 237.11'
N00°00'00"E 2021.44'(OA)
R=36' 28°14'33" L=17.75' CB=N14°07'16"E CD=17.57'
1045.83'
R=48' 115°05'23" L=96.42' CB=N29°18'09"W CD=81.01'
S03°09'10"W (R)
91.74'
211.55'
N86°50'50"W 303.29'
N86°22'37"E 333.50'
N84°17'15"E 427.71'
N78°27'30"E 151.07'
N73°54'28"E 208.17'
N74°28'30"E 183.80'
N55°00'35"E 486.06'
N89°33'02"E 35.00'
N.E. SECTION 24 T.11N., R.5E.
N00°26'58"W 568.90'
SEE SHEET 7

50' SEWER EASEMENT TO CITY OF ROSEVILLE PER D.N. 2001-0074684 (SEE SHEET 21)

EXTERIOR LIMIT CONSERVATION EASEMENT PER D.N. 2004-0158160 (50' OFFSET FROM LOTLINE OR R/W)

N52°10'30"E 101.69'(12)

SEE DETAIL 'A-A' ON THIS SHEET

LOT 9-A

FIDDYMENT ROAD

73' 83'

N00°26'58"W 518.24'

N00°26'58"W 778.93'(OA)

N00°26'58"W 1098.10'

N00°26'58"W 617.65'

LOT 21

45' SEWER ESMT. TO CITY OF ROSEVILLE PER D.N. 2001-0079231 (SEE SHEET 21)

N86°49'20"E 259.95'(12)

N59°07'49"E 235.19'(12)

SEE DETAIL '6-A' ON SHEET 16

FUTURE RIGHT-OF-WAY SEPARATE DOCUMENT

20' S.D.E.(12) LOT 19 AA B.M. 10

N18°36'58"E 348.37'(12)

LOT 22 AA B.M. 10

N00°26'58"W 1003.72'(12)

50' P.U.E. & P.E. (12)

45' S.S.E. (12)

N89°08'17"E 90.60'(12)

N73°22'44"E 412.66'(12)

239.30'

57.43'

N74°02'32"E 296.73'(12)(OA)

N00°54'51"W 297.26'(12)

N77°45'32"E 159.16'(12)

LOT 16 AA B.M. 10

LOT 17 AA B.M. 10

LOT 18 AA B.M. 10

N89°05'09"E 433.75'(12)

N89°05'09"E 1603.96'(CALC 12)

N00°54'51"W 100.00'(TIE)(12)

N89°05'09"E 62.01'(13)

50' P.U.E. & P.E. PREVIOUSLY DEDICATED PER AA B.M. 10

LOT 15 AA B.M. 10

FIDDYMENT ROAD

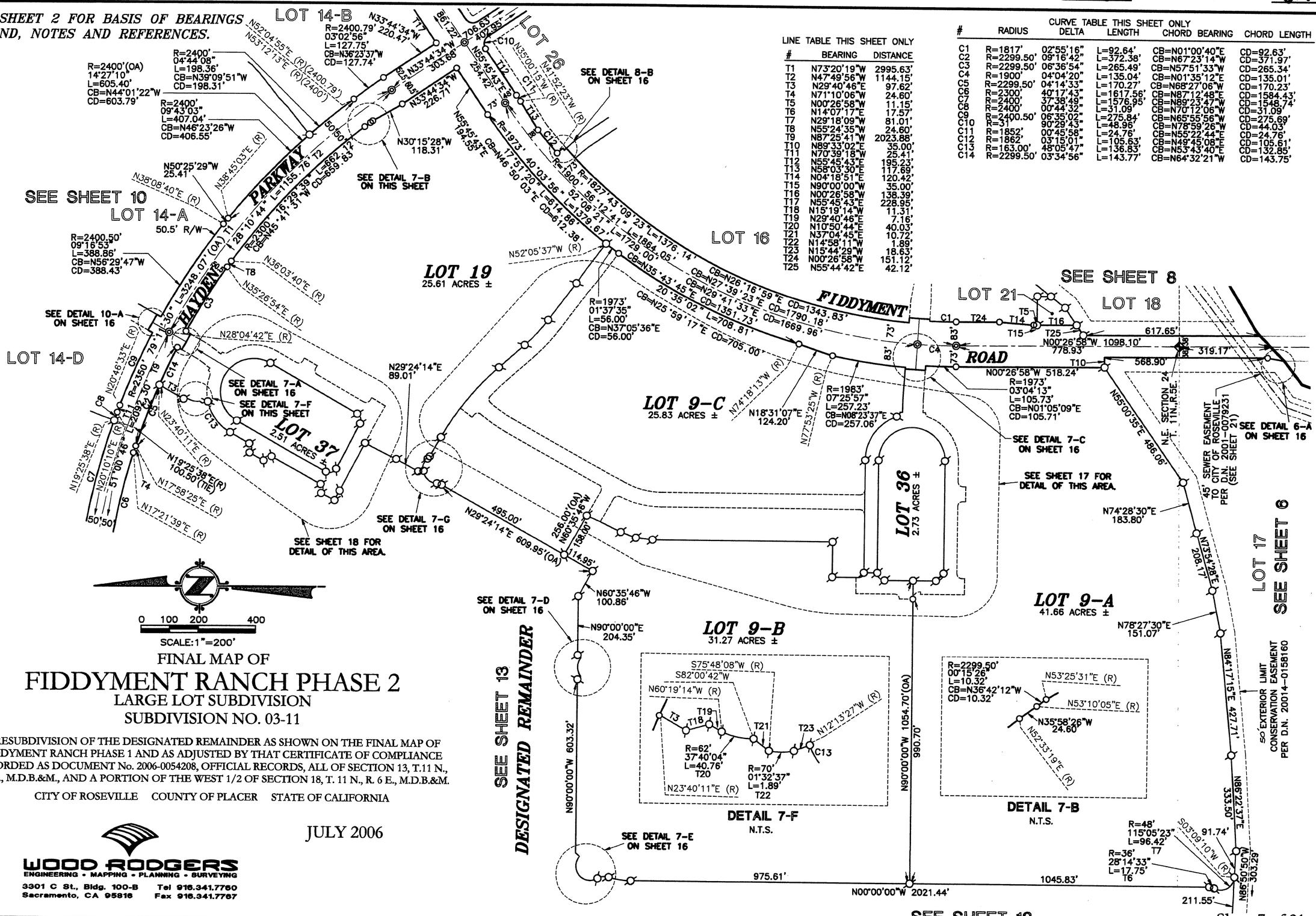
25' P.U.E. & P.E.
25' R/W
PARKWAY
25' R/W
25' P.U.E. & P.E.
N03°51'05"E 372.96'
N03°51'05"E 347.96'

N86°08'55"W 50.50'(12)
N02°42'20"E 25.00'
N08°51'08"E 120.46'(12)
N03°51'05"E 223.64'(12)
25' P.U.E. & P.E. PREVIOUSLY DEDICATED PER AA B.M. 10
N03°51'05"E 333.64'(12)
N86°08'55"W 87.85'(12)
N10°51'52"E 100.00'(R)(12)
HAYDEN PARKWAY
C4(12)
C2(12)
N86°08'55"W 202.75'(12)
N04°27'09"E (R)
N79°11'36"W 123.69'(12)
R=2050'(12) 08°16'24" L=296.02' CB=N77°58'23"W CD=295.76'
N07°53'25"E (R)
C7(12)
C3(12)
T1(12)
T3(12)
50' P.U.E. & P.E. PREVIOUSLY DEDICATED PER AA B.M. 10
EXTERIOR LIMIT CONSERVATION EASEMENT PER D.N. 2004-0158160 (50' OFFSET FROM LOTLINE OR R/W)
R=2040'(12)(OA) 17°04'40" L=608.05' CB=N82°22'31"W CD=605.80'
N73°50'11"W 954.66'(12)
BLUE OAKS BLVD.
C9
C8
C1(12)
C5(12)
SEE SHEET 14
N03°51'05"E 191.28'(12)
N86°08'55"W 202.75'(12)
R=2000'(12) 12°18'44" L=429.78' CB=N79°59'33"W CD=428.95'
150' RIGHT-OF-WAY PREVIOUSLY DEDICATED PER AA B.M. 10
50' P.U.E. & P.E. PREVIOUSLY DEDICATED PER AA B.M. 10
R=2090'(12) 07°13'02" L=263.26' CB=N77°26'42"W CD=263.09'
N08°56'47"E 100.00'(R)
N08°56'47"E 50.00'(R)
R=2140' 09°51'38" L=368.29' CB=N85°59'02"W CD=367.84'
100' RIGHT-OF-WAY PREVIOUSLY DEDICATED PER AA B.M. 10
LOT A
SEE SHEET 15

FIDDYMENT RANCH VILLAGE 5 AA B.M. 53

SEE SHEET 2 FOR BASIS OF BEARINGS LEGEND, NOTES AND REFERENCES.

SEE SHEET 2 FOR BASIS OF BEARINGS LEGEND, NOTES AND REFERENCES.



LINE TABLE THIS SHEET ONLY

#	BEARING	DISTANCE
T1	N73°20'19"W	2995.63'
T2	N47°49'56"W	1144.15'
T3	N29°40'46"E	97.62'
T4	N71°10'06"W	24.60'
T5	N00°26'58"W	11.15'
T6	N14°07'17"E	17.57'
T7	N29°18'09"W	81.01'
T8	N55°24'35"W	24.60'
T9	N87°25'41"W	2023.88'
T10	N89°33'02"E	35.00'
T11	N70°39'18"W	25.41'
T12	N55°45'43"E	195.23'
T13	N58°03'30"E	117.69'
T14	N04°18'51"E	120.42'
T15	N90°00'00"W	35.00'
T16	N00°26'58"W	138.39'
T17	N55°45'43"E	228.95'
T18	N15°19'14"W	11.31'
T19	N29°40'46"E	7.16'
T20	N10°50'44"E	40.03'
T21	N37°04'45"E	10.72'
T22	N14°58'11"W	1.89'
T23	N15°44'29"W	18.63'
T24	N00°26'58"W	151.12'
T25	N55°44'42"E	42.12'

CURVE TABLE THIS SHEET ONLY

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	R=1817'	02°55'16"	L=92.64'	CB=N01°00'40"E	CD=92.63'
C2	R=2299.50'	09°16'42"	L=372.38'	CB=N67°23'14"W	CD=371.97'
C3	R=2299.50'	06°36'54"	L=265.49'	CB=N57°51'33"W	CD=265.34'
C4	R=1900'	04°04'20"	L=135.04'	CB=N01°35'12"E	CD=135.01'
C5	R=2299.50'	04°14'33"	L=170.27'	CB=N68°27'06"W	CD=170.23'
C6	R=2300'	40°17'43"	L=1617.56'	CB=N87°12'48"E	CD=1584.43'
C7	R=2400'	37°38'49"	L=1576.95'	CB=N89°23'47"W	CD=1548.74'
C8	R=2400'	00°44'32"	L=31.09'	CB=N70°12'06"W	CD=31.09'
C9	R=2400.50'	06°35'02"	L=275.84'	CB=N65°55'56"W	CD=275.69'
C10	R=31'	90°29'43"	L=48.96'	CB=N78°59'26"W	CD=44.03'
C11	R=1852'	00°45'58"	L=24.76'	CB=N55°22'44"E	CD=24.76'
C12	R=1862'	03°15'01"	L=105.63'	CB=N49°45'08"E	CD=105.61'
C13	R=163.00'	48°05'47"	L=136.83'	CB=N53°43'40"E	CD=132.85'
C14	R=2299.50'	03°34'56"	L=143.77'	CB=N64°32'21"W	CD=143.75'

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION

SUBDIVISION NO. 03-11

A RESUBDIVISION OF THE DESIGNATED REMAINDER AS SHOWN ON THE FINAL MAP OF FIDDYMENT RANCH PHASE 1 AND AS ADJUSTED BY THAT CERTIFICATE OF COMPLIANCE RECORDED AS DOCUMENT No. 2006-0054208, OFFICIAL RECORDS, ALL OF SECTION 13, T.11 N., R.5 E., M.D.B.&M., AND A PORTION OF THE WEST 1/2 OF SECTION 18, T. 11 N., R. 6 E., M.D.B.&M.

CITY OF ROSEVILLE COUNTY OF PLACER STATE OF CALIFORNIA

JULY 2006

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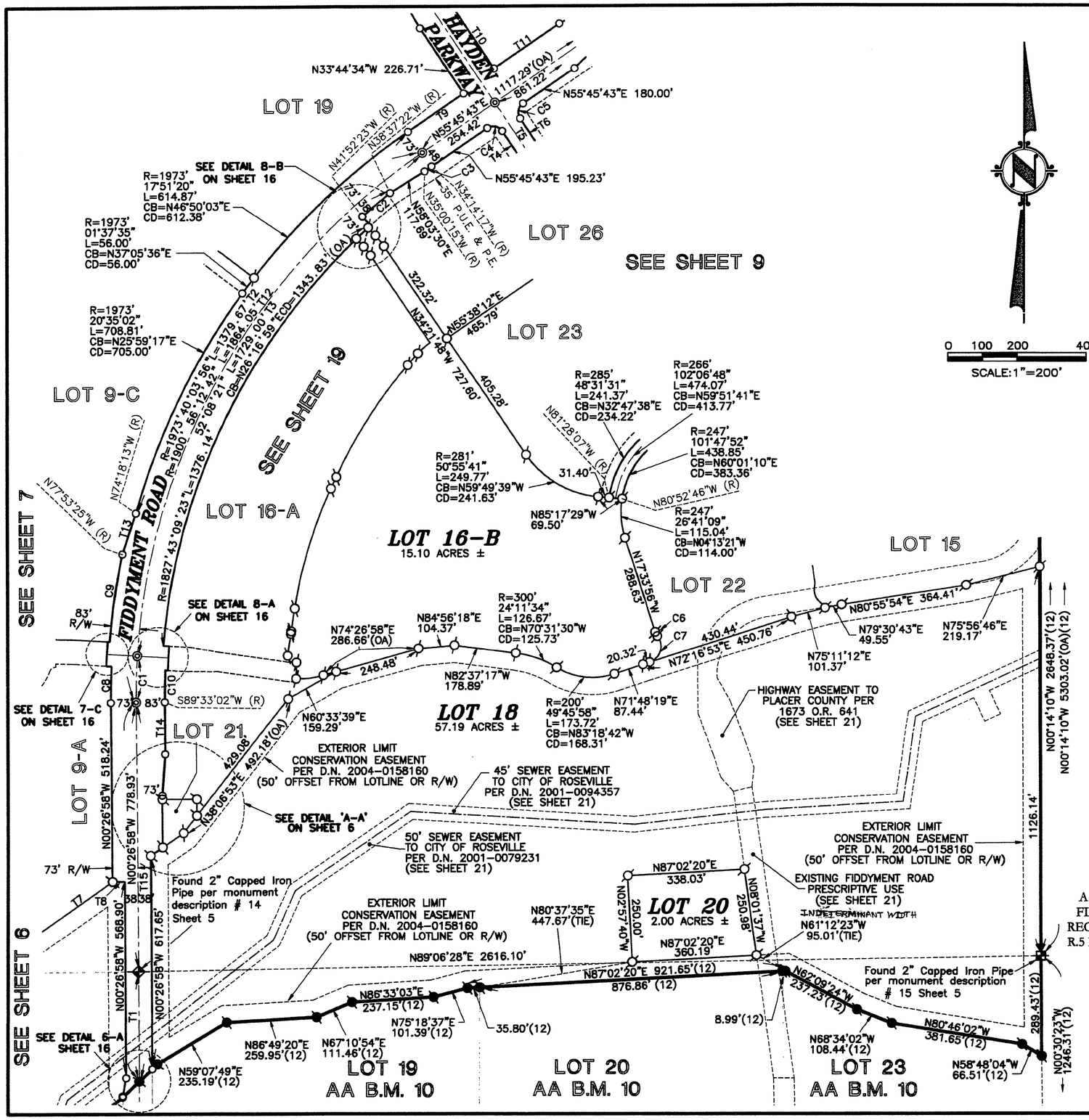

SEE SHEET 2 FOR BASIS OF BEARINGS LEGEND, NOTES AND REFERENCES.

CURVE TABLE THIS SHEET ONLY

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD DISTANCE
C1	R=1900'	04°04'20"	L=135.04'	CB=N01°35'12"E	CD=135.01'
C2	R=1862'	03°15'01"	L=105.63'	CB=N49°45'08"E	CD=105.61'
C3	R=1852'	00°45'58"	L=24.76'	CB=N55°22'44"E	CD=24.76'
C4	R=31'	90°29'43"	L=48.96'	CB=N76°59'26"W	CD=44.03'
C5	R=31'	89°30'17"	L=48.43'	CB=N11°00'35"E	CD=43.65'
C6	R=36'	21°47'11"	L=13.69'	CB=N28°27'32"W	CD=13.61'
C7	R=48'	111°38'00"	L=93.52'	CB=N16°27'53"E	CD=79.42'
C8	R=1973'	03°04'13"	L=105.73'	CB=N01°05'09"E	CD=105.71'
C9	R=1973'	01°37'35"	L=56.00'	CB=N37°05'36"E	CD=56.00'
C10	R=1817'	02°55'16"	L=92.64'	CB=N01°00'40"E	CD=92.63'

LINE TABLE THIS SHEET ONLY

#	BEARING	DISTANCE
T1	N00°26'58"W	319.17'
T2	N35°43'45"E	1351.73'
T3	N29°41'33"E	1669.96'
T4	N33°44'34"W	220.00'
T5	N33°44'34"W	402.95'
T6	N33°44'34"W	220.00'
T7	N55°00'35"E	486.06'
T8	N89°33'02"E	35.00'
T9	N55°45'43"E	194.55'
T10	N33°44'34"W	220.47'
T11	N55°45'43"E	228.95'
T12	N27°39'23"E	1790.18'
T13	N18°31'07"E	124.20'
T14	N00°26'58"W	151.12'
T15	N00°26'58"W	1098.10

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION

SUBDIVISION NO. 03-11

A RESUBDIVISION OF THE DESIGNATED REMAINDER AS SHOWN ON THE FINAL MAP OF FIDDYMENT RANCH PHASE 1 AND AS ADJUSTED BY THAT CERTIFICATE OF COMPLIANCE RECORDED AS DOCUMENT No. 2006-0054208, OFFICIAL RECORDS, ALL OF SECTION 13, T.11 N., R.5 E., M.D.B.&M., AND A PORTION OF THE WEST 1/2 OF SECTION 18, T. 11 N., R. 6 E., M.D.B.&M.

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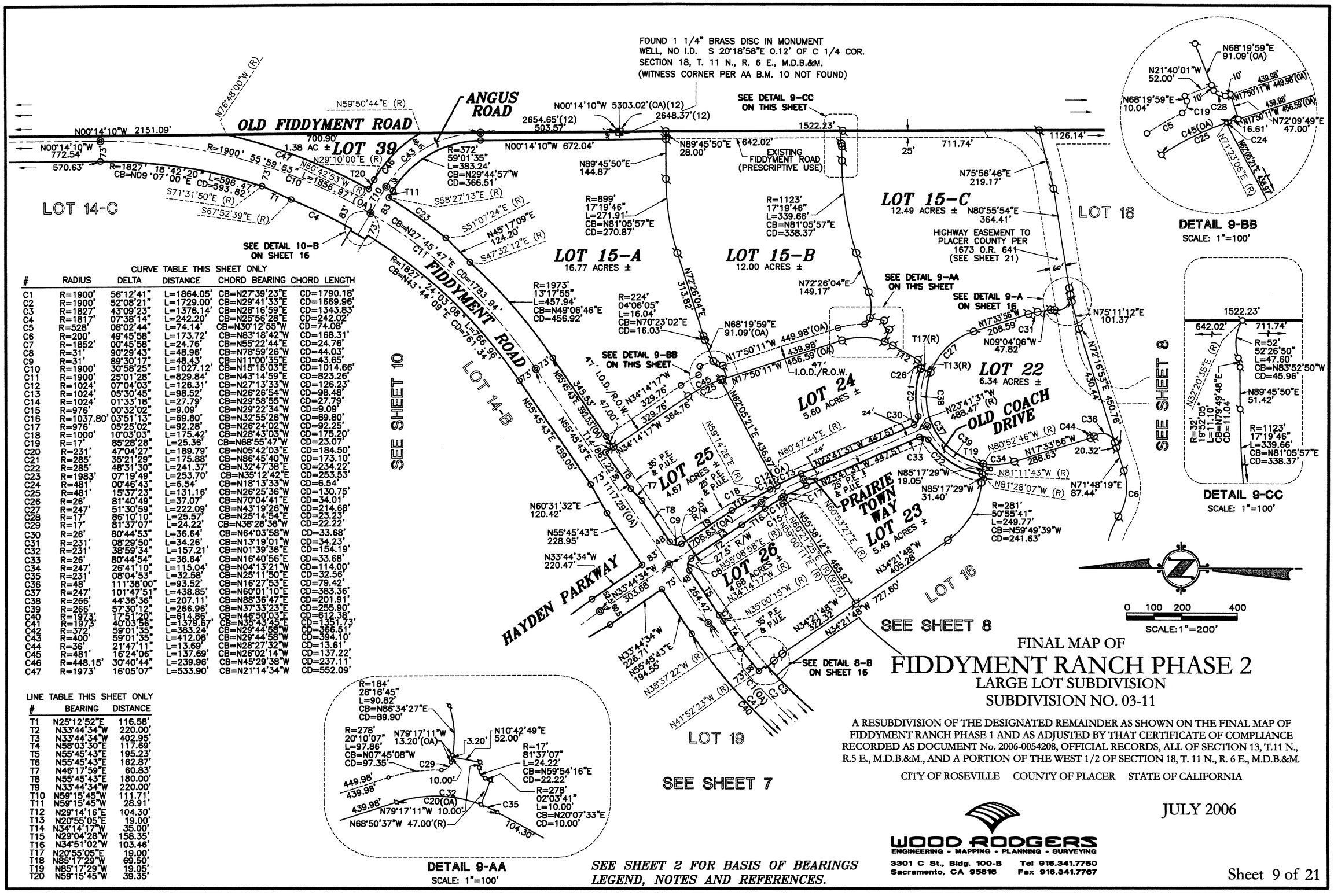

CURVE TABLE THIS SHEET ONLY

#	RADIUS	DELTA	DISTANCE	CHORD BEARING	CHORD LENGTH
C1	R=1900'	56°12'41"	L=1864.05'	CB=N27°39'23"E	CD=1790.18'
C2	R=1900'	52°08'21"	L=1729.00'	CB=N29°41'33"E	CD=1669.96'
C3	R=1827'	43°09'23"	L=1376.14'	CB=N26°16'59"E	CD=1343.83'
C4	R=1817'	07°38'14"	L=242.20'	CB=N25°56'28"E	CD=242.02'
C5	R=528'	08°02'44"	L=74.14'	CB=N30°12'55"W	CD=74.08'
C6	R=200'	49°45'58"	L=173.72'	CB=N83°18'42"W	CD=168.31'
C7	R=1852'	00°45'58"	L=24.76'	CB=N55°22'44"E	CD=24.76'
C8	R=31'	90°29'43"	L=48.96'	CB=N78°59'26"W	CD=44.03'
C9	R=31'	89°30'17"	L=48.43'	CB=N11°00'35"E	CD=43.65'
C10	R=1900'	30°58'25"	L=1027.12'	CB=N15°15'03"E	CD=1014.66'
C11	R=1900'	25°01'28"	L=829.84'	CB=N43°14'59"E	CD=823.26'
C12	R=1024'	07°04'03"	L=126.31'	CB=N27°13'33"W	CD=126.23'
C13	R=1024'	05°30'45"	L=98.52'	CB=N26°26'54"W	CD=98.48'
C14	R=1024'	01°33'18"	L=27.79'	CB=N29°58'55"W	CD=27.79'
C15	R=976'	00°32'02"	L=9.09'	CB=N29°22'34"W	CD=9.09'
C16	R=1037.80'	03°51'13"	L=69.80'	CB=N32°55'26"W	CD=69.80'
C17	R=976'	05°25'02"	L=92.28'	CB=N26°24'02"W	CD=92.25'
C18	R=1000'	10°03'03"	L=175.42'	CB=N28°43'03"W	CD=175.20'
C19	R=17'	85°28'28"	L=25.36'	CB=N66°55'47"W	CD=23.07'
C20	R=231'	47°04'27"	L=189.79'	CB=N05°42'03"E	CD=184.50'
C21	R=285'	35°21'29"	L=175.88'	CB=N86°45'40"W	CD=173.10'
C22	R=285'	48°31'30"	L=241.37'	CB=N32°47'38"E	CD=234.22'
C23	R=1983'	07°19'49"	L=253.70'	CB=N35°12'42"E	CD=253.53'
C24	R=481'	00°46'43"	L=6.54'	CB=N18°13'33"W	CD=6.54'
C25	R=481'	15°37'23"	L=131.16'	CB=N26°25'36"W	CD=130.75'
C26	R=26'	81°40'49"	L=37.07'	CB=N70°04'41"E	CD=34.01'
C27	R=247'	51°30'59"	L=222.09'	CB=N43°19'26"W	CD=214.68'
C28	R=17'	86°10'10"	L=25.57'	CB=N25°14'54"E	CD=23.23'
C29	R=17'	81°37'07"	L=24.22'	CB=N38°28'38"W	CD=22.22'
C30	R=26'	80°44'53"	L=36.64'	CB=N64°03'58"W	CD=33.68'
C31	R=231'	08°29'50"	L=34.26'	CB=N13°19'01"W	CD=34.23'
C32	R=231'	38°59'34"	L=157.21'	CB=N01°39'36"E	CD=154.19'
C33	R=26'	80°44'54"	L=36.64'	CB=N16°40'56"E	CD=33.68'
C34	R=247'	26°41'10"	L=115.04'	CB=N04°13'21"W	CD=114.00'
C35	R=231'	08°04'53"	L=32.58'	CB=N25°11'50"E	CD=32.56'
C36	R=48'	111°38'00"	L=93.52'	CB=N16°27'53"E	CD=79.42'
C37	R=247'	101°47'51"	L=438.85'	CB=N60°01'10"E	CD=383.36'
C38	R=266'	44°36'36"	L=207.11'	CB=N88°36'47"E	CD=201.91'
C39	R=266'	57°30'12"	L=266.96'	CB=N37°33'23"E	CD=255.90'
C40	R=1973'	17°51'20"	L=614.86'	CB=N46°50'03"E	CD=612.38'
C41	R=1973'	40°03'56"	L=1379.67'	CB=N35°43'45"E	CD=1351.73'
C42	R=372'	59°01'35"	L=383.24'	CB=N29°44'58"W	CD=366.51'
C43	R=400'	59°01'35"	L=412.08'	CB=N29°44'58"W	CD=394.10'
C44	R=36'	21°47'11"	L=13.69'	CB=N28°27'32"W	CD=13.61'
C45	R=481'	16°24'06"	L=137.69'	CB=N26°02'14"W	CD=137.22'
C46	R=448.15'	30°40'44"	L=239.96'	CB=N45°29'38"W	CD=237.11'
C47	R=1973'	16°05'07"	L=533.90'	CB=N21°14'34"W	CD=552.09'

LINE TABLE THIS SHEET ONLY

#	BEARING	DISTANCE
T1	N25°12'52"E	116.58'
T2	N33°44'34"W	220.00'
T3	N33°44'34"W	402.95'
T4	N58°03'30"E	117.69'
T5	N55°45'43"E	195.23'
T6	N55°45'43"E	162.87'
T7	N46°17'59"E	60.83'
T8	N55°45'43"E	180.00'
T9	N33°44'34"W	220.00'
T10	N59°15'45"W	111.71'
T11	N59°15'45"W	28.91'
T12	N29°14'16"E	104.30'
T13	N20°55'05"E	19.00'
T14	N34°14'17"W	35.00'
T15	N29°04'28"W	158.35'
T16	N34°51'02"W	103.46'
T17	N20°55'05"E	19.00'
T18	N85°17'29"W	69.50'
T19	N85°17'29"W	19.05'
T20	N59°15'45"W	39.35'

DETAIL 9-BB
SCALE: 1"=100'

DETAIL 9-CC
SCALE: 1"=100'

DETAIL 9-AA
SCALE: 1"=100'

SCALE: 1"=200'

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION
SUBDIVISION NO. 03-11

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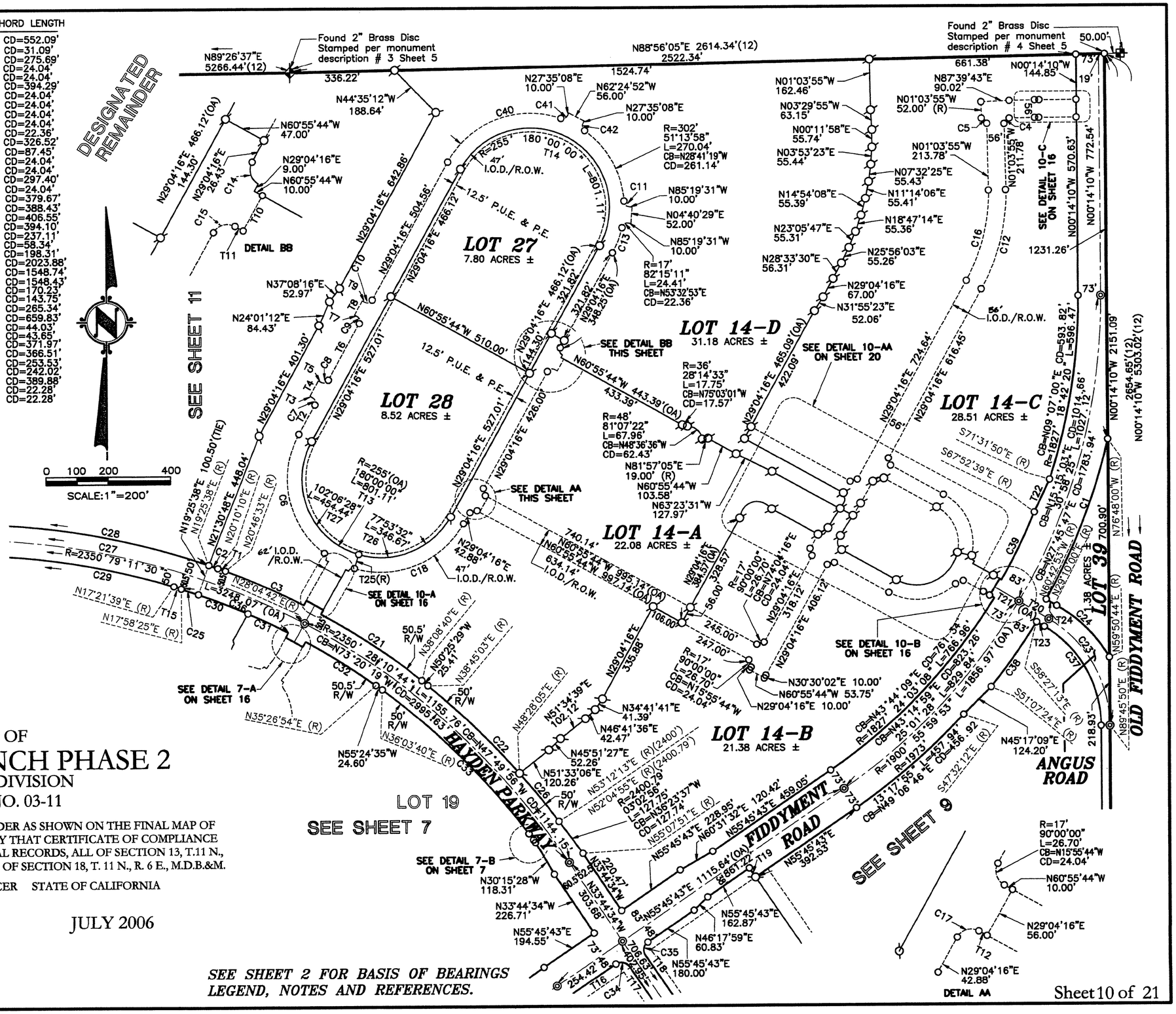
#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	R=1973'	16°05'07"	L=533.90'	CB=N21°14'34"E	CD=552.09'
C2	R=2400'	00°44'32"	L=31.09'	CB=N70°12'06"W	CD=31.09'
C3	R=2400.50'	06°35'02"	L=275.84'	CB=N65°55'56"W	CD=275.69'
C4	R=17'	90°00'00"	L=26.70'	CB=N43°56'05"E	CD=24.04'
C5	R=17'	90°00'00"	L=26.70'	CB=N46°03'55"W	CD=24.04'
C6	R=302'	81°30'21"	L=429.61'	CB=N11°40'55"W	CD=394.29'
C7	R=17'	90°00'00"	L=26.70'	CB=N15°55'44"W	CD=24.04'
C8	R=17'	90°00'00"	L=26.70'	CB=N74°04'16"E	CD=24.04'
C9	R=17'	90°00'00"	L=26.70'	CB=N15°55'44"W	CD=24.04'
C10	R=17'	90°00'00"	L=26.70'	CB=N74°04'16"E	CD=24.04'
C11	R=17'	82°15'11"	L=24.41'	CB=N44°11'56"W	CD=22.36'
C12	R=628'	30°08'11"	L=330.32'	CB=N14°00'11"E	CD=326.52'
C13	R=302'	16°38'58"	L=87.76'	CB=N20°44'47"E	CD=87.45'
C14	R=17'	90°00'00"	L=26.70'	CB=N15°55'44"W	CD=24.04'
C15	R=17'	90°00'00"	L=26.70'	CB=N74°04'16"E	CD=24.04'
C16	R=572'	30°08'11"	L=300.86'	CB=N14°00'11"E	CD=297.40'
C17	R=17'	90°00'00"	L=26.70'	CB=N74°04'16"E	CD=24.04'
C18	R=302'	77°53'32"	L=410.56'	CB=N68°01'02"E	CD=379.67'
C21	R=2400.50'	09°16'53"	L=388.86'	CB=N56°29'47"W	CD=388.43'
C22	R=2400'	09°43'02"	L=407.03'	CB=N46°23'26"W	CD=406.55'
C23	R=400'	59°01'35"	L=412.08'	CB=N29°44'58"W	CD=394.10'
C24	R=448.15'	30°40'44"	L=239.96'	CB=N45°29'38"W	CD=237.11'
C25	R=2299.50'	01°27'13"	L=58.34'	CB=N71°17'59"W	CD=58.34'
C26	R=2400'	04°44'08"	L=198.36'	CB=N39°09'51"W	CD=198.31'
C27	R=2350'	51°00'46"	L=2092.30'	CB=N87°25'41"W	CD=2023.88'
C28	R=2400'	37°38'49"	L=1576.95'	CB=N89°23'47"W	CD=1548.74'
C29	R=2300'	40°17'43"	L=1617.56'	CB=N87°12'48"E	CD=1548.43'
C30	R=2299.50'	04°14'33"	L=170.27'	CB=N68°27'06"W	CD=170.23'
C31	R=2299.50'	03°34'56"	L=143.77'	CB=N64°32'21"W	CD=143.75'
C32	R=2299.50'	06°36'54"	L=265.48'	CB=N57°51'33"W	CD=265.34'
C33	R=2300'	16°29'39"	L=662.12'	CB=N45°41'31"W	CD=659.83'
C34	R=31'	90°29'43"	L=48.96'	CB=N78°59'26"W	CD=44.03'
C35	R=31'	89°30'17"	L=48.43'	CB=N11°00'35"E	CD=43.65'
C36	R=2299.50'	09°16'42"	L=372.38'	CB=N67°23'14"W	CD=371.97'
C37	R=372'	59°01'35"	L=383.24'	CB=N29°44'58"W	CD=366.51'
C38	R=1983'	07°19'49"	L=253.70'	CB=N35°12'42"E	CD=253.53'
C39	R=1817'	07°38'14"	L=242.20'	CB=N25°56'28"E	CD=242.02'
C40	R=302'	80°24'17"	L=423.81'	CB=N69°16'25"E	CD=389.88'
C41	R=17'	81°53'25"	L=24.30'	CB=N68°31'51"E	CD=22.28'
C42	R=17'	81°53'26"	L=24.30'	CB=N13°21'35"W	CD=22.28'

LINE TABLE THIS SHEET ONLY

#	BEARING	DISTANCE	#	BEARING	DISTANCE
T1	N70°39'18"W	25.41'	T15	N71°10'06"W	24.60'
T2	N29°04'16"E	106.57'	T16	N55°45'43"E	195.23'
T3	N60°55'44"W	10.00'	T17	N33°44'34"W	220.00'
T4	N29°04'16"E	56.00'	T18	N34°44'34"W	220.00'
T5	N60°55'44"W	10.00'	T19	N34°14'17"W	35.00'
T6	N29°04'16"E	206.00'	T20	N59°15'45"W	111.71'
T7	N60°55'44"W	10.00'	T21	N59°15'45"W	201.77'
T8	N29°04'16"E	52.00'	T22	N25°12'52"E	116.58'
T9	N60°55'44"W	10.00'	T23	N59°15'45"W	28.91'
T10	N29°04'16"E	43.00'	T24	N59°15'45"W	39.35'
T11	N60°55'44"W	10.00'	T25	N16°57'48"E	47.00'
T12	N60°55'44"W	10.00'	T26	N68°01'02"E	320.58'
T13	N60°55'44"W	510.00'	T27	N21°58'58"W	396.65'
T14	N60°55'44"W	510.00'			



FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION

SUBDIVISION NO. 03-11

A RESUBDIVISION OF THE DESIGNATED REMAINDER AS SHOWN ON THE FINAL MAP OF FIDDYMENT RANCH PHASE 1 AND AS ADJUSTED BY THAT CERTIFICATE OF COMPLIANCE RECORDED AS DOCUMENT No. 2006-0054208, OFFICIAL RECORDS, ALL OF SECTION 13, T.11 N., R.5 E., M.D.B.&M., AND A PORTION OF THE WEST 1/2 OF SECTION 18, T. 11 N., R. 6 E., M.D.B.&M.

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SEE SHEET 2 FOR BASIS OF BEARINGS LEGEND, NOTES AND REFERENCES.

Found 3/4" Rebar
Tagged per monument
description # 1 Sheet 5

N89°26'37"E 5266.44'(12)
4803.97'

Found 2" Brass Disc
Stamped per monument
description # 3 Sheet 5

N88°56'05"E 2614.34'(12)
2522.34'
462.47'
336.22'
N44°35'12"W
188.64'
N00°00'01"W
284.89'
N87°27'03"E
764.08'
N74°10'08"E
736.87'
N29°04'16"E 642.86'
N37°08'16"E 52.97'
N24°01'12"E 84.43'
N29°04'16"E
401.30'
N21°30'48"E
448.04'

DESIGNATED REMAINDER

EXTERIOR LIMIT
CONSERVATION EASEMENT
PER D.N. 2004-0158160

SEE SHEET 10

N00°12'49"W 2644.65'
1732.60'
912.05'

N85°35'34"E
204.54'
N71°12'16"E
828.23'
N88°55'01"E 1242.35'
N57°05'47"E
274.22'
N89°59'49"E
91.75'

R=2375'
00°25'32"
L=17.64'
CB=N66°51'10"E
CD=17.64'
R=2425'
03°38'42"
L=154.27'
CB=N68°53'17"E
CD=154.24'
R=2375'
04°33'29"
L=188.94'
CB=N69°20'40"E
CD=188.89'
N03°40'22"W 1029.11'
N19°17'23"W (R)
N03°40'22"W
25.84'
N18°13'11"W (R)
N35°52'03"W
540.79'
N23°21'36"W (R)
N67°03'56"E
392.89'
25' R/W
HAYDEN PARKWAY
392.89'
50'
SEE DETAIL D-D
ON THIS SHEET
N67°03'56"E
392.89'
N18°22'35"W (R)
CB=N89°23'47"W CD=1548.74'
R=2400' 37°38'49" L=1576.95'
R=2350' 51°00'46" L=2092.30' CB=N87°25'41"W CD=2025.88'
R=2300' 40°17'43" L=1617.56'
CB=N87°12'48"E CD=1584.43'
N19°25'38"E (R)
100.50'(TIE)
N19°25'38"E (R)
N17°21'39"E (R)
N71°10'06"W
24.60'
R=2400'
00°44'32"
L=31.09'
CB=N70°12'06"W
CD=31.09'
N29°40'46"E
97.62'
R=2299.50'
09°16'42"
L=372.38'
CB=N67°23'14"W
CD=371.97'
R=2299.50'
04°14'33"
L=170.27'
CB=N68°27'06"W
CD=170.23'
R=2350'(OA)
79°11'30"
L=3248.07'
CB=N73°20'19"W
CD=2995.63'
CB=N33°04'46"E CD=2521.81'
R=2350' 64°53'56" L=2661.84'
CB=N33°24'51"E CD=2549.03'
R=2300' 67°18'09" L=2701.70'
CB=N33°24'51"E CD=2642.96'
R=2250' 67°18'09" L=2642.96'
CB=N33°24'51"E CD=2493.61'
N17°58'25"E (R)
R=2299.50'
01°27'13"
L=58.34'
CB=N71°17'59"W
CD=58.34'

DESIGNATED REMAINDER
SEE SHEET 12

Found 1 1/2" Capped Iron Pipe
Tagged per monument
description # 5 Sheet 5

N00°13'02"W
2644.64'

SEE SHEET 13

EXTERIOR LIMIT
CONSERVATION EASEMENT
PER D.N. 2004-0158160

N35°52'01"W
25.51'
R=2325'
01°24'45"
L=57.32'
CB=N66°21'34"E
CD=57.32'
N24°28'16"W (R)
N24°20'49"W (R)
DESIGNATED REMAINDER
R=2350'
64°53'56"
L=2661.84'
CB=N33°04'46"E
CD=2521.81'
392.89'
N67°03'56"E 392.89'
392.89'
50'
R=2300'
67°18'09"
L=2701.70'
CB=N33°24'51"E
CD=2549.03'
DESIGNATED REMAINDER
R=2250'
67°18'09"
L=2642.96'
CB=N33°24'51"E
CD=2493.61'

DETAIL D-D
SCALE: 1"=150'

0 300 600
SCALE:1"=300'

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION
SUBDIVISION NO. 03-11

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CITY OF ROSEVILLE COUNTY OF PLACER STATE OF CALIFORNIA

JULY 2006

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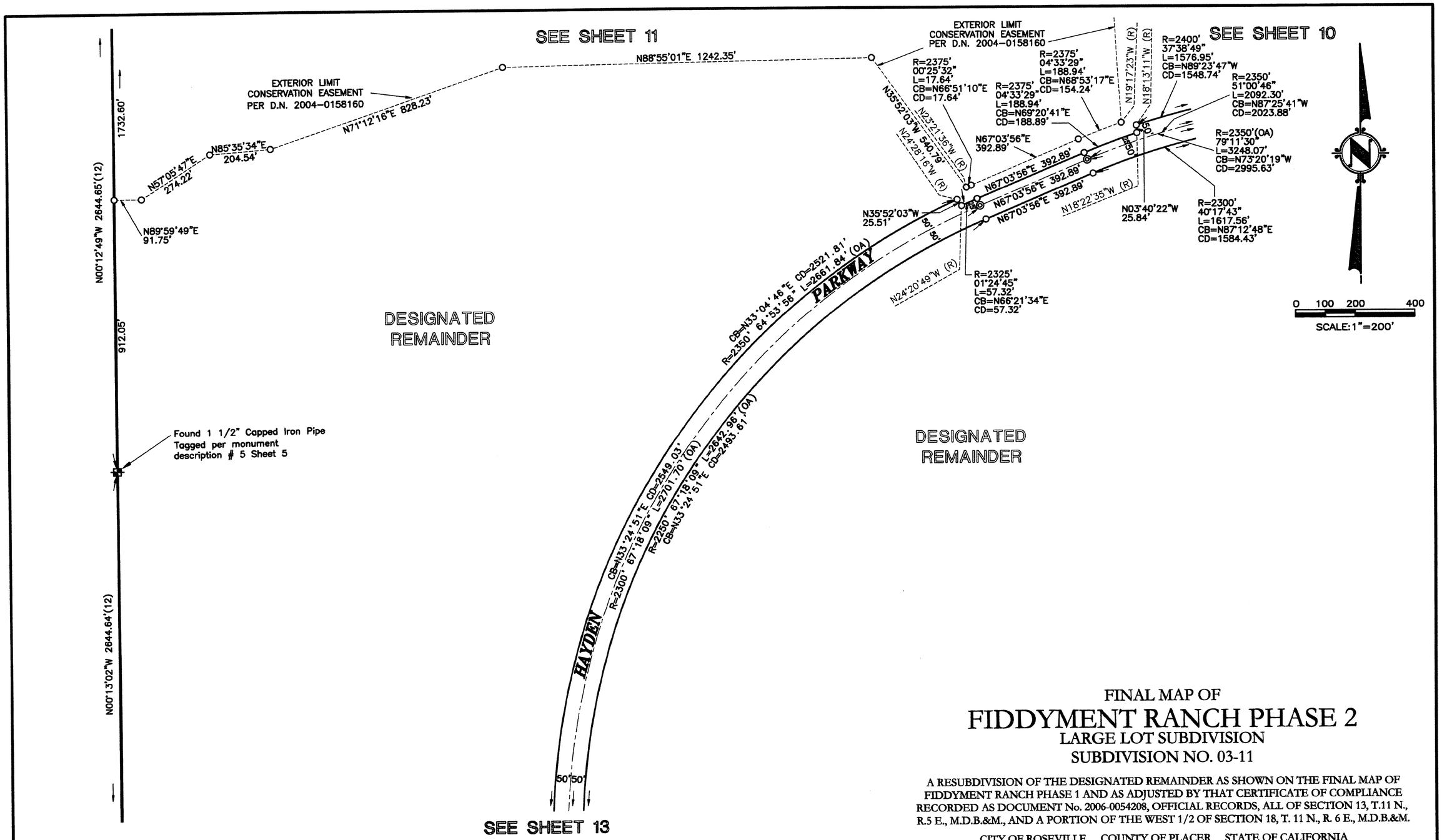

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FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION

SUBDIVISION NO. 03-11

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FINAL MAP OF

FIDDYMENT RANCH PHASE 2

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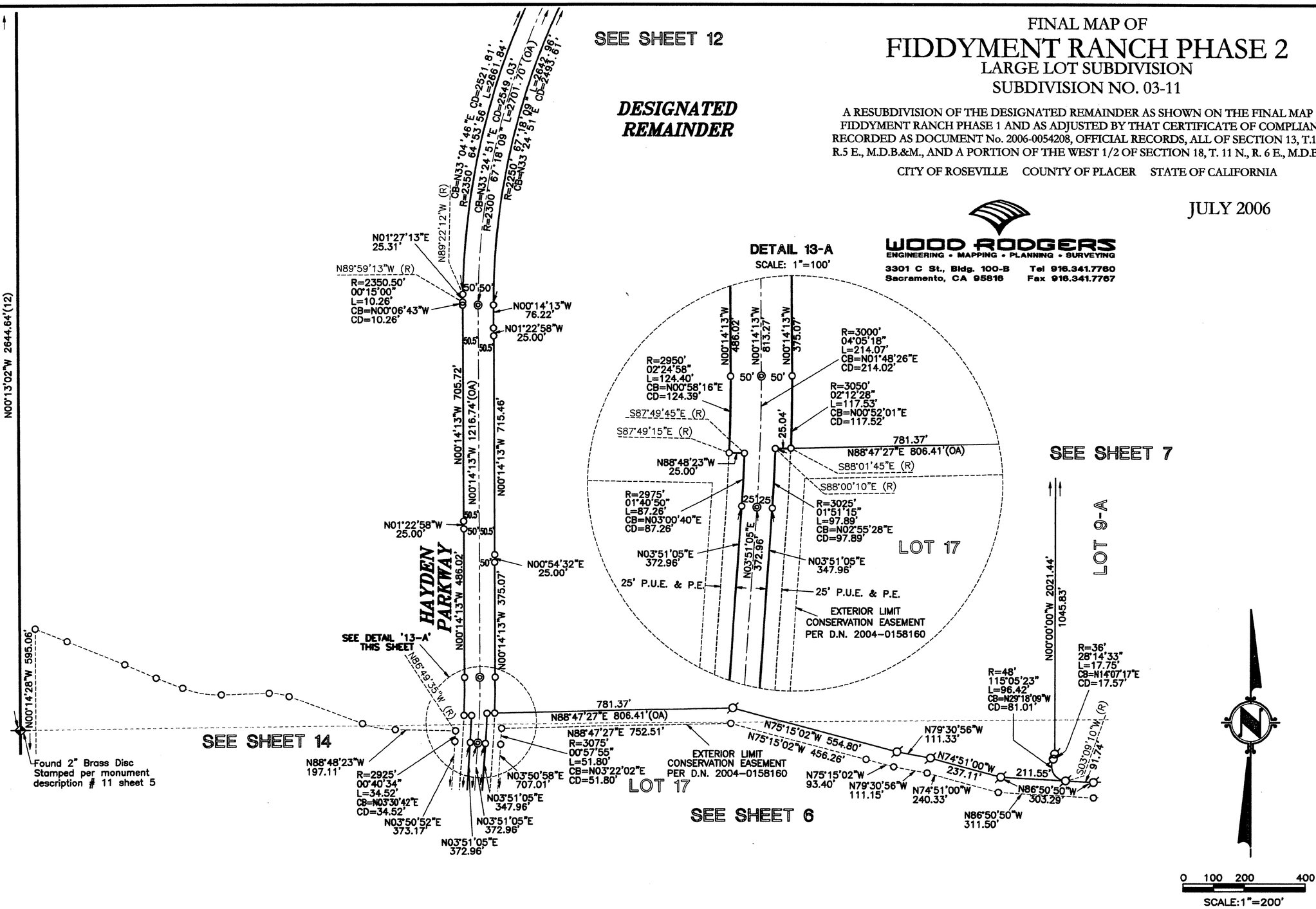
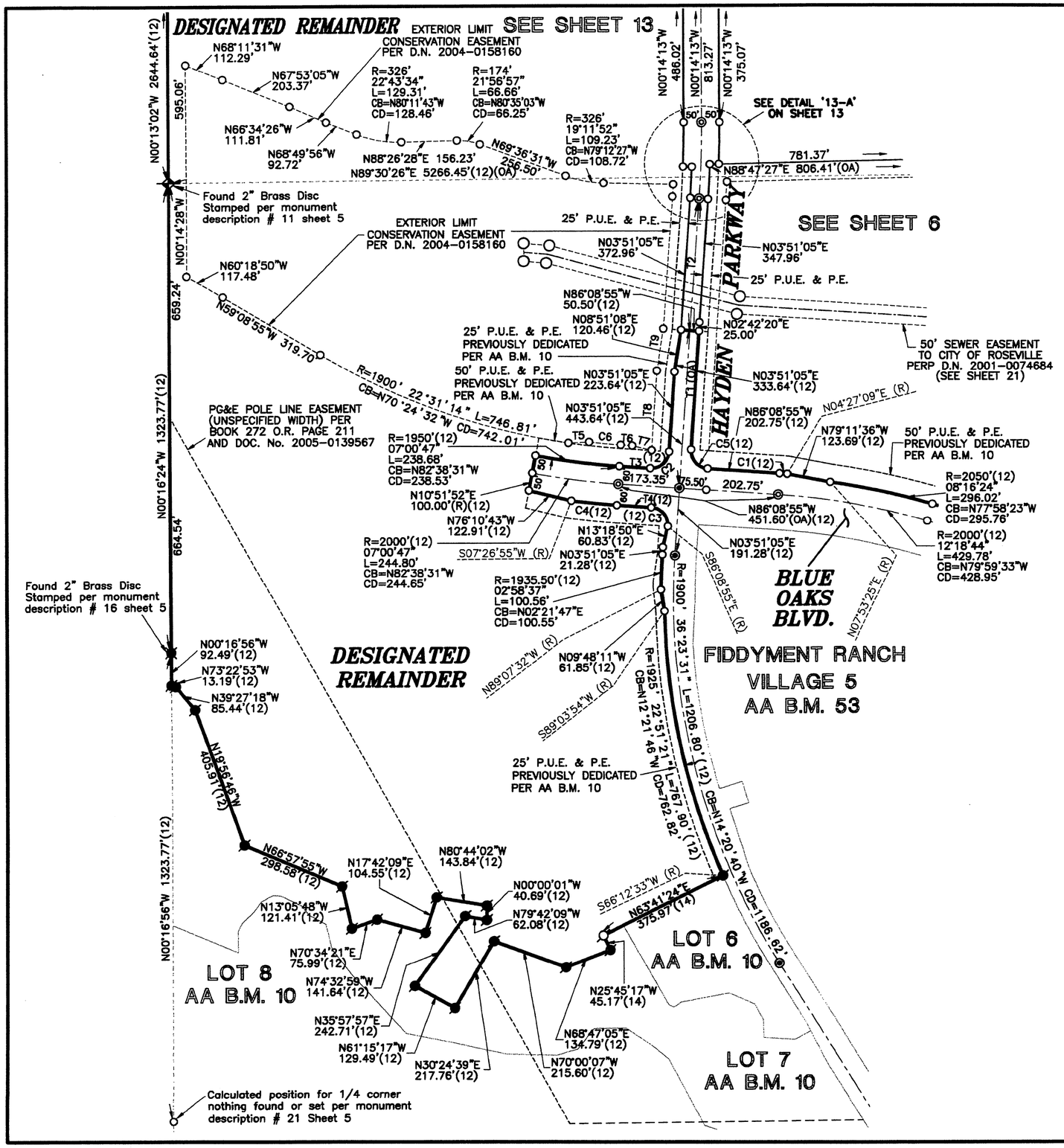
SEE SHEET 12

DESIGNATED REMAINDER



SEE SHEET 2 FOR BASIS OF BEARINGS LEGEND, NOTES AND REFERENCES.



SEE SHEET 2 FOR BASIS OF BEARINGS LEGEND, NOTES AND REFERENCES.

CURVE TABLE THIS SHEET ONLY

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	R=2060'	00°36'04"	L=21.61'	CB=N85°50'53"W	CD=21.61'
C2	R=50'	90°00'00"	L=78.54'	CB=N48°51'05"E	CD=70.71'
C3	R=50'	90°00'00"	L=78.54'	CB=N41°08'55"W	CD=70.71'
C4	R=2060'	03°35'50"	L=129.33'	CB=N84°21'00"W	CD=129.31'
C5	R=50'	90°00'00"	L=78.54'	CB=N41°08'55"W	CD=70.71'
C6	R=1890'	02°44'18"	L=90.33'	CB=N84°46'46"W	CD=90.32'

LINE TABLE THIS SHEET ONLY

#	BEARING	DISTANCE
T1	N03°51'05"E	1007.88'
T2	N03°51'05"E	372.96'
T3	N86°08'55"W	87.85'
T4	N86°08'55"W	97.85'
T5	N87°36'30"E	58.44'
T6	N86°08'55"W	32.63'
T7	N76°39'55"W	56.49'
T8	N03°51'05"E	223.14'
T9	N08°36'54"E	120.41'

0 100 200 400
SCALE:1"=200'

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION
SUBDIVISION NO. 03-11

A RESUBDIVISION OF THE DESIGNATED REMAINDER AS SHOWN ON THE FINAL MAP OF FIDDYMENT RANCH PHASE 1 AND AS ADJUSTED BY THAT CERTIFICATE OF COMPLIANCE RECORDED AS DOCUMENT No. 2006-0054208, OFFICIAL RECORDS, ALL OF SECTION 13, T.11 N., R.5 E., M.D.B.&M., AND A PORTION OF THE WEST 1/2 OF SECTION 18, T. 11 N., R. 6 E., M.D.B.&M.

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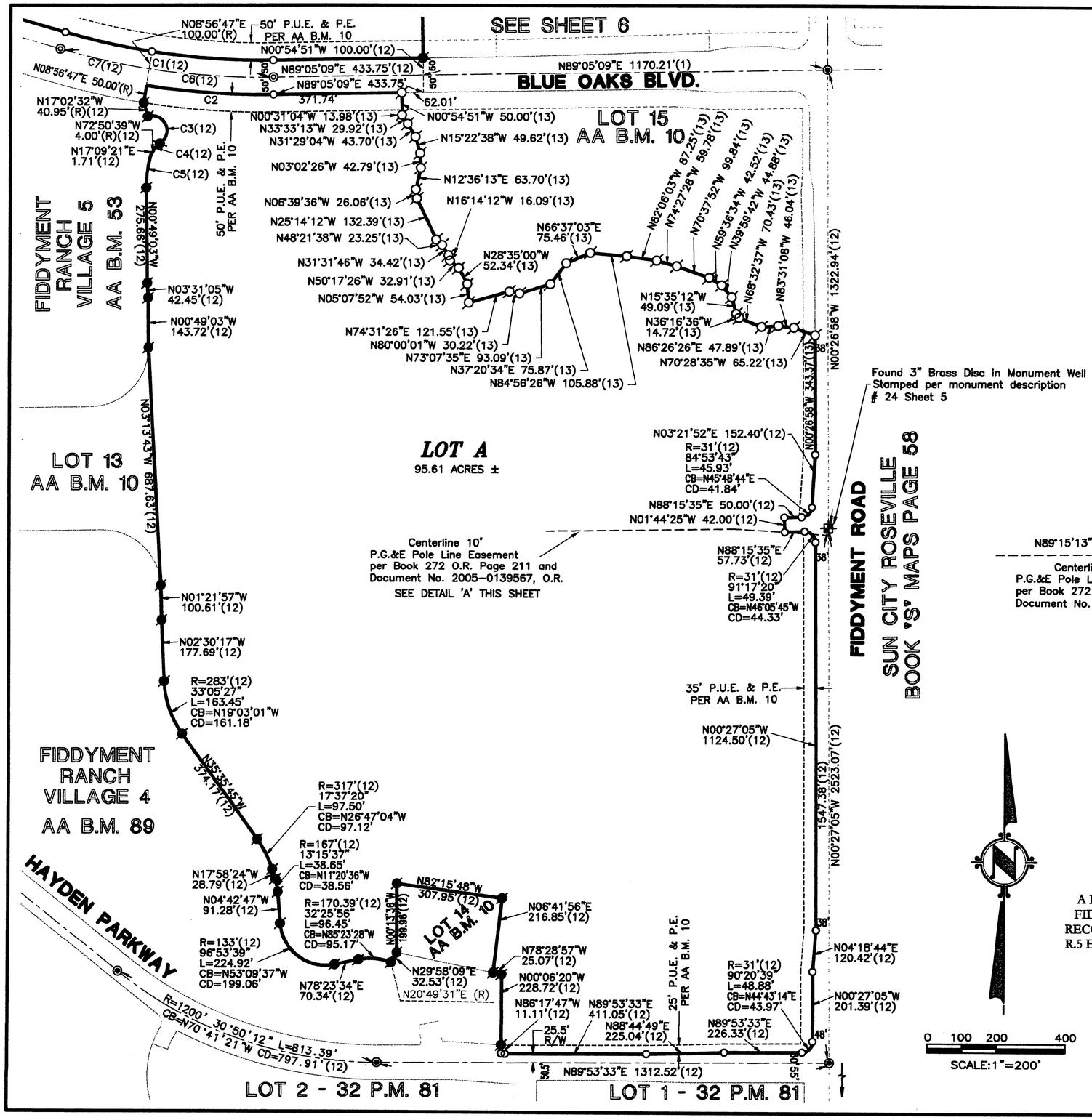

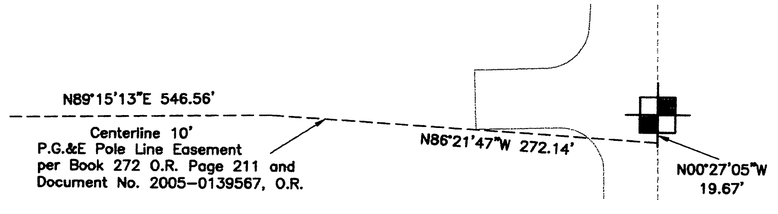

DETAIL 'A'
N.T.S.

CURVE TABLE THIS SHEET ONLY

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	R=2090'	17°04'40"	L=622.95'	CB=N82°22'31"W	CD=620.65'
C2	R=2140'	09°51'38"	L=368.29'	CB=N85°59'02"W	CD=367.84'
C3	R=43'	165°36'28"	L=124.29'	CB=N24°14'18"W	CD=85.32'
C4	R=45'	41°24'35"	L=32.52'	CB=N37°51'38"E	CD=31.82'
C5	R=333'	17°58'24"	L=104.46'	CB=N08°10'09"E	CD=104.03'
C6	R=2090'	09°51'38"	L=359.69'	CB=N85°59'02"W	CD=359.24'
C7	R=2090'	07°13'02"	L=263.26'	CB=N77°26'42"W	CD=263.09'

0 100 200 400
SCALE:1"=200'

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION
SUBDIVISION NO. 03-11

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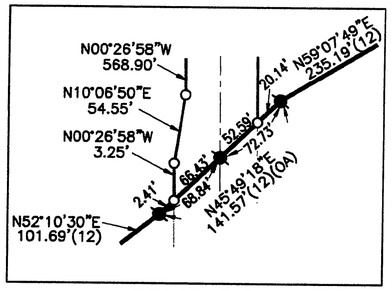
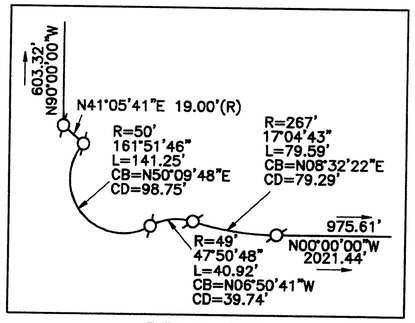


DETAIL 6-A
(SHEET 6)
N.T.S.



DETAIL 7-E
(SHEET 7)
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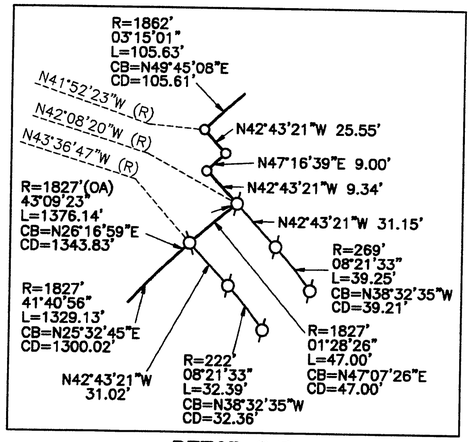

DETAIL 8-B
(SHEET 8)
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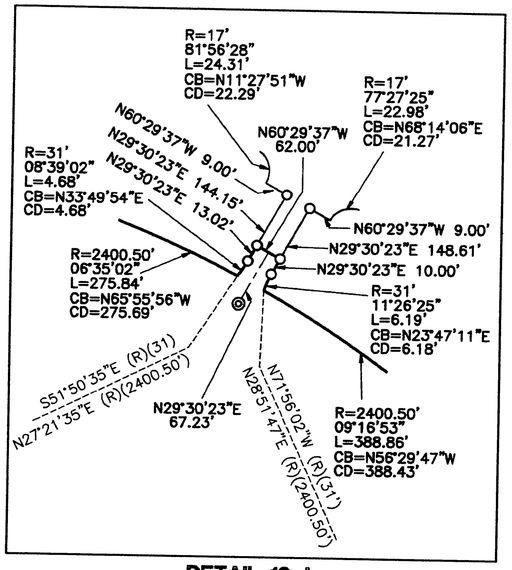

DETAIL 10-A
(SHEET 10)
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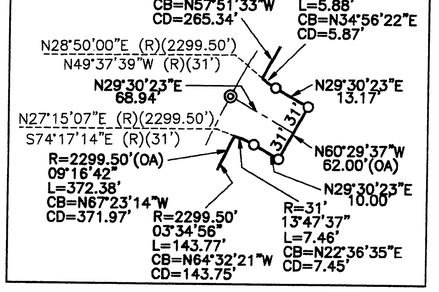

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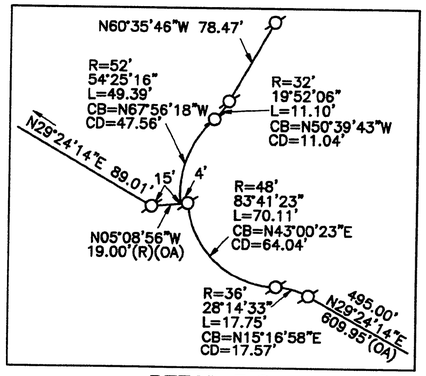
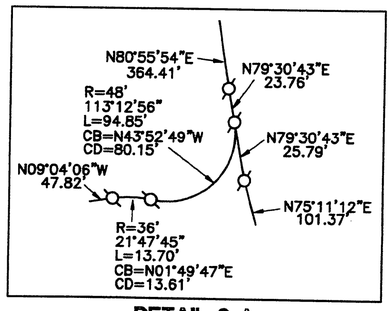


DETAIL 7-G
(SHEET 7)
N.T.S.



DETAIL 9-A
(SHEET 9)
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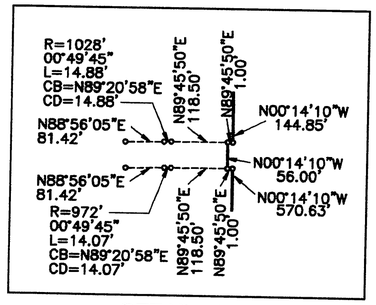
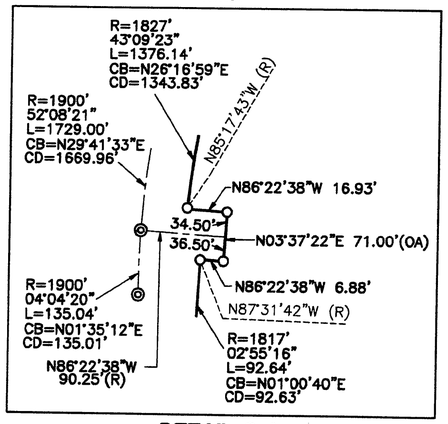


DETAIL 10-C
(SHEET 10)
N.T.S.



DETAIL 8-A
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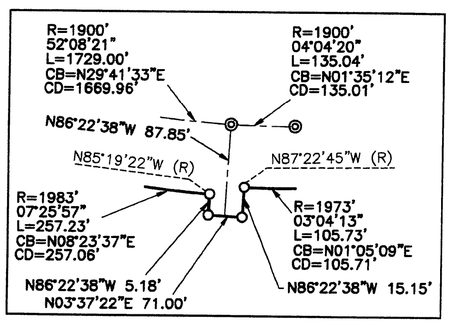

DETAIL 7-C
(SHEET 7)
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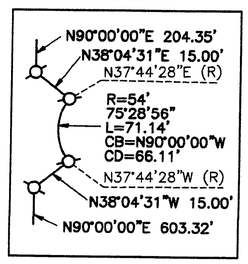

DETAIL 7-D
(SHEET 7)
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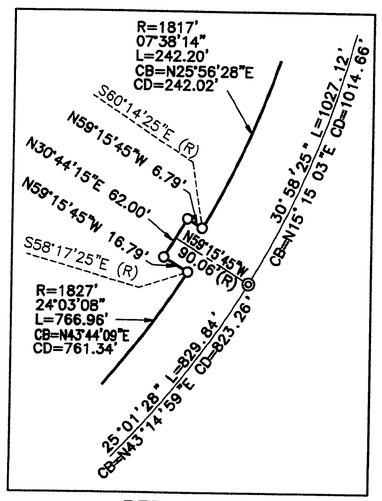

DETAIL 10-B
(SHEET 10)
N.T.S.

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION
SUBDIVISION NO. 03-11

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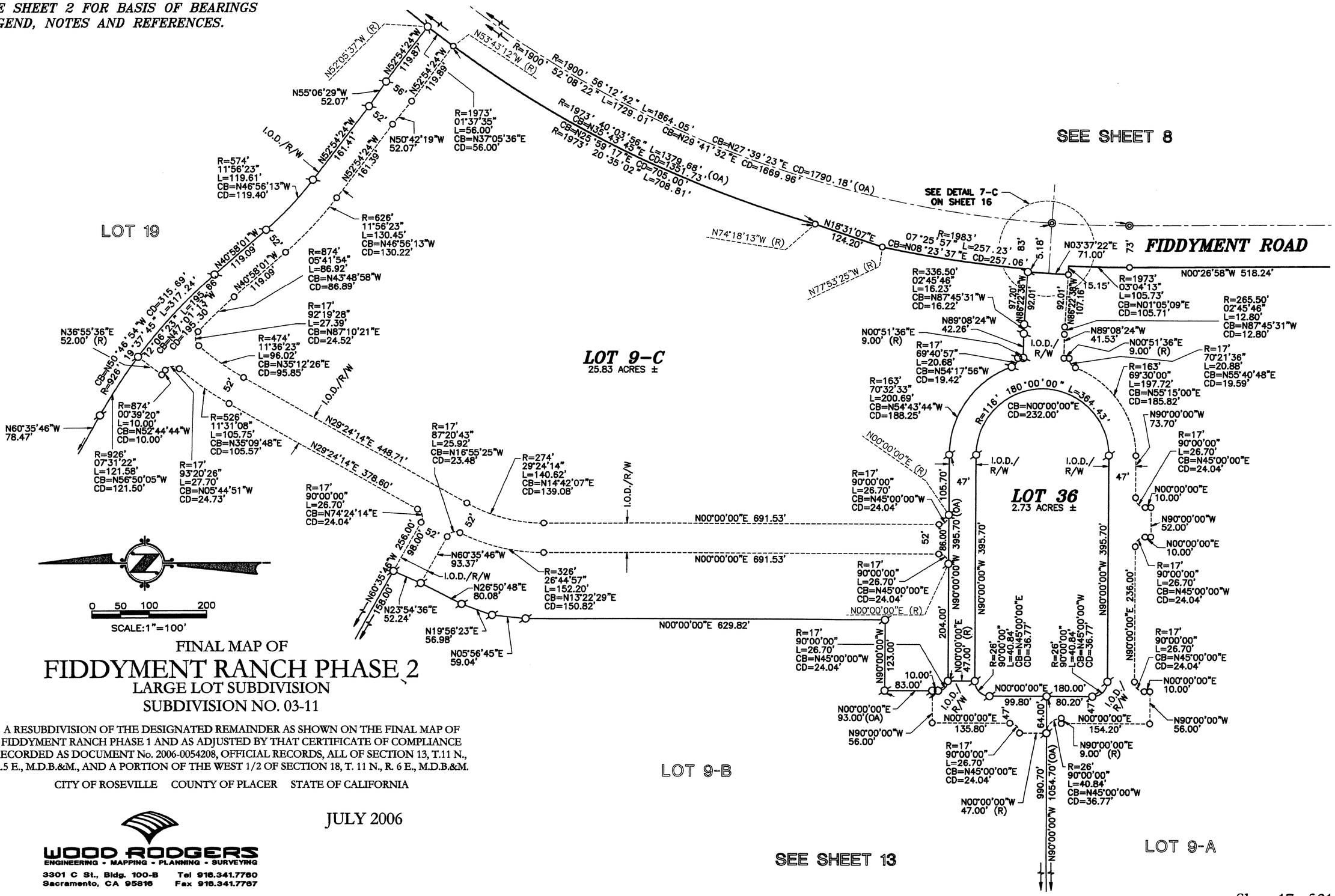

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION

SUBDIVISION NO. 03-11

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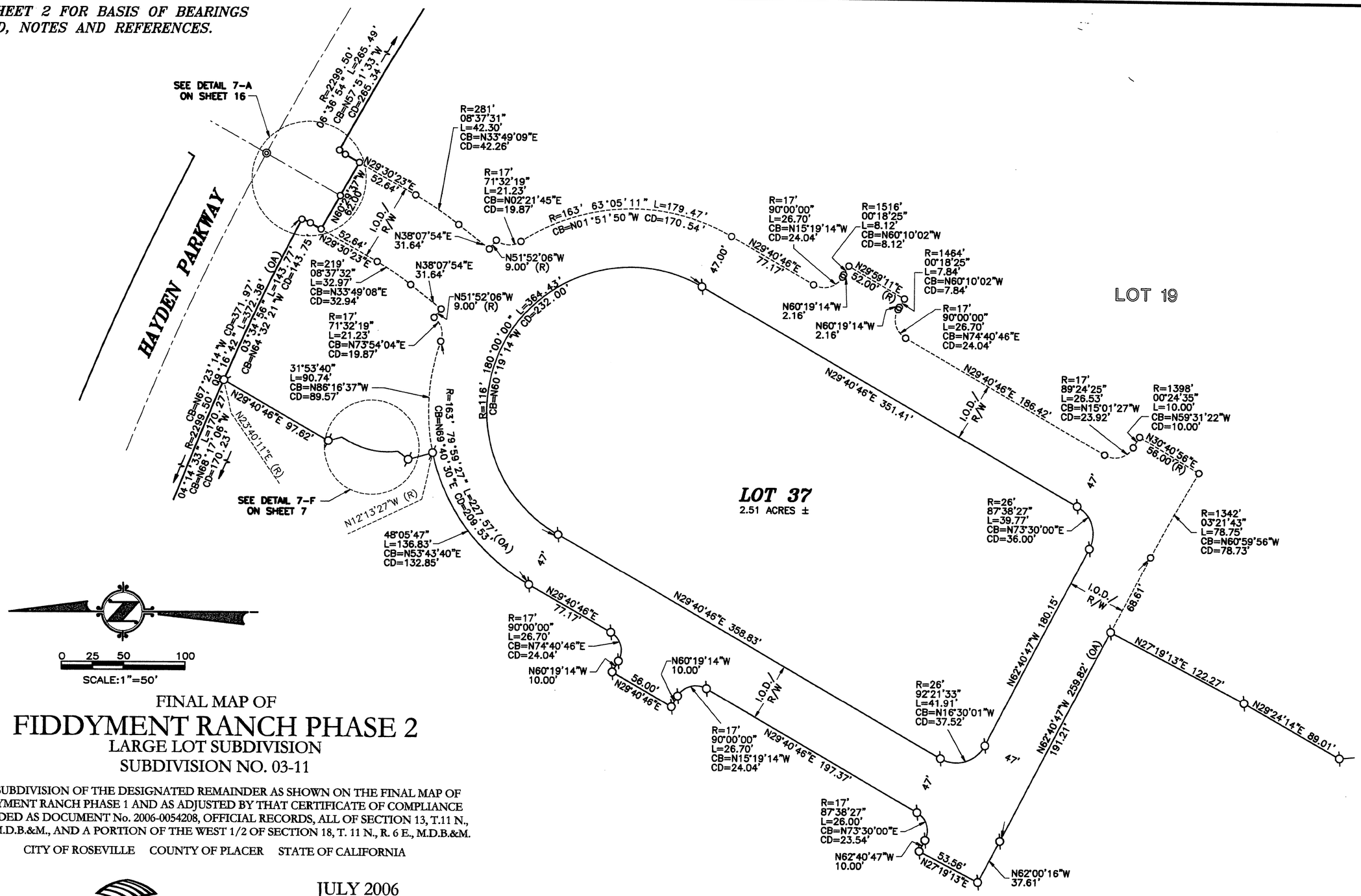
Sacramento, CA 95816 Fax 916.341.7767

SEE SHEET 2 FOR BASIS OF BEARINGS
LEGEND, NOTES AND REFERENCES.



FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION
SUBDIVISION NO. 03-11

A RESUBDIVISION OF THE DESIGNATED REMAINDER AS SHOWN ON THE FINAL MAP OF FIDDYMENT RANCH PHASE 1 AND AS ADJUSTED BY THAT CERTIFICATE OF COMPLIANCE RECORDED AS DOCUMENT No. 2006-0054208, OFFICIAL RECORDS, ALL OF SECTION 13, T.11 N., R.5 E., M.D.B.&M., AND A PORTION OF THE WEST 1/2 OF SECTION 18, T. 11 N., R. 6 E., M.D.B.&M.

CITY OF ROSEVILLE COUNTY OF PLACER STATE OF CALIFORNIA

JULY 2006

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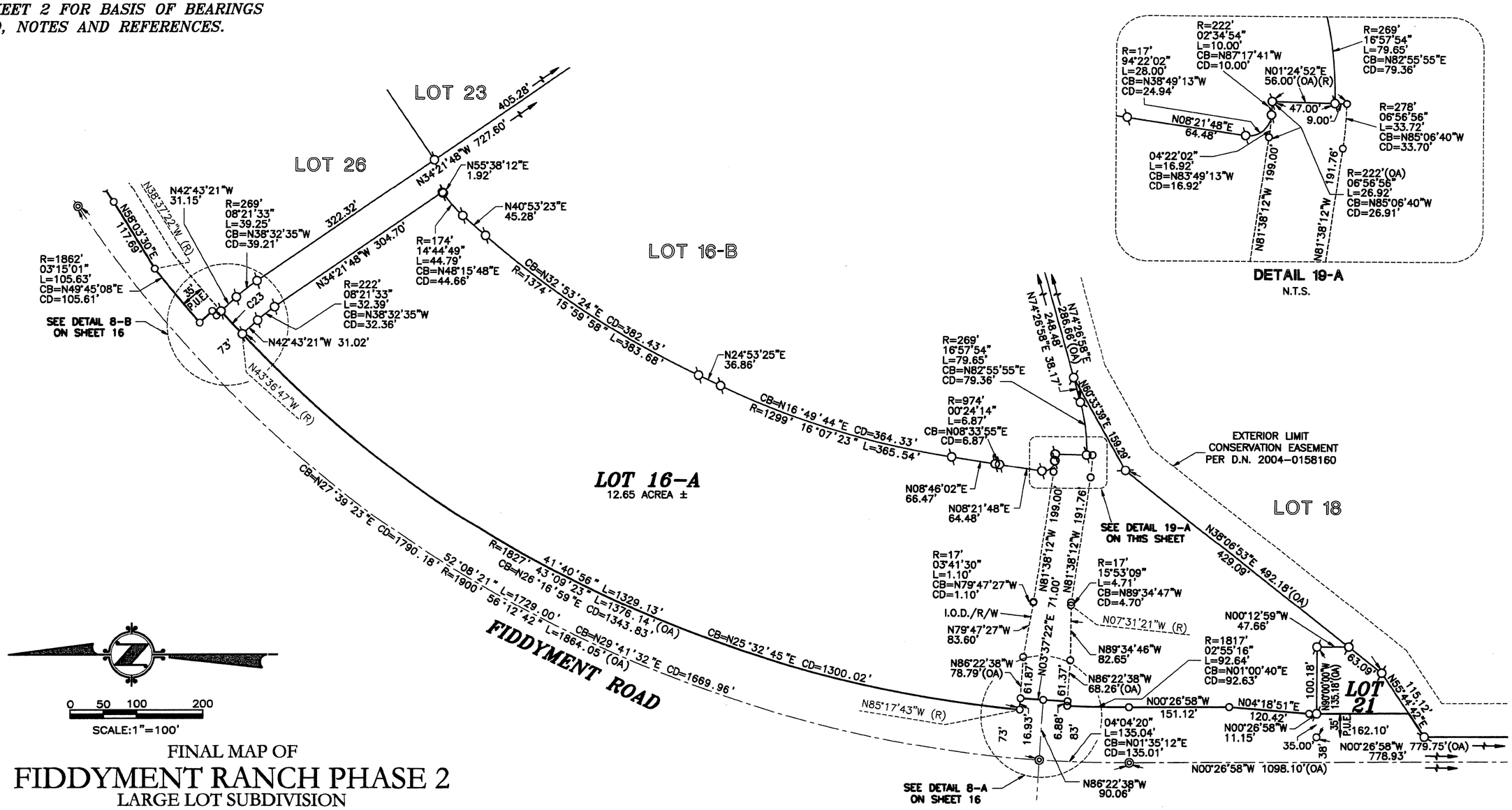
Sacramento, CA 95816 Fax 916.341.7767

DESIGNATED REMAINDER

SEE SHEET 2 FOR BASIS OF BEARINGS
LEGEND, NOTES AND REFERENCES.



DETAIL 19-A
N.T.S.

0 50 100 200
SCALE:1"=100'

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

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SUBDIVISION NO. 03-11

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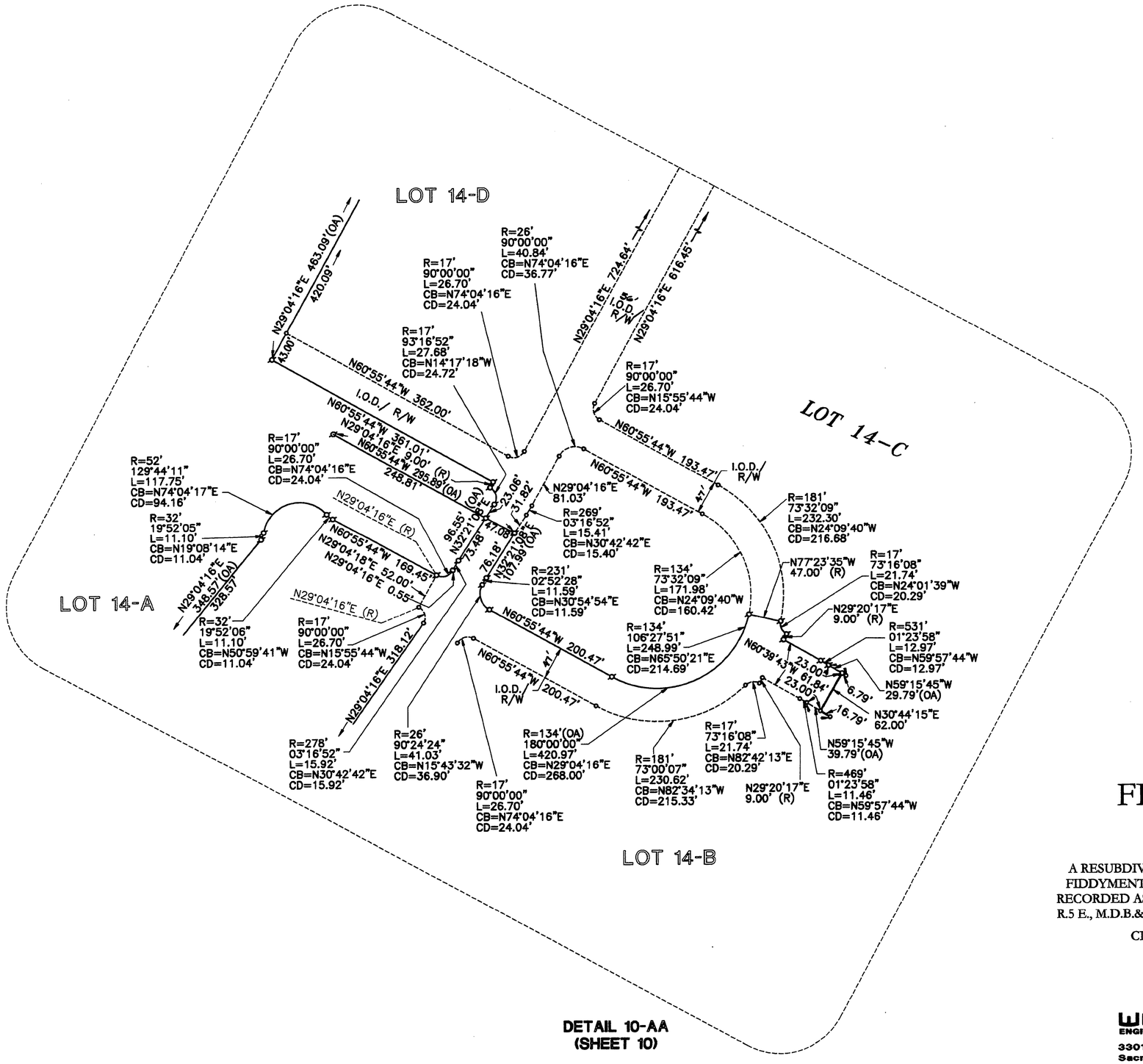
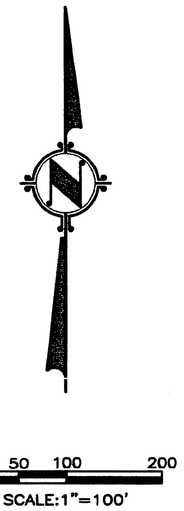
SEE SHEET 2 FOR BASIS OF BEARINGS LEGEND, NOTES AND REFERENCES.



DETAIL 10-AA
(SHEET 10)



0 50 100 200

SCALE:1"=100'

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION

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CITY OF ROSEVILLE COUNTY OF PLACER STATE OF CALIFORNIA

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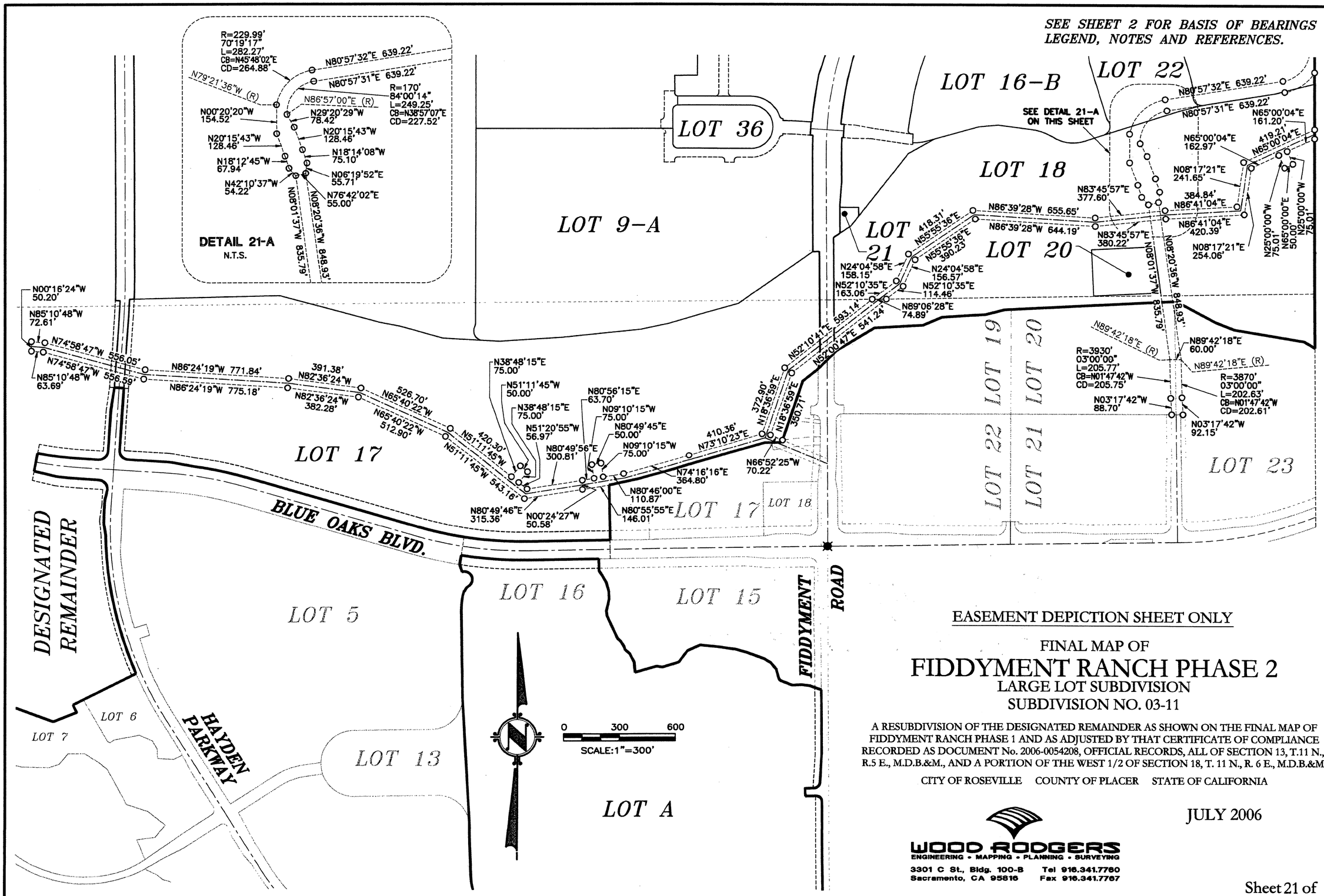
SEE SHEET 2 FOR BASIS OF BEARINGS
LEGEND, NOTES AND REFERENCES.



EASEMENT DEPICTION SHEET ONLY

FINAL MAP OF

FIDDYMENT RANCH PHASE 2

LARGE LOT SUBDIVISION

SUBDIVISION NO. 03-11

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CITY OF ROSEVILLE COUNTY OF PLACER STATE OF CALIFORNIA

JULY 2006

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Sacramento, CA 95816 Fax 916.341.7767

COUNCIL COMMUNICATION

CC #: 1745
File #: 0400-04-09-1

Title:	Federico - Phase 2 - Earl Rush Drive and Silver Spruce Drive - Notice of Completion
Contact:	Andrew Druck 916-223-7577 adruck@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.9.

RECOMMENDATION TO COUNCIL

Staff recommends that the City Council adopt the attached resolution accepting Federico - Phase 2 Earl Rush Drive and Silver Spruce Drive, CWJ #190538, as complete and authorizing the City Engineer to execute the Notice of Completion.

BACKGROUND

The Engineering Division has made a final inspection of the above project and has found the roadway infrastructure work complete in accordance with the improvement plans and City Specifications.

FISCAL IMPACT

The actions requested as part of this action have no impact to the City's General Fund. Construction costs were paid by the developer.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. Approval of a Notice of Completion meets the above criteria and is not subject to CEQA. No additional environmental review is required.

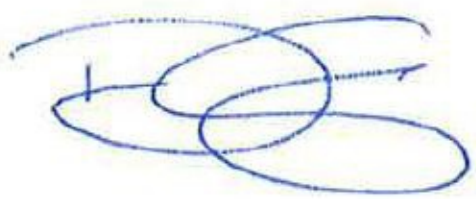
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal F - Invest in well-planned infrastructure and growth

Respectfully Submitted,

Andrew Druck, Construction Inspector

Mike Isom, Development Services Director



_____

Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution 21-425

NOC

Exhibit A

Final Map

RESOLUTION NO. 21-425

RESOLUTION OF THE COUNCIL OF THE CITY OF ROSEVILLE ACCEPTING THE PUBLIC WORK KNOWN AS FEDERICO – PHASE 2 EARL RUSH DRIVE AND SILVER SPRUCE DRIVE PROJECT, APPROVING THE "NOTICE OF COMPLETION", AND AUTHORIZING AND DIRECTING THE CITY ENGINEER TO EXECUTE SAID NOTICE ON BEHALF OF THE CITY OF ROSEVILLE, THEREFORE, AND ACCEPTING A PORTION OF THE DEDICATIONS OFFERED ON THE RECORDED MAP OF THE SUBDIVISION.

BE IT RESOLVED by the Council of the City of Roseville as follows:

1. The "Notice of Completion" on file in the City Clerk's Department relative to that public work known as the Federico - Phase 2 Earl Rush Drive and Silver Spruce Drive is hereby approved and the public work accepted.

2. A portion of the right-of-way and easements offered for dedication on the final map of Sierra Vista – Federico Large Lot Subdivision recorded in Book EE of Maps, Page 6 , in the office of the recorder of Placer County, is hereby accepted by the City in part as said dedications relates to the improvement plan set known as Federico - Phase 2 Earl Rush Drive and Silver Spruce Drive
3. The City Engineer is hereby authorized and directed to execute said Notice on behalf of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville, this_____day of_____, 20_____, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
CITY CLERK

RECORDING REQUESTED BY AND WHEN
RECORDED MAIL TO:

CITY CLERK
CITY OF ROSEVILLE
311 VERNON STREET
ROSEVILLE, CA 95678

Exempt from recording fees
Pursuant to Gov't Code §27383

NOTICE OF COMPLETION

NOTICE IS HEREBY GIVEN that the public work of improvement known as the _____ Project was completed and accepted by the City of Roseville on _____. The location is situated in the City of Roseville, County of Placer, State of California and is indicated on the attached map, marked as Exhibit "A" and incorporated herein by this reference. The real property herein described is owned by the City of Roseville, 311 Vernon Street, Roseville CA 95678.

The direct/general contractor on said project was _____.

The surety on said project was _____

_____.

_____

City of Roseville
Owner

ATTEST:

_____
Sonia Orozco, City Clerk

State of California)
County of Placer)

I,_____, being first duly sworn, depose and say: I am the _____ of the City of Roseville, a municipal corporation in the State of California, owner of the property described in the above Notice. I am duly authorized to make this verification for and on behalf of the City of Roseville. I have read the Notice of Completion and know its contents and the facts stated therein are true.

_____

City of Roseville

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Placer)

Subscribed and sworn to (or affirmed) before me on this _____ day of _____,

20___, _____

proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

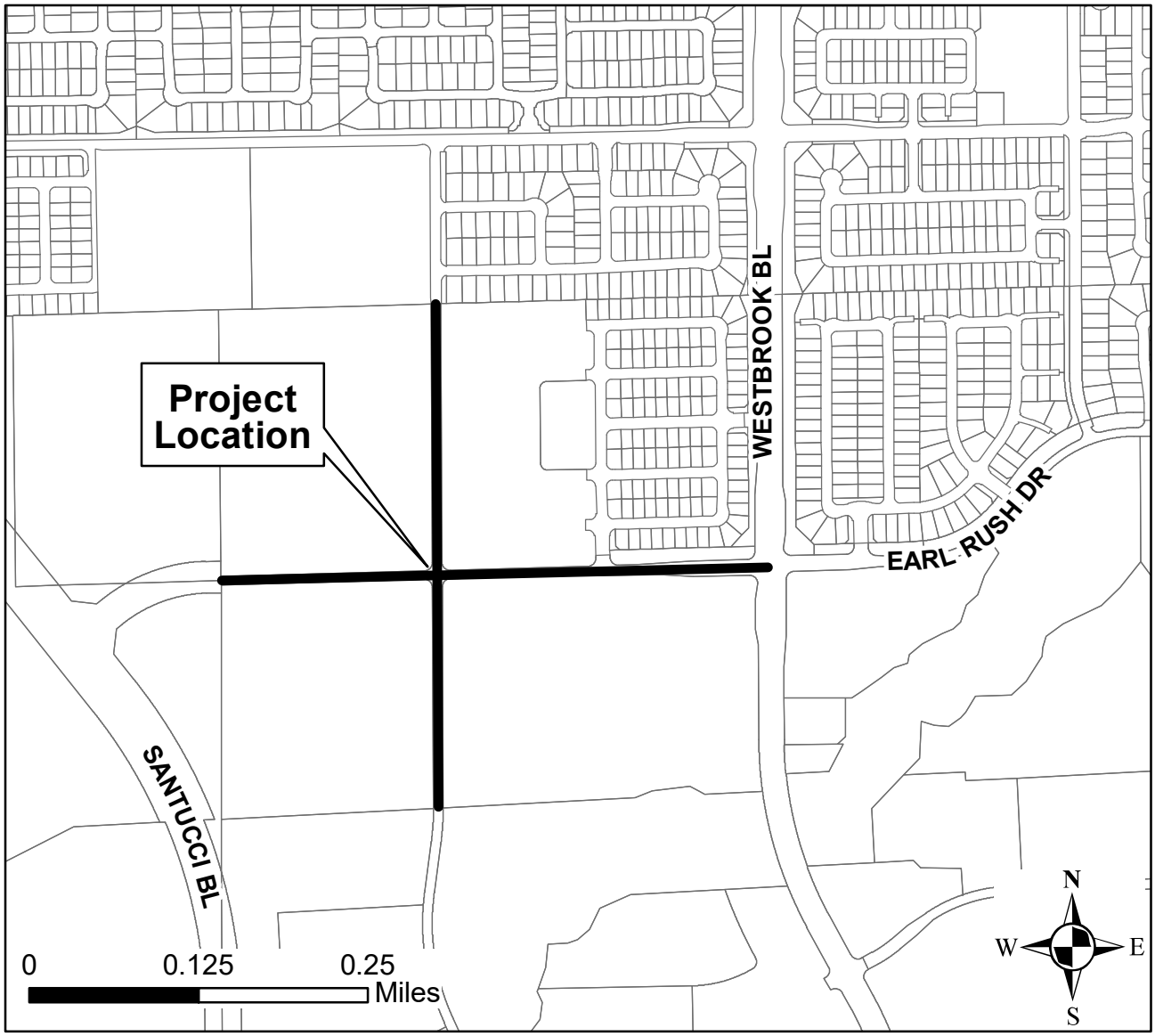
_____

Place Notary Seal and/or Stamp Above

Signature of Notary Public

EXHIBIT A

City of Roseville
Federico - Phase 2
Earl Rush Drive and Silver Spruce Drive



OWNER'S STATEMENT

THE UNDERSIGNED HEREBY CERTIFY THAT THEY ARE THE ONLY PERSONS HAVING ANY RECORD TITLE INTEREST IN THE REAL PROPERTY INCLUDED WITHIN THE SUBDIVISION SHOWN UPON THIS FINAL MAP OF "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION" AND THEY HEREBY CONSENT TO THE PREPARATION AND RECORDATION OF THIS FINAL MAP AND HEREBY OFFER FOR DEDICATION AND DO HEREBY DEDICATE FOR SPECIFIC PURPOSES THE FOLLOWING:

THE REAL PROPERTY DESCRIBED BELOW IS DEDICATED AS EASEMENT FOR PUBLIC PURPOSES:

(A) PUBLIC EASEMENTS FOR THE INSTALLATION AND MAINTENANCE OF, BUT NOT LIMITED TO ELECTROLIERS, WATER AND GAS PIPES, SEWER AND DRAINAGE PIPES, AND FOR UNDERGROUND WIRE AND CONDUITS FOR ELECTRIC, TELEPHONE AND TELEVISION SERVICES AND TRAFFIC CONTROL APPURTENANCES TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO ON, OVER, UNDER AND ACROSS THOSE STRIPS OF LAND LYING CONTIGUOUS TO THE RIGHT OF WAY AS SHOWN HEREON AND DESIGNATED "P.U.E." (PUBLIC UTILITY EASEMENT).

(B) PUBLIC UTILITY EASEMENT (P.U.E.) FOR INSTALLATION AND MAINTENANCE OF WATER, SEWER, GAS PIPES, ELECTROLIERS , TRAFFIC CONTROL APPURTENANCES, AND FOR POLES AND UNDERGROUND WIRES AND CONDUITS FOR ELECTRIC POWER THAT IS LIMITED BY THIS EASEMENT TO A MAXIMUM OF 13,000 VOLTS, AND TELEVISION AND TELEPHONE SERVICES TOGETHER WITH ALL APPURTENANCES PERTAINING THERETO, ON, UNDER AND ACROSS THOSE STRIPS OF LAND LYING BETWEEN THE SIDELINES OF THE RIGHTS OF WAY AND THE LINES DELINEATED P.U.E., LOCATED ON LOT 34.

(C) PUBLIC EASEMENT FOR THE INGRESS AND EGRESS OF EMERGENCY VEHICLES AND UTILITY MAINTENANCE VEHICLES, TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO ON, OVER AND ACROSS THOSE STRIPS OF LAND SHOWN HEREON AND DESIGNATED "M.A.E." (MAINTENANCE ACCESS EASEMENT).

(D) PUBLIC EASEMENT FOR THE INSTALLATION AND MAINTENANCE OF A BUS SHELTER TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO ON, OVER AND ACROSS THAT STRIP OF LAND SHOWN HEREON AND DESIGNATED "BUS SHELTER EASEMENT".

(E) A PUBLIC EASEMENT FOR PEDESTRIAN / BICYCLE ACCESS AND THE INSTALLATION, REPAIR, REMOVAL OR REPLACEMENT OF LANDSCAPING TOGETHER WITH ANY AND ALL APPURTENANCES THERETO, ON, OVER, UNDER AND ACROSS THOSE STRIPS OF LAND SHOWN HEREON AND DESIGNATED "PASEO EASEMENT" (P.E.).

THE REAL PROPERTY DESCRIBED BELOW IS IRREVOCABLY DEDICATED IN FEE FOR PUBLIC PURPOSES:

(A) AS PUBLIC RIGHT OF WAY (INCLUDING ALL IMPROVEMENTS THEREON) THE STREETS SHOWN HEREON AS SANTUCCI BOULEVARD, VISTA GRANDE BOULEVARD, WESTBROOK BOULEVARD, BRANSTON DRIVE, FEDERICO DRIVE, SIERRA GLEN DRIVE, SUMMERFAIRE DRIVE, SILVER SPRUCE DRIVE, VISTA PARK DRIVE, MARKET STREET AND THE AREAS SHOWN HEREON AS I.O.D. / R.O.W.

(B) LOT 28 SHOWN HEREON TO THE CITY OF ROSEVILLE FOR A FIRE STATION.

(C) LOTS 8, 11, 13, 20, 23, 29, 30, 31, 32, 39 AND 40 SHOWN HEREON TO THE CITY OF ROSEVILLE FOR OPEN SPACE PURPOSES.

(D) LOTS 3, 9, 24 AND 33 SHOWN HEREON TO THE CITY OF ROSEVILLE FOR A PARK PURPOSES.

(E) LOT 34 SHOWN HEREON IS HEREBY RESERVED TO BE DEDICATED IN THE FUTURE AS A SCHOOL SITE.

(F) LOT 19 SHOWN HEREON TO THE CITY OF ROSEVILLE FOR A WATER TREATMENT/ WELL SITE.

(G) LOT 15 SHOWN HEREON TO THE CITY OF ROSEVILLE FOR A RECYCLING CENTER.

FEDERICO/TYLER FAMILY LIMITED PARTNERSHIP,
A CALIFORNIA LIMITED PARTNERSHIP
BY: THE JAMES A. FEDERICO AND GRACE R. FEDERICO FAMILY REVOCABLE TRUST AS AMENDED AND RESTATED IN 2005, GENERAL PARTNER

BY: _____
LEONARD A. FEDERICO,
TRUSTEE OF THE JAMES A. FEDERICO AND GRACE R. FEDERICO FAMILY REVOCABLE TRUST, AS AMENDED AND RESTATED IN 2005, GENERAL PARTNER

BY: _____
LEONARD A. FEDERICO,
GENERAL PARTNER

SEE SHEET 2 FOR ADDITIONAL OWNER'S SIGNATURES

NOTARY'S ACKNOWLEDGMENT

A NOTARY PUBLIC OR OTHER OFFICER COMPLETING THIS CERTIFICATE VERIFIES ONLY THE IDENTITY OF THE INDIVIDUAL WHO SIGNED THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED, AND NOT THE TRUTHFULNESS, ACCURACY OR VALIDITY OF THAT DOCUMENT.

STATE OF CALIFORNIA

COUNTY OF Fresno

ON December 21, 2017 BEFORE ME, Pauline J. Moore, Notary Public,

PERSONALLY APPEARED Leonard A. Federico

WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) (IS) ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT (HE)/SHE/THEY EXECUTED THE SAME IN (HIS)/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY (HIS)/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND and official seal.

Pauline J Moore — Pauline J. Moore
SIGNATURE — PRINTED NAME

MY PRINCIPAL PLACE OF BUSINESS IS Fresno COUNTY

MY COMMISSION EXPIRES: July 31, 2019 MY COMMISSION NUMBER: 2118207

PAULINE J. MOORE
Commission # 2118207
Notary Public - California
Fresno County
My Comm. Expires Jul 31, 2019

SUBDIVISION MAP ACT SECTION 66477.5 CERTIFICATE

PURSUANT TO SECTION 66477.5 OF THE SUBDIVISION MAP ACT THE CITY OF ROSEVILLE SHALL RECONVEY LOTS 15, 19 & 28 AS DEDICATED TO THE CITY ON THE MAP OF SUBDIVISION NO. PL15-0192, SIERRA VISTA FEDERICO LARGE LOT SUBDIVISION, TO THE SUBDIVIDER NAMED BELOW IF THE CITY OF ROSEVILLE MAKES A DETERMINATION THAT THE SAME PUBLIC PURPOSE FOR WHICH THE PROPERTY WAS DEDICATED DOES NOT EXIST, OR THE PROPERTY OR ANY PORTION THEREOF IS NOT NEEDED FOR PUBLIC UTILITIES EXCEPT FOR ANY PORTION OF THE PROPERTY THAT IS REQUIRED FOR THE SAME PUBLIC PURPOSE OR PUBLIC UTILITIES.

SUBDIVIDER: FEDERICO / TYLER FAMILY LIMITED PARTNERSHIP
A CALIFORNIA LIMITED PARTNERSHIP

ADDRESS: 2144 SHEILAH WAY
SACRAMENTO, CA 95822

SURVEYOR'S STATEMENT

THIS FINAL MAP OF "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION" WAS PREPARED BY ME OR UNDER MY DIRECTION AND IS BASED UPON A FIELD SURVEY IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCES AT THE REQUEST OF MOURIER INVESTMENTS, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY AND WESTPARK SIERRA VISTA LLC, IN NOVEMBER 2016. I HEREBY STATE THAT THIS FINAL MAP SUBSTANTIALLY CONFORMS TO THE APPROVED OR CONDITIONALLY APPROVED TENTATIVE MAP. ALL MONUMENTS SHOWN HEREON ARE OF THE CHARACTER AND WILL OCCUPY THE POSITIONS INDICATED, AND WILL BE SET BY DECEMBER 31, 2019 AND THAT THE MONUMENTS ARE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED.

MACKAY & SOMPS CIVIL ENGINEERS, INC.

_____
CRAIG E. SPIESS, PLS 7944
EXPIRATION DATE: DECEMBER 31, 2019

DATE: 12/14/17

LICENSED LAND SURVEYOR
CRAIG E. SPIESS
12/31/19
No. 7944
STATE OF CALIFORNIA

CITY ENGINEER'S STATEMENT

I HEREBY STATE THAT I HAVE EXAMINED THIS FINAL MAP OF "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION" AND FIND IT TO BE SUBSTANTIALLY THE SAME AS THE TENTATIVE MAP ON FILE AND ANY APPROVED ALTERATIONS THEREOF; THAT ALL PROVISIONS OF THE SUBDIVISION MAP ACT AND ALL APPLICABLE CITY ORDINANCES HAVE BEEN COMPLIED WITH.

_____ DATE: 1/10/18
MARC STOUT, R.C.E. 69879
CITY ENGINEER, CITY OF ROSEVILLE
LICENSE EXPIRES: SEPTEMBER 30, 2018

I HEREBY STATE THAT I AM SATISFIED THIS THIS FINAL MAP OF "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION" IS TECHNICALLY CORRECT.

FOR MARC STOUT, CITY ENGINEER, CITY OF ROSEVILLE

_____ DATE: 1/10/18
TIMOTHY G. BLAIR, PLS 8278
EXPIRES DECEMBER 31, 2019

LICENSED LAND SURVEYOR
TIMOTHY G. BLAIR
Exp. 12-31-19
No. 8278
STATE OF CALIFORNIA

CITY CLERK'S STATEMENT

I HEREBY CERTIFY THAT THE CITY COUNCIL, CITY OF ROSEVILLE, HAS APPROVED THIS FINAL MAP OF "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION", AND HAS ACCEPTED ON BEHALF OF THE PUBLIC, SUBJECT TO IMPROVEMENT, THE EASEMENTS OFFERED HEREON FOR DEDICATION IN ACCORDANCE WITH THE TERMS OF THAT OFFER. THE CITY COUNCIL REJECTS AT THIS TIME, BUT RESERVES THE RIGHT TO ACCEPT AT A LATER DATE, ON BEHALF OF THE PUBLIC ALL IRREVOCABLE OFFERS OF DEDICATION IN ACCORDANCE WITH THE TERMS OF THOSE OFFERS AND DOES ALSO HEREBY APPROVE THE ABANDONMENT OF THE IRREVOCABLE OFFERS OF DEDICATION AND EASEMENT LISTED HEREON WITHIN NOTE 5 ON SHEET 4.

_____
CITY CLERK, CITY OF ROSEVILLE

DATE: 01 11 18 BY: _____
ASSISTANT CITY CLERK

RECORDER'S STATEMENT

FILED THIS 16th DAY OF February, 2018, AT 9:36 A.M. IN BOOK EE OF MAPS, AT PAGE 6, IN THE OFFICE OF THE PLACER COUNTY RECORDER, AT THE REQUEST OF MACKAY & SOMPS CIVIL ENGINEERS, INC.

Ryan Ronco DOCUMENT NO.: 2018-0010061
RECORDER OF PLACER COUNTY
STATE OF CALIFORNIA

BY: _____ FEE: $ 149.00
DEPUTY

FINAL MAP OF
SIERRA VISTA - FEDERICO
LARGE LOT SUBDIVISION
SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

CITY OF ROSEVILLE • PLACER COUNTY • CALIFORNIA

JANUARY 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

OWNER'S STATEMENT CONTINUED

BY: Anna J. Starks
ANNA J. STARKS,
GENERAL PARTNER
Federico/Tyler Family Limited Partnership

NOTARY'S ACKNOWLEDGMENT

A NOTARY PUBLIC OR OTHER OFFICER COMPLETING THIS CERTIFICATE VERIFIES ONLY THE IDENTITY OF THE INDIVIDUAL WHO SIGNED THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED, AND NOT THE TRUTHFULNESS, ACCURACY OR VALIDITY OF THAT DOCUMENT.

STATE OF CALIFORNIA

COUNTY OF SACRAMENTO

ON JAN 4, 2018 BEFORE ME, SANDRA LESSARD, NOTARY PUBLIC

PERSONALLY APPEARED ANNA J. STARKS
WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/~~ARE~~ SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT ~~HE/SHE/THEY~~ EXECUTED THE SAME IN ~~HIS/HER/THEIR~~ AUTHORIZED CAPACITY(~~IES~~), AND THAT BY ~~HIS/HER/THEIR~~ SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND and official seal.

Sandra Lessard — SANDRA LESSARD
SIGNATURE — PRINTED NAME

MY PRINCIPAL PLACE OF BUSINESS IS PLACER COUNTY

MY COMMISSION EXPIRES: Oct 18, 2020 MY COMMISSION NUMBER: 2165215

BY: Janet M Wright
JANET M. WRIGHT,
GENERAL PARTNER
Federico/Tyler Family Limited Partnership

NOTARY'S ACKNOWLEDGMENT

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STATE OF CALIFORNIA

COUNTY OF SACRAMENTO

ON JAN. 4, 2018 BEFORE ME, SANDRA LESSARD, NOTARY PUBLIC

PERSONALLY APPEARED JANET M. WRIGHT
WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/~~ARE~~ SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT ~~HE/SHE/THEY~~ EXECUTED THE SAME IN ~~HIS/HER/THEIR~~ AUTHORIZED CAPACITY(~~IES~~), AND THAT BY ~~HIS/HER/THEIR~~ SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND and official seal

Sandra Lessard — SANDRA LESSARD
SIGNATURE — PRINTED NAME

MY PRINCIPAL PLACE OF BUSINESS IS PLACER COUNTY

MY COMMISSION EXPIRES: Oct 18, 2020 MY COMMISSION NUMBER: 2165215

BY: Gary J. Federico
GARY J. FEDERICO,
GENERAL PARTNER
Federico/Tyler Family Limited Partnership

NOTARY'S ACKNOWLEDGMENT

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STATE OF CALIFORNIA

COUNTY OF SACRAMENTO

ON JAN 4, 2018 BEFORE ME, SANDRA LESSARD, NOTARY PUBLIC

PERSONALLY APPEARED GARY J. FEDERICO
WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/~~ARE~~ SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT ~~HE/SHE/THEY~~ EXECUTED THE SAME IN ~~HIS/HER/THEIR~~ AUTHORIZED CAPACITY(~~IES~~), AND THAT BY ~~HIS/HER/THEIR~~ SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND and official seal.

Sandra Lessard — SANDRA LESSARD
SIGNATURE — PRINTED NAME

MY PRINCIPAL PLACE OF BUSINESS IS PLACER COUNTY

MY COMMISSION EXPIRES: Oct 18, 2020 MY COMMISSION NUMBER: 2165215

FINAL MAP OF

SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

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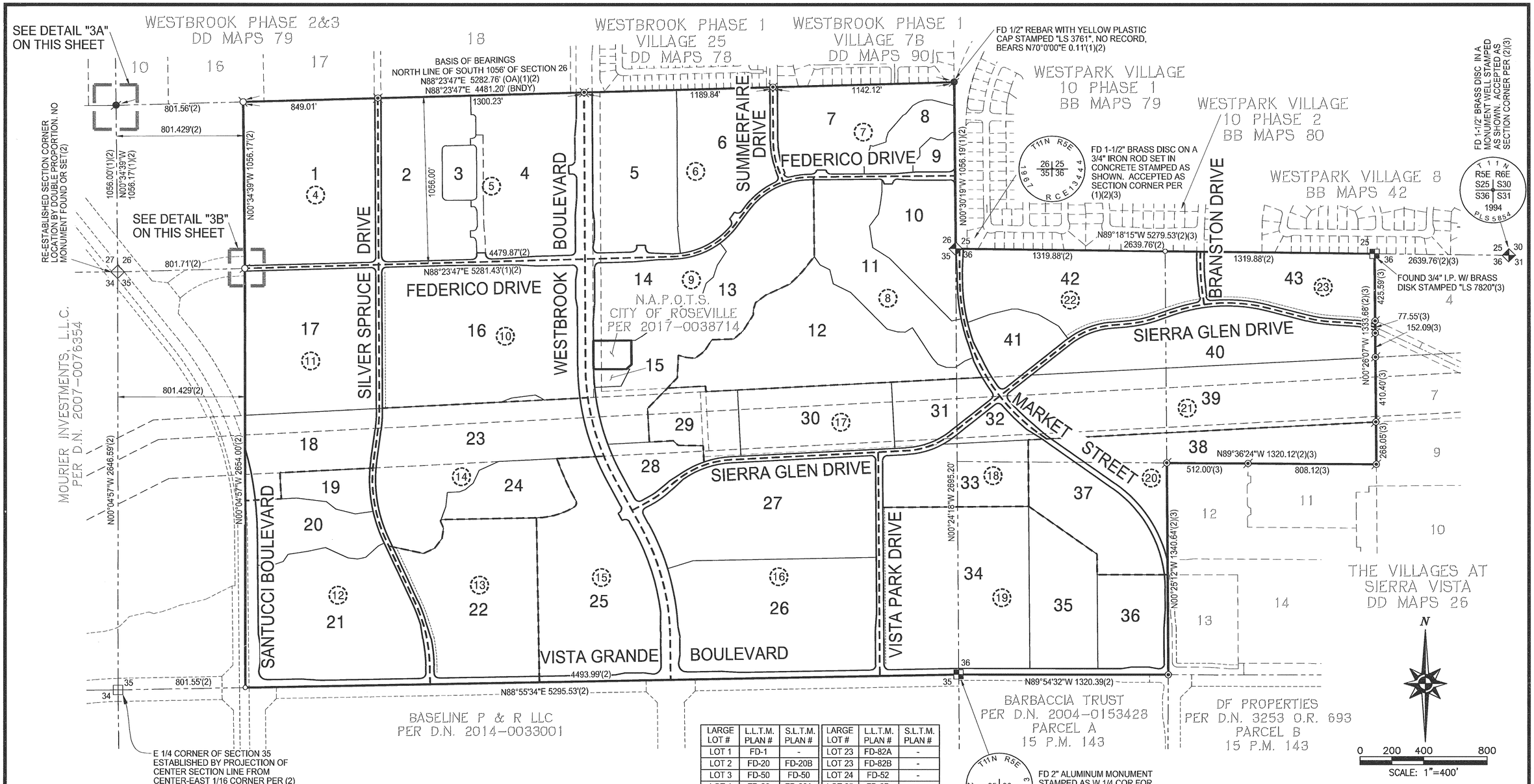
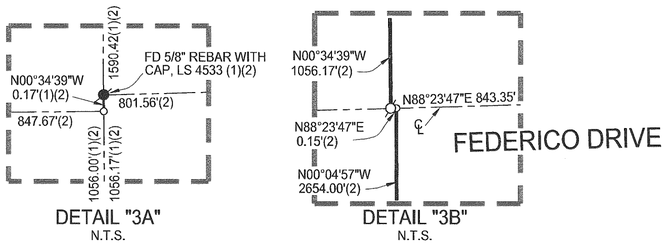
JANUARY 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189





LARGE LOT #	L.L.T.M. PLAN #	S.L.T.M. PLAN #
LOT 1	FD-1	-
LOT 2	FD-20	FD-20B
LOT 3	FD-50	FD-50
LOT 4	FD-20	FD-20A
LOT 5	FD-22	FD-22A
LOT 6	FD-22	FD-22B
LOT 7	FD-3	-
LOT 8	FD-83	-
LOT 9	FD-51	-
LOT 10	FD-4	-
LOT 11	FD-84B	-
LOT 12	FD-5	-
LOT 13	FD-84A	-
LOT 14	FD-60	FD-34
LOT 15	FD-62	-
LOT 16	FD-21	-
LOT 17	FD-2	-
LOT 18	FD-40	-
LOT 19	FD-63	-
LOT 20	FD-80	-
LOT 21	FD-23	-
LOT 22	FD-8A	-

LARGE LOT #	L.L.T.M. PLAN #	S.L.T.M. PLAN #
LOT 23	FD-82A	-
LOT 23	FD-82B	-
LOT 24	FD-52	-
LOT 25	FD-8B	-
LOT 26	FD-10	-
LOT 27	FD-9	-
LOT 28	FD-64	-
LOT 29	FD-85A	-
LOT 30	FD-85B	-
LOT 31	FD-85C	-
LOT 32	FD-86	-
LOT 33	FD-53	-
LOT 34	FD-65	-
LOT 35	FD-33	-
LOT 36	FD-41	-
LOT 37	FD-32	-
LOT 38	FD-24	-
LOT 39	FD-88B	-
LOT 40	FD-88A	-
LOT 41	FD-87A	-
LOT 42	FD-6	-
LOT 43	FD-7	-

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SUBDIVISION NO. PL15-0192

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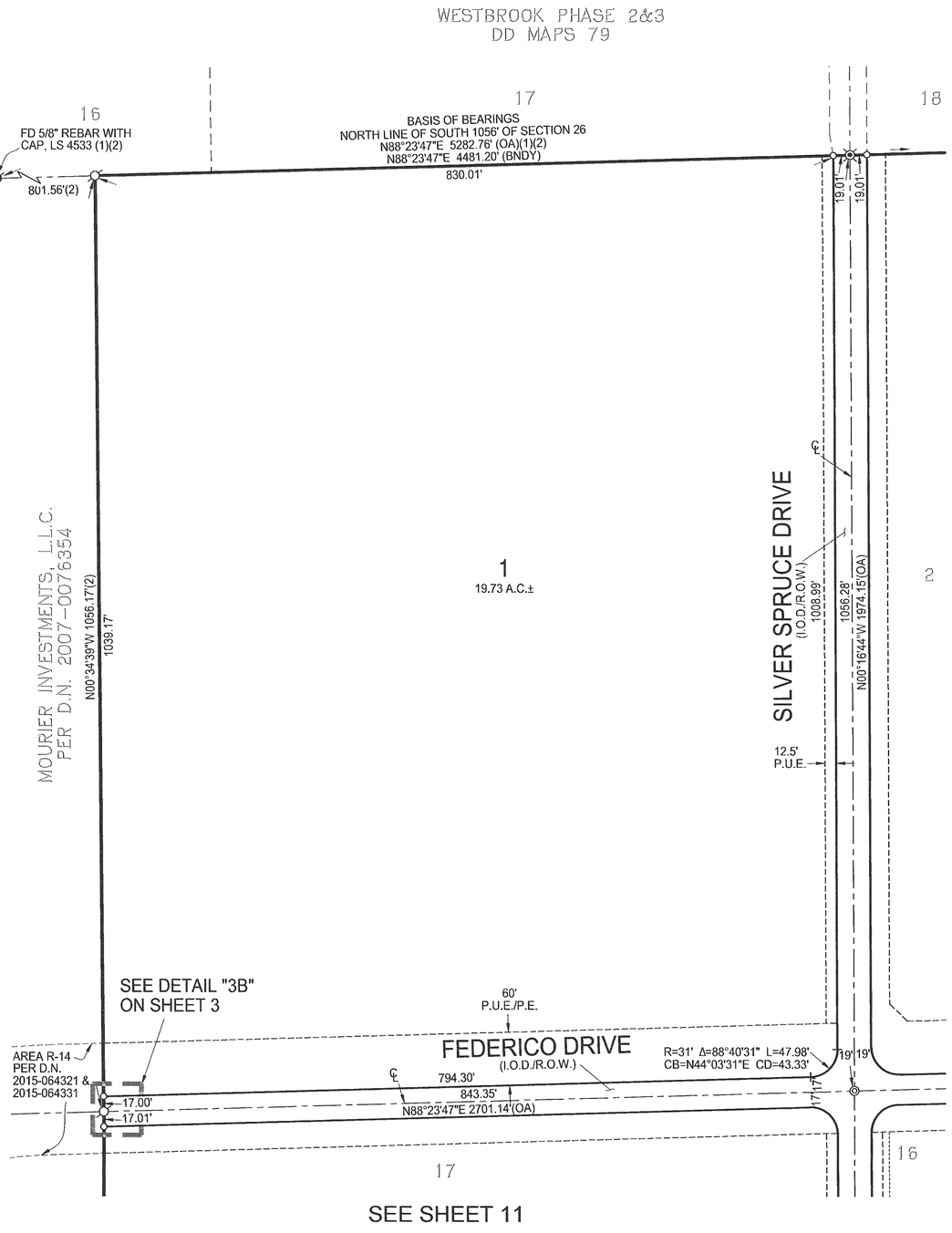

LEGEND

◆	FOUND SECTION CORNER AS NOTED
⊕	SECTION CORNER, NO MONUMENT FOUND OR SET
◪	FOUND QUARTER SECTION CORNER AS NOTED
⊞	QUARTER SECTION CORNER, NO MONUMENT FOUND OR SET
●	FOUND MONUMENT AS NOTED
⊙	FOUND 2" DISC STAMPED "LS 7820" IN STANDARD CITY OF ROSEVILLE MONUMENT WELL.(3)
⊗	FOUND COPPERWELD SURVEY MONUMENT WITH CENTER PUNCH IN MONUMENT WELL STAMPED "LS 7944"
⊙	FOUND 3/4" IRON PIPE W/ BRASS DISC STAMPED "LS 7820"(3)
◎	SET COPPERWELD SURVEY MONUMENT WITH CENTER PUNCH IN MONUMENT WELL STAMPED "LS 7944"
○	SET 3/4" IRON PIPE WITH PLASTIC PLUG STAMPED "LS 7944"
o	DIMENSION POINT (NOTHING FOUND OR SET)
AC.	ACRES
CB	CHORD BEARING
CD	CHORD DISTANCE
℄	CENTERLINE
D.N.	DOCUMENT NUMBER
E.E.	ELECTRICAL EASEMENT
I.O.D.	IRREVOCABLE OFFER OF DEDICATION
I.P.	IRON PIPE
M.A.E.	MAINTENANCE ACCESS EASEMENT
NAPOTS	NOT A PART OF THIS SURVEY
(OA)	OVERALL
O.R.	OFFICIAL RECORDS OF PLACER COUNTY
P.E.	PASEO EASEMENT
P.U.E.	PUBLIC UTILITY EASEMENT
(R)	RADIAL BEARING
R.O.W.	RIGHT OF WAY
S.F.	SQUARE FEET
S.L.T.M.	SMALL LOT TENTATIVE MAP
S.M.U.D.	SACRAMENTO MUNICIPAL UTILITY DISTRICT
L.L.T.M.	LARGE LOT TENTATIVE MAP
( )	DENOTES RECORD INFORMATION
(1)	SHEET INDEX

NOTES:

1. ALL CURVES ARE DIMENSIONED WITH RADIUS, DELTA, ARC LENGTH, CHORD BEARING AND CHORD LENGTH. CHORD LENGTHS MAY CONTAIN SOME ROUNDING ERROR. ALL DISTANCES SHOWN ARE FEET AND DECIMALS THEREOF.
2. TOTAL AREA FOR THIS SUBDIVISION IS 505.05± ACRES, CONSISTING OF 43 LARGE LOTS.
3. THE EASEMENT FOR TEMPORARY INGRESS / EGRESS EASEMENT GRANTED TO FRANK T. CHAN, TRUST OF THE FRANK T. CHAN FAMILY TRUST U/A DATED DECEMBER 8, 2003, ET AL, IN DEED RECORDED AUGUST 13, 2015, AS INSTRUMENT NO. 2015-0070559, OFFICIAL RECORDS OF PLACER COUNTY IS FULLY CONTAINED IN THE RIGHT OF WAY SHOWN HEREON.
4. THE CITY WILL NOT BE MAINTAINING LANDSCAPING ON LOTS 14, 34 & 37 SHOWN HEREON.
5. PURSUANT TO SECTION 66499.20.2 OF THE GOVERNMENT CODE, THE LANDS SHOWN HEREON, ARE HEREBY MERGED AND RESUBDIVIDED, AND THE FOLLOWING IRREVOCABLE OFFERS OF DEDICATION AND DRAINAGE EASEMENT THAT AFFECT THIS MAP ARE HEREBY ABANDONED:
   - A. AREA R-1, R-2, R-3, R-9, R-10, R-13, R-14, R-15 AND R-16 AS DESCRIBED IN THAT CERTAIN GRANT DEED RECORDED JULY 24, 2015 IN DOCUMENT NO. 2015-0064322, OFFICIAL RECORDS PLACER COUNTY.
   - B. AREA O-7, O-8, O-9, O-10, O-11, O-12 AND O-13 AS DESCRIBED IN THAT CERTAIN GRANT DEED RECORDED JULY 24, 2015 IN DOCUMENT NO. 2015-0064322, OFFICIAL RECORDS PLACER COUNTY.
   - C. AREA PQP-2, PQP-3, PQP-4 AND PQP-5 AS DESCRIBED IN THAT CERTAIN GRANT DEED RECORDED JULY 24, 2015 IN DOCUMENT NO. 2015-0064322, OFFICIAL RECORDS PLACER COUNTY.
   - D. AREA E-6, E-7, E-8, E-12, E-17 AND E-19 AS DESCRIBED IN THAT CERTAIN EASEMENT RECORDED JULY 24, 2015 IN DOCUMENT NO. 2015-0064332, OFFICIAL RECORDS PLACER COUNTY.
   - E. AREA R-1, R-2, R-3, R-9, R-10, R-13, R-14, R-15 AND R-16 AS DESCRIBED IN THAT CERTAIN EASEMENT RECORDED JULY 24, 2015 IN DOCUMENT NO. 2015-0064332, OFFICIAL RECORDS PLACER COUNTY.
   - F. A PORTION OF THAT CERTAIN DRAINAGE EASEMENT SHOWN AS SHOWN PARCEL 2 AND DESCRIBED IN EXHIBIT "B-1 AS DESCRIBED IN THAT CERTAIN GRANT OF EASEMENT RECORDED NOVEMBER 14, 2006 IN DOCUMENT NO. 2006-0122389, OFFICIAL RECORDS PLACER COUNTY, NOT SHOWN WITHIN LOT 7.

BASIS OF BEARINGS:

THE BEARING N 88°23'47" E, BEING THE NORTH LINE OF THE SOUTH 1056.00' OF SECTION 26 AS SHOWN ON THAT CERTAIN RECORD OF SURVEY ENTITLED "RECORD OF SURVEY NO. 3221" RECORDED JULY 24, 2015 IN BOOK 22 OF SURVEYS, AT PAGE 135, PLACER COUNTY RECORDS. DISTANCES SHOWN HEREON ARE GROUND DISTANCES.

REFERENCES:

(1) CC MAPS 85
(2) 22 R.S. 135
(3) DD MAPS 26
(4) DOC. NO. 2017-0038714

N

0 50 100 200

SCALE: 1"=100'

FINAL MAP OF

SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

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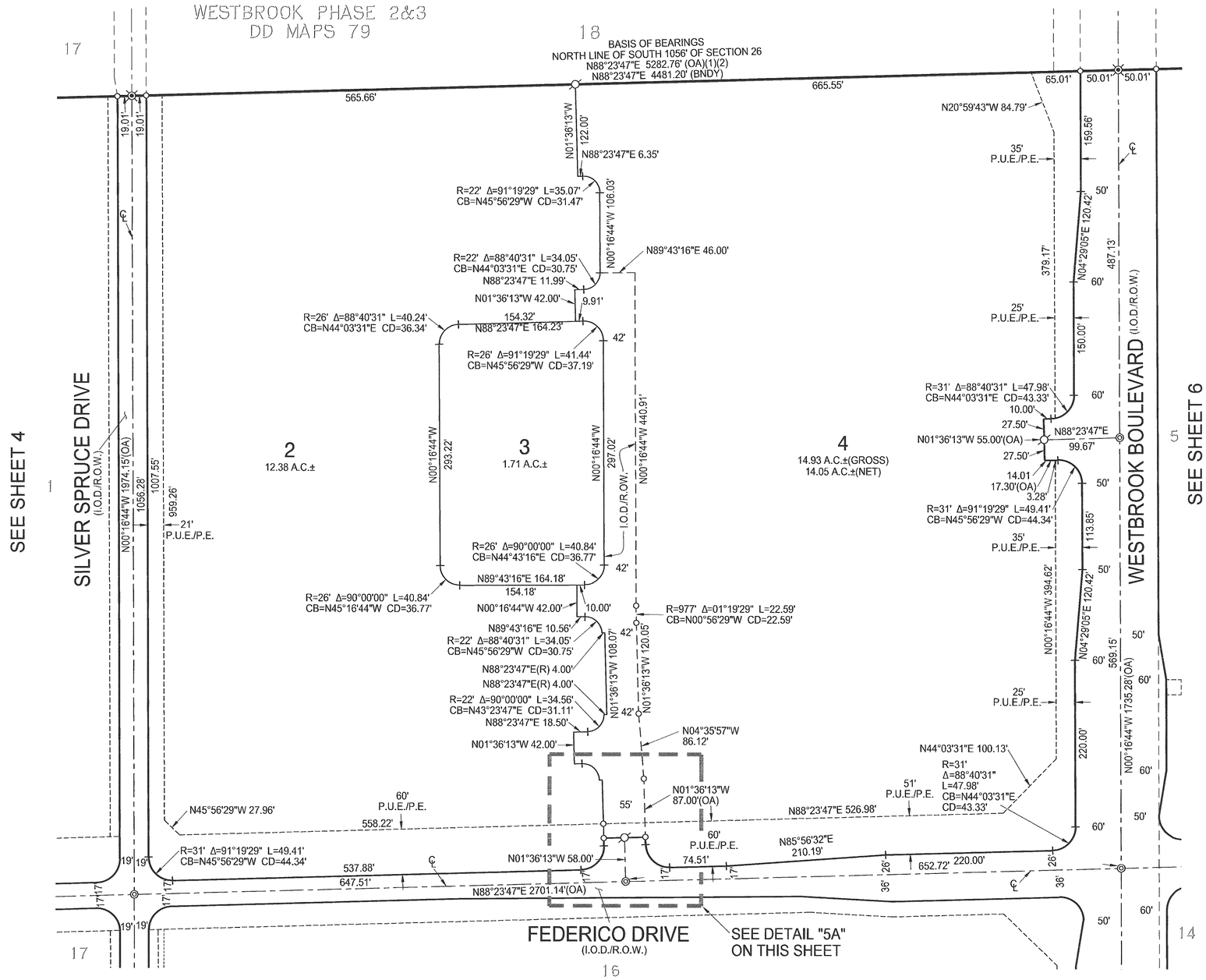
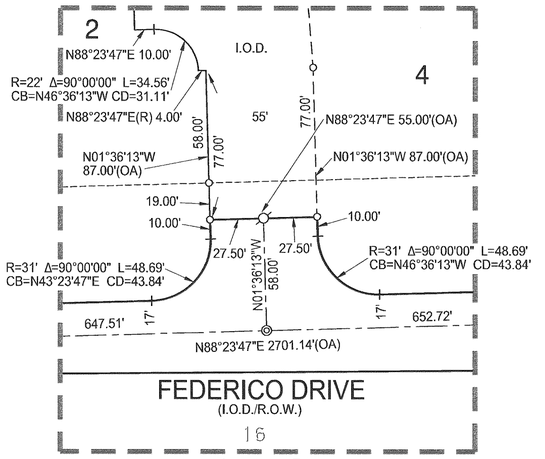
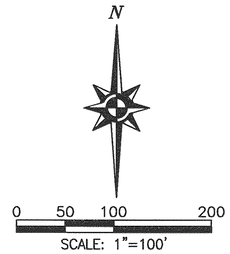
JANUARY 2018





DETAIL "5A"
N.T.S.



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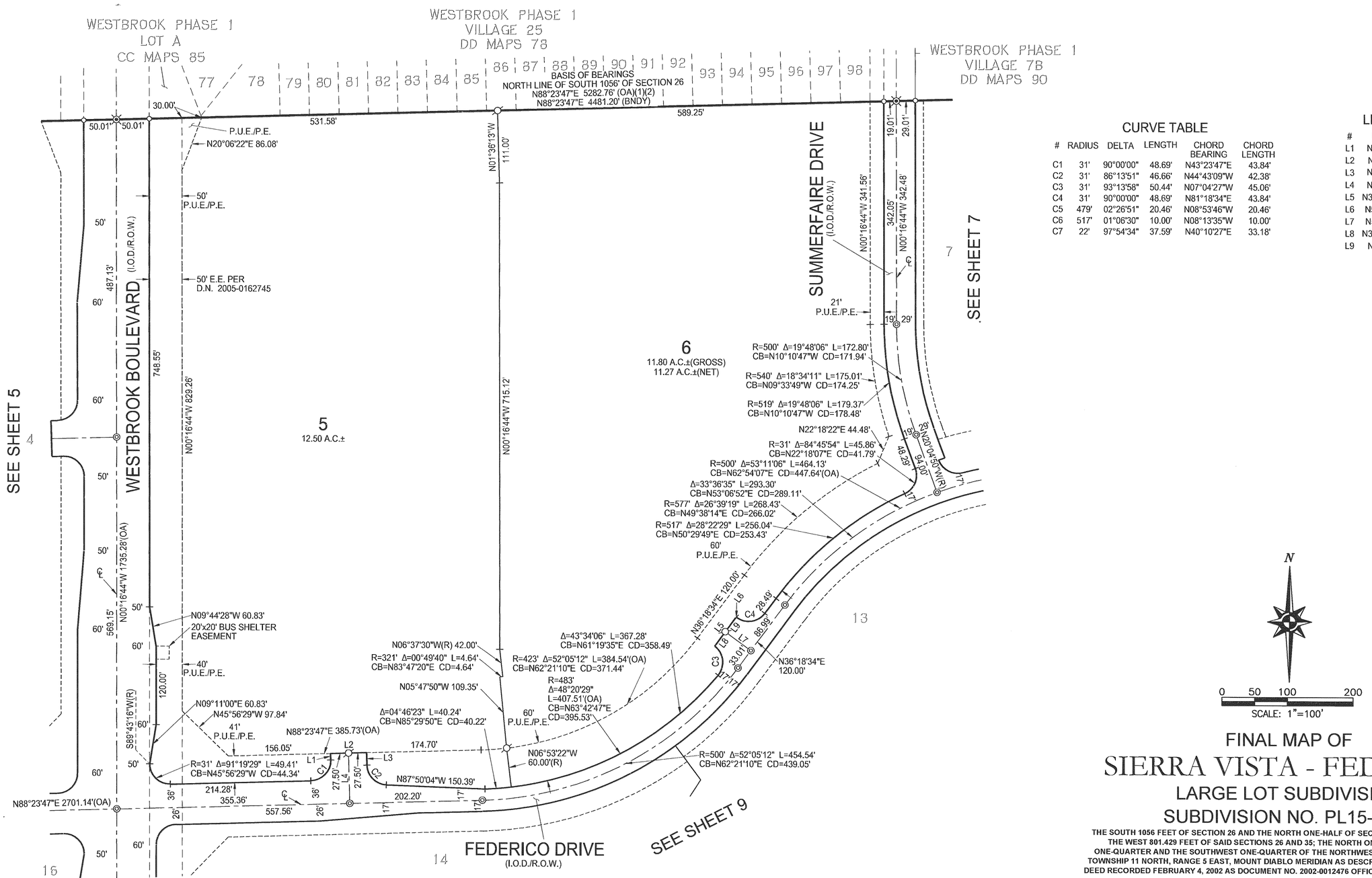

CURVE TABLE

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	31'	90°00'00"	48.69'	N43°23'47"E	43.84'
C2	31'	86°13'51"	46.66'	N44°43'09"W	42.38'
C3	31'	93°13'58"	50.44'	N07°04'27"W	45.06'
C4	31'	90°00'00"	48.69'	N81°18'34"E	43.84'
C5	479'	02°26'51"	20.46'	N08°53'46"W	20.46'
C6	517'	01°06'30"	10.00'	N08°13'35"W	10.00'
C7	22'	97°54'34"	37.59'	N40°10'27"E	33.18'

LINE TABLE

#	BEARING	LENGTH
L1	N01°36'13"W	10.00'
L2	N88°23'47"E	55.00'
L3	N01°36'13"W	19.16'
L4	N01°36'13"W	77.00'
L5	N36°18'34"E(R)	55.00'
L6	N53°41'26"W	0.72'
L7	N53°41'26"W	48.72'
L8	N36°18'34"E(R)	29.50'
L9	N36°18'34"E	29.50'

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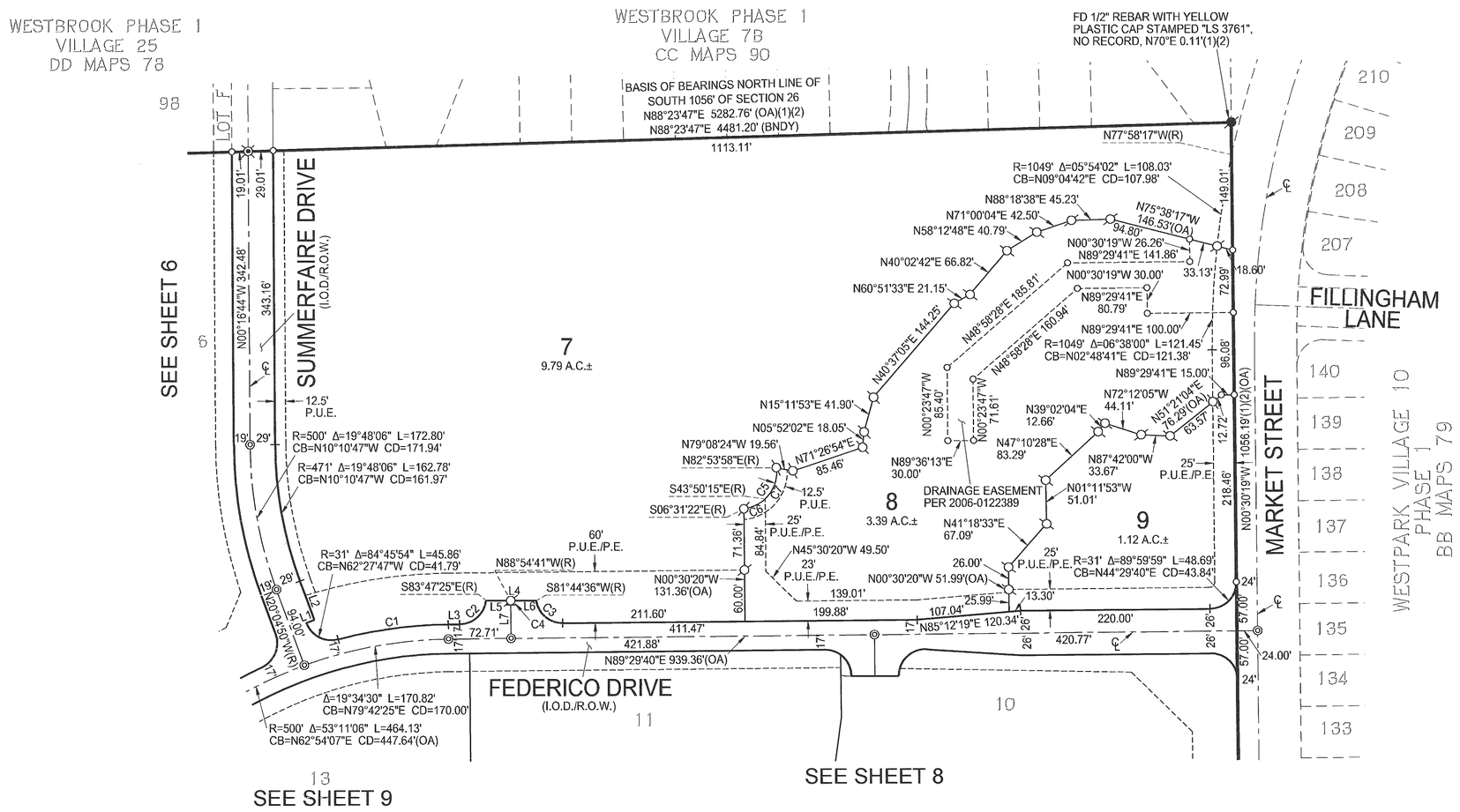

CURVE TABLE

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	517'	14°20'24"	129.40'	N82°19'28"E	129.06'
C2	31'	83°17'05"	45.06'	N47°51'07"E	41.20'
C3	31'	82°14'56"	44.50'	N49°22'52"W	40.78'
C4	250'	00°34'59"	2.54'	N00°47'50"W	2.54'
C5	43'	90°34'40"	67.98'	N38°11'18"E	61.12'
C6	43'	37°18'53"	28.00'	N64°49'12"E	27.51'
C7	43'	53°15'48"	39.97'	N19°31'52"E	38.55'

LINE TABLE

#	BEARING	LENGTH
L1	N69°55'10"E(R)	10.00'
L2	N20°04'50"W	48.29'
L3	N89°29'40"E	13.18'
L4	N89°57'30"W	58.20'
L5	N89°57'30"W	28.73'
L6	N89°57'30"W	29.47'
L7	N00°30'20"W	41.56'

N

0 50 100 200

SCALE: 1"=100'

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JANUARY 2018

SHEET 8 OF 23 18254.FED

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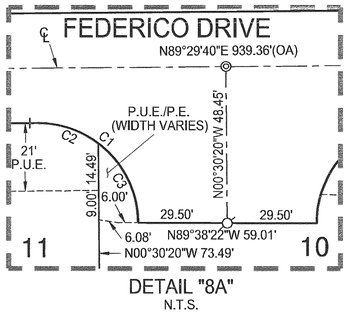
SCALE: 1"=100'



DETAIL "8A"
N.T.S.

SEE SHEET 7

SEE DETAIL "8A" ON THIS SHEET

FEDERICO DRIVE
(I.O.D./R.O.W.)

7 8 9

72.71' 421.88' 436.09' N89°29'40"E 939.36'(OA) 411.61' 420.77' 109.25' 220.00'

N86°12'59"W

N88°58'37"W 269.05'

N89°43'57"W 55.01'(OA)

N89°29'40"E(R)

N37°17'39"E(R)

S89°29'40"W(R)

24.47' 21.00' 21' P.U.E./P.E. 24.00'

N00°30'20"W 73.49'

N07°40'29"E 79.19'

N10°32'32"E 65.65'

N36°33'42"E 93.49'

N07°57'44"W 138.02'

N57°41'52"W 126.29'

N00°30'20"W 488.08' 467.08'

N35°04'49"W 63.75'

N38°29'54"E 129.05'

N63°28'49"W 67.96'

N13°10'51"W 92.70'

N64°13'33"W 123.20'

N45°28'48"E 102.71'

N65°04'39"E 164.95'

N53°33'38"E 83.61'

N16°50'56"E 46.67'

N01°52'29"E 33.45'

N32°20'52"E 115.87'

N47°36'55"E 79.73'

N88°03'55"E 139.31'

N32°24'38"E 71.33'

N42°26'21"E 31.08'

N54°17'35"E 57.31'

N85°30'27"W 55.68'

N73°48'43"W 52.11'

N02°37'38"E 143.41'

N43°39'58"E 270.37'(OA) 89.82'

N87°02'25"E 240.13'

N02°57'35"W 35.00'

35' E.E. PER D.N. 2005-0162745

35' E.E. PER D.N. 2005-0162745

29

13

SEE SHEET 9

SEE SHEET 9

10
7.70 A.C.±

11
10.92 A.C.±

12
17.51 A.C.±

30

31

SEE SHEET 17

N45°30'19"W 98.99'

R=31' Δ=90°00'01" L=48.69' CB=N45°30'21"W CD=43.84'

N00°30'19"W 1056.19'(1)(2)(OA)

N00°30'19"W 463.16'

405.66'

554.09'

53' P.U.E./P.E.

WESTPARK VILLAGE 10 PHASE 1 BB MAPS 79

136 135 134 133 132 131 130 129 128

FD 1-1/2" BRASS DISC ON A 3/4" IRON ROD SET IN CONCRETE STAMPED AS SHOWN. ACCEPTED AS SECTION CORNER PER (1)(2)(3)

T11N R5E 26 25 35 36 1967 RCE 13444

RE-SET WITH MONUMENT WELL AT CENTERLINE INTERSECTION FOR REFERENCE POINT STAMPED:

T11N R5E 26 25 35 36 2017 RP LS 7944

24.01' 23.98' N89°18'15"W 2639.76(BNDY)

N03°10'05"W 150.67' N00°30'19"W 207.94'

57.93'

60' P.U.E./P.E.

Δ=11°11'46" L=237.81' CB=N06°06'12"W CD=237.44'

N44°39'27"W 556.60'

MARKET STREET
(I.O.D./R.O.W.)

42

SEE SHEET 22

R=1217' Δ=19°36'36" L=416.53'(OA) CB=N10°18'37"W CD=414.50'

N78°17'55"E(R) 60.00'

N57°51'26"E 51.88'

N75°04'19"W 66.62'

N88°11'43"W 50.25'

N33°30'04"W 228.85'

Δ=08°24'49" L=178.71' CB=N15°54'30"W CD=178.55'

41

23' P.U.E./P.E.

S69°53'05"W(R)

77.67'

N17°42'11"W 105.66'(OA)

N66°14'46"E 54.27'

N40°51'50"W 53.28'

N57°05'51"E 72.52'

27.99'

N69°26'38"W 56.45'

N90°00'00"E 55.43'

S64°56'43"W(R)

51' P.U.E./P.E.

Δ=05°12'05" L=111.30' CB=N27°39'20"W CD=111.26'

515.01'

57.09'

S59°44'38"W(R)

R=1226' Δ=10°30'00" L=224.67' CB=N30°18'17"W CD=224.36'(OA)

R=1200' Δ=54°20'44" L=1138.21' CB=N27°40'41"W CD=1096.02'(OA)

N87°02'25"E 1743.05'

125' S.M.U.D. EASEMENT PER D.N. 935 O.R. 29

CURVE TABLE

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	31'	90°00'00"	48.69'	N45°30'20"W	43.84'
C2	31'	37°47'59"	20.45'	N71°36'21"W	20.08'
C3	31'	52°12'01"	28.24'	N26°36'21"W	27.28'
C4	31'	77°34'05"	41.97'	N54°59'59"E	38.84'
C5	31'	16°43'16"	9.05'	N07°51'18"E	9.01'
C6	31'	94°17'21"	51.02'	N46°38'20"E	45.45'

LINE TABLE

#	BEARING	LENGTH
L1	N00°30'20"W	48.37'
L2	N89°38'22"W	27.50
L3	N89°38'22"W	27.50

SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

CURVE TABLE

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	1450'	04°32'23"	114.89'	N03°20'10"W	114.86'
C2	1450'	02°29'20"	62.99'	N06°51'01"W	62.98'
C3	1450'	04°59'06"	126.16'	N10°35'14"W	126.12'
C4	1450'	07°07'32"	180.33'	N16°38'33"W	180.21'
C5	1450'	03°07'37"	79.14'	N21°46'08"W	79.13'
C6	1450'	05°14'48"	132.78'	N25°57'21"W	132.73'
C7	1450'	14°35'58"	369.47'	N12°54'20"W	368.48'

SEE SHEET 10

SEE SHEET 14

SEE SHEET 15

SEE SHEET 6

SEE SHEET 7

SEE SHEET 8

SEE SHEET 17

WESTBROOK BOULEVARD (I.O.D./R.O.W.)

FEDERICO DRIVE (I.O.D./R.O.W.)

SUMMERFAIRE DRIVE (I.O.D./R.O.W.)

SIERRA GLEN DRIVE (I.O.D./R.O.W.)

N.A.P.O.T.S.
CITY OF ROSEVILLE
PER D.N. 2017-0038714

14 — 7.04 A.C.±

15 — 21,943 S.F.±

13 — 16.28 A.C.±

28 — 3.19 A.C.±

16 · 5 · 6 · 7 · 23 · 25 · 29 · 11 · 12

N88°23'47"E 2701.14'(OA) 652.72' 569.15'

N00°16'44"W 1735.26'(OA) 678.99'

N00°16'44"W 220.00'

N44°03'31"E 100.13'

R=31' Δ=88°40'31" L=47.98' CB=N44°03'31"E CD=43.33'

N89°23'47"E 388.62' 355.36' 557.56'

N83°37'57"E 108.37'

139.85'

202.20'

N00°16'44"W 403.02'

N04°29'05"E 120.42'

N00°16'44"W 284.08' 122.81'

161.27'(4)

N89°43'16"E 239.65'(4) 189.65'

N89°43'16"E 23.90'

N57°26'47"E 48.14'

N53°21'56"E 60.66'

N54°39'03"E 93.31'

N50°26'01"E 66.08'

N70°54'34"E 56.03'

N61°49'11"E 87.33'

N12°52'20"E 33.89'

N67°11'35"E 46.50'

N48°48'36"E 59.64'

N19°09'50"E 79.85'

N19°13'45"E 70.81'

N46°13'47"E 38.64'

N32°20'22"E 103.17'

N36°35'07"W(R) 65.00'

R=500' Δ=52°05'12" L=454.54' CB=N62°21'10"E CD=439.05'

Δ=34°58'53" L=315.65' CB=N70°54'20"E CD=310.77'

R=547' Δ=34°58'53" L=333.97' CB=N70°54'20"E CD=328.80'

R=517' Δ=52°05'12" L=470.00' CB=N62°21'10"E CD=453.98'(OA)

Δ=17°06'19" L=154.35' CB=N44°51'44"E CD=153.77'

Δ=33°36'35" L=293.30' CB=N53°06'52"E CD=289.11'

N20°04'50"W(R)

N36°18'34"E 120.00'

R=483' Δ=53°11'06" L=448.35' CB=N62°54'07"E CD=432.42'

R=500' Δ=53°11'06" L=464.13'(OA) CB=N62°54'07"E CD=447.64'

Δ=19°34'30" L=170.82' CB=N79°42'25"E CD=170.00'

N89°29'40"E 24.47'

N89°29'40"E 939.36'(OA)

N00°30'20"W 488.08'(OA) 467.08'

N00°16'44"W 1735.26'(OA) 740.90'

R=1500' Δ=28°18'01" L=741.01' CB=N14°25'44"W CD=733.39'(OA)

R=1450' Δ=28°18'01" L=716.20' CB=N14°25'44"W CD=708.94'(OA)

N89°43'16"W(4) 151.51'(4)

N89°43'16"W(R) 229.42'

S89°56'01"W(R)

R=1450' Δ=00°47'14" L=19.93' CB=N0°40'21"W CD=19.93'(OA)

S00°16'44"E 151.66'(4)

N47°00'48"E 43.55'(4)

21.91'

N87°02'25"E 117.05'

S84°23'39"W(R)

N27°31'53"E 120.83'

N87°02'25"E 167.10'

416.17'

417.30'

N87°02'25"E 694.48'

S69°47'40"W(R)

52.44'

N43°39'58"E 270.37'

180.55'

89.82'

N02°37'38"E 143.41'

N73°48'43"W 52.11'

N85°30'27"W 55.68'

N42°26'21"E 31.08'

N32°24'38"E 71.33'

N54°17'35"E 57.31'

N89°03'55"E 139.31'

N47°38'55"E 79.73'

N32°20'52"E 115.87'

N53°33'38"E 83.61'

N16°50'56"E 46.67'

N01°52'29"E 33.45'

N65°04'39"E 164.95'

N45°28'48"E 102.71'

N38°29'54"E 129.05'

263.74'

N87°02'25"E 413.74'(OA)

N02°57'35"W 211.11'

N87°02'25"E 277.18'

N87°02'25"E 240.13'

N02°57'35"W 35.00'

N02°57'35"W 375.00'

N02°57'35"W 103.45'(OA)

N19°08'03"W(R)

R=600' Δ=36°59'07" L=387.37' CB=N68°32'51"E CD=380.62'(OA)

Δ=16°10'27" L=174.74' CB=N78°57'11"E CD=174.16'

N61°25'15"E 211.00'(OA) 230.96'

352.76'(OA) 173.96'

N28°34'45"W

R=500' Δ=11°21'58" L=99.19' CB=N55°44'16"E CD=99.03'

R=474' Δ=11°21'58" L=94.03' CB=N55°44'16"E CD=93.88'

R=31' Δ=90°00'00" L=48.69' CB=N73°34'45"W CD=43.84'

Δ=09°22'25" L=211.92' CB=N24°23'32"W CD=211.73'

N45°57'19"W 42.58'

N89°23'33"W 157.64'

N33°59'00"W(R) 12.5' P.U.E./P.E. N57°02'51"E 85.00'

N50°03'17"E 82.71' 102.79'

150.00' 250' TOWER EASEMENT PER D.N. 612 O.R. 534

125' SMUD EASEMENT PER D.N. 935 O.R. 29

50' E.E. PER D.N. 2005-0162745

35' E.E. PER D.N. 2005-0162745

50' P.U.E./P.E. SEE NOTE 4 ON SHEET 4

30' P.U.E./P.E. SEE NOTE 4 ON SHEET 4

40' P.U.E./P.E.

21' P.U.E./P.E.

50' P.U.E./P.E.

50' P.U.E./L.S.E.(4)

21' P.U.E./P.E.

FINAL MAP OF

SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

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N

0 50 100 200

SCALE: 1"=100'

JANUARY 2018

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SEE SHEET 5

SEE SHEET 11

SEE SHEET 9

SEE SHEET 14

FEDERICO DRIVE
(I.O.D./R.O.W.)

SILVER SPRUCE DRIVE
(I.O.D./R.O.W.)

WESTBROOK BOULEVARD
(I.O.D./R.O.W.)

16
24.44 A.C.±

17

18

23

14

15

28

1

2

4

843.35'

647.51'

N88°23'47"E 2701.14'(OA)

378.75'

N89°32'31"E 450.09'

N88°23'47"E 858.40'

652.72'

N86°50'24"W

220.00'

120.42'

N86°50'24"W
108.37'

N88°23'47"E 147.09'

569.15'

557.56'

R=31' Δ=88°40'31" L=47.98'
CB=N44°03'31"E CD=43.33'

30'
P.U.E./P.E.

20'
P.U.E./P.E.

N45°56'29"W 97.84'

R=31' Δ=91°19'29" L=49.41'
CB=N45°56'29"W CD=44.34'

N89°43'16"E(R)

N09°11'00"E 60.83'

120.00'

25'
P.U.E./P.E.

N09°44'28"W 60.83'

N00°16'44"W 551.01'

678.99'

N00°16'44"W 1735.28'(OA)

370.10'

35'
P.U.E./P.E.

12.5'
P.U.E.

20'
P.E.

N00°16'44"W 1974.15'(OA)

917.87'

871.01'(OA)

862.21'

20.02'

8.80'

728.37'

N87°02'25"E 1245.45'(OA)

N68°47'33"E 73.12'

N82°23'12"E 147.95'

N61°53'04"W 42.23'

N58°06'47"W
22.92'

225.17'

190.05'

35.12'

S82°14'14"W(R)

125' S.M.U.D. EASEMENT
PER D.N. 935 O.R. 29

N87°02'25"E 1274.39'

R=900' Δ=08°18'47" L=130.58'
CB=N03°52'39"E CD=130.47'(OA)

R=919' Δ=08°18'47" L=133.34'
CB=N03°52'39"E CD=133.22'(OA)

Δ=07°29'02" L=202.46'
CB=N04°01'15"W CD=202.31'

R=1585' Δ=07°22'39" L=204.09'
CB=N03°58'04"W CD=203.95'

R=1500' Δ=28°08'01" L=740.90'
CB=N14°25'44"W CD=733.39'(OA)

R=1550' Δ=28°18'01" L=765.59'
CB=N14°29'44"W CD=757.84'(OA)

R=1550' Δ=14°12'10" L=384.23'
CB=N14°51'51"W CD=383.24'

N.A.P.O.T.S.
CITY OF ROSEVILLE
PER D.N. 2017-0038714

N

0 50 100 200
SCALE: 1"=100'

SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

FINAL MAP OF
SIERRA VISTA - FEDERICO
LARGE LOT SUBDIVISION
SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

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JANUARY 2018

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BOOK EE OF MAPS, PAGE 6

SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

SEE SHEET 4

AREA R-14 PER DOC. No. 2015-064321 & 2015-064331

17.00'
17.01'

843.35'
N88°23'47"E 2701.14'(OA)
792.68'

30' P.U.E./P.E.

FEDERICO DRIVE
(I.O.D./R.O.W.)

R=31' Δ=91°19'29" L=49.41'
CB=N45°56'29"W CD=44.34'

19' 19' 17' 17'

MOURIER INVESTMENTS, L.L.C.
PER 2007-0076354

913.09'

17
17.12 A.C.±

12.5' P.U.E.

861.68'
917.87'
N00°16'44"W 1974.15'(OA)

SILVER SPRUCE DRIVE
(I.O.D./R.O.W.)

SEE SHEET 10

AREA E-19 PER D.N. 2015-064331

815.71'
N87°02'25"E 828.22'(OA)

125' S.M.U.D. EASEMENT PER D.N. 935 O.R. 29

25' P.U.E.

12.51'
7.02'

R=881' Δ=08°18'47" L=127.82'
CB=N03°52'39"E CD=127.71'

R=900' Δ=08°18'47" L=130.58'
CB=N03°52'39"E CD=130.47'

AREA E-6 PER D.N. 2015-064331

207.99'

N87°02'25"E

12.5' P.U.E.

188.12'
N08°02'03"E 188.12'

AREA R-1 PER D.N. 2015-064321 & D.N. 2015-064331

N74°18'22"E(R)

250' USA EASEMENT PER D.N. 612 O.R. 534

18
7.55 A.C.±

Δ=03°34'13" L=57.27'
CB=N06°14'56"E CD=57.26'

R=900' Δ=32°59'30" L=518.23'
CB=N08°27'42"W CD=511.10'(OA)

12.60'

554.06'
N87°02'25"E 566.66'(OA)

N85°32'10"W(R)

SEE SHEET 14

C1
C2
C3

309.89'

N00°04'57"W 2654.00'(2)(OA)

40' P.U.E./P.E.

R=2061'
Δ=15°03'24"
L=541.61'
CB=N08°09'56"W
CD=540.05'(OA)

N02°57'35"W 165.00'

R=919' Δ=32°59'30" L=529.17'
CB=N08°27'42"W CD=521.89'(OA)

N82°53'18"E(R)

61'

40.07'

124.29'

N87°02'25"E 260.78'(OA)

N83°38'45"E(R)

SANTUCCI BOULEVARD
(I.O.D./R.O.W.)

R=2000' Δ=06°28'29" L=226.01'
CB=N03°52'28"W CD=225.89'(OA)

SEE SHEET 12

CURVE TABLE

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	2061'	04°36'40"	165.86'	N08°39'35"W	165.82'
C2	2061'	04°43'44"	170.10'	N13°19'46"W	170.05'
C3	2061'	09°20'23"	335.96'	N11°01'26"W	335.59'

N

0 50 100 200

SCALE: 1"=100'

FINAL MAP OF
SIERRA VISTA - FEDERICO
LARGE LOT SUBDIVISION
SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

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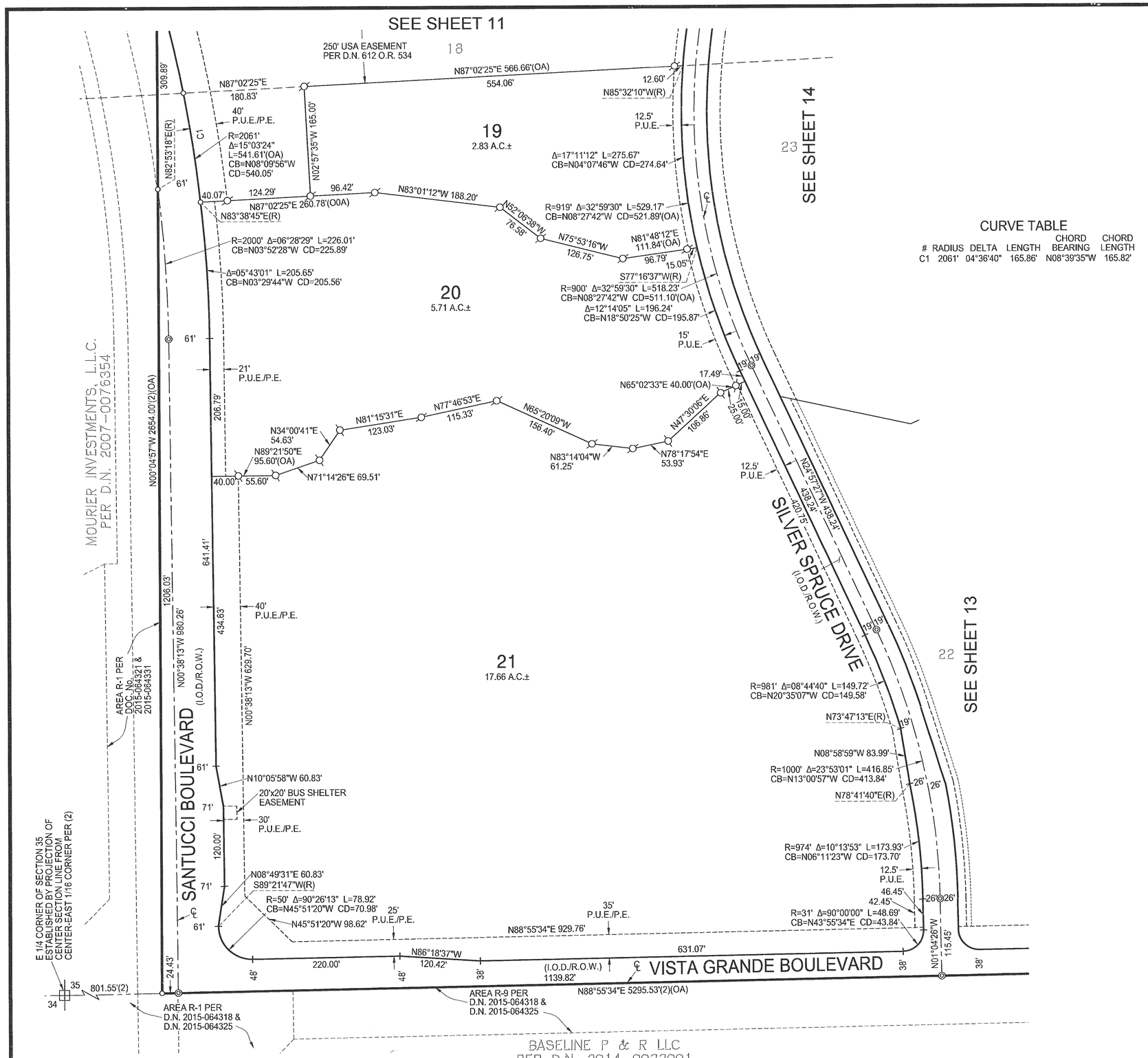
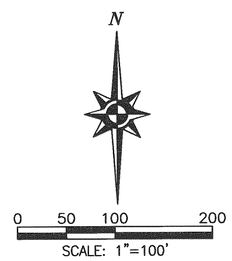


CURVE TABLE

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	2061'	04°36'40"	165.86'	N08°39'35"W	165.82'



FINAL MAP OF SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

SUBDIVISION NO. PL15-0192

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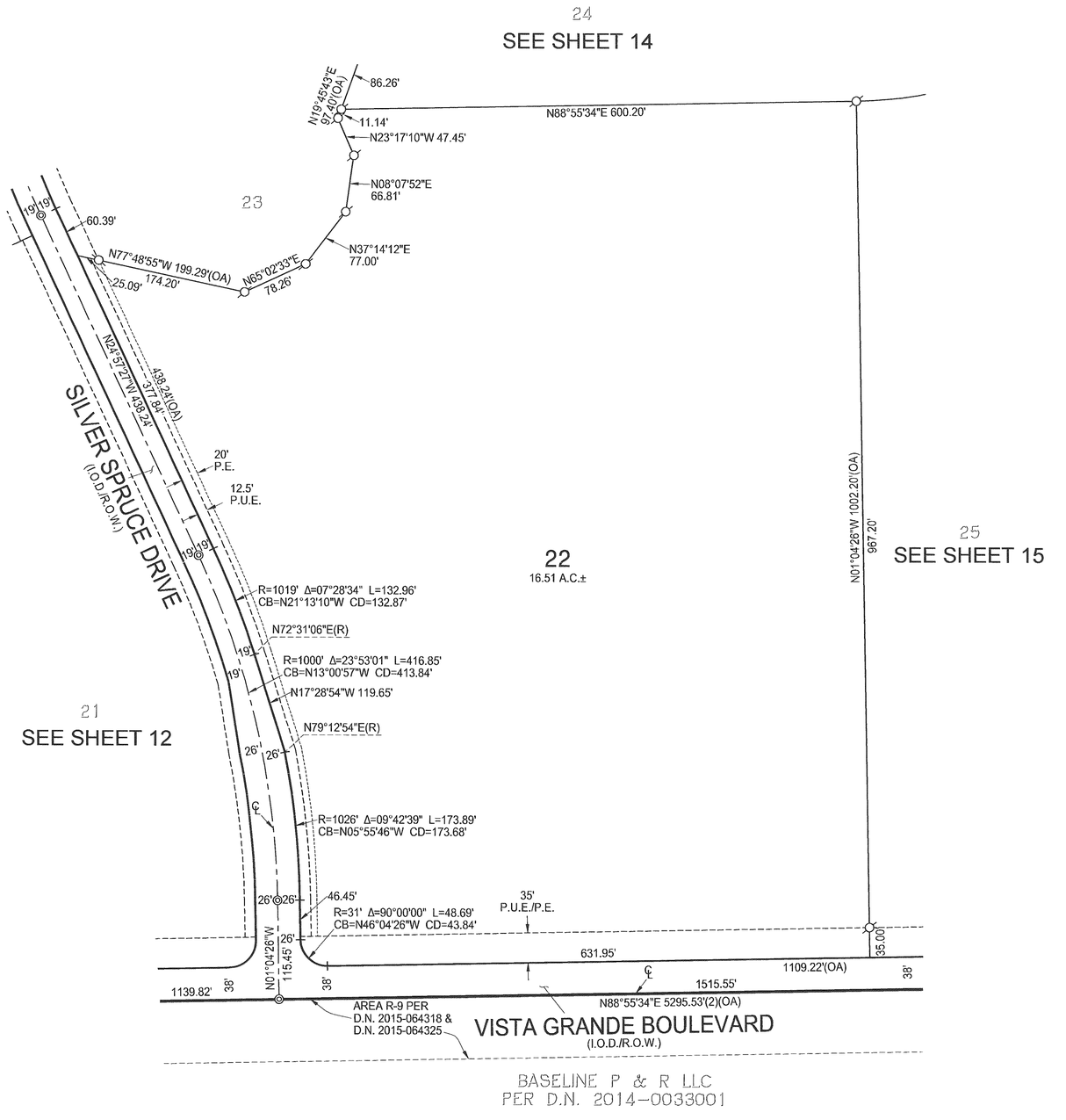

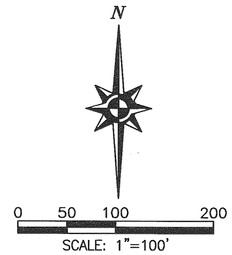

FINAL MAP OF

SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

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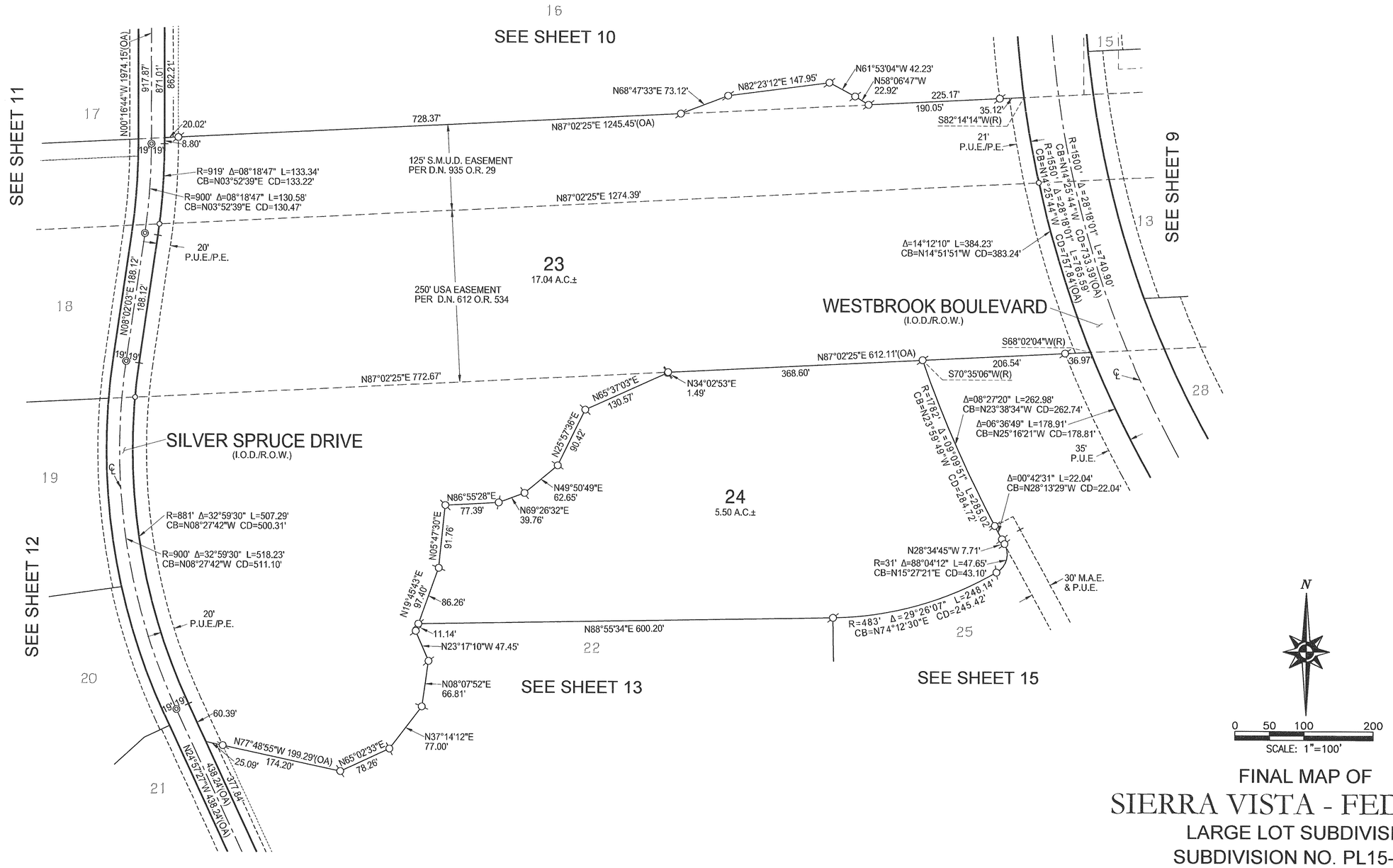

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SCALE: 1"=100'

FINAL MAP OF

SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

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SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

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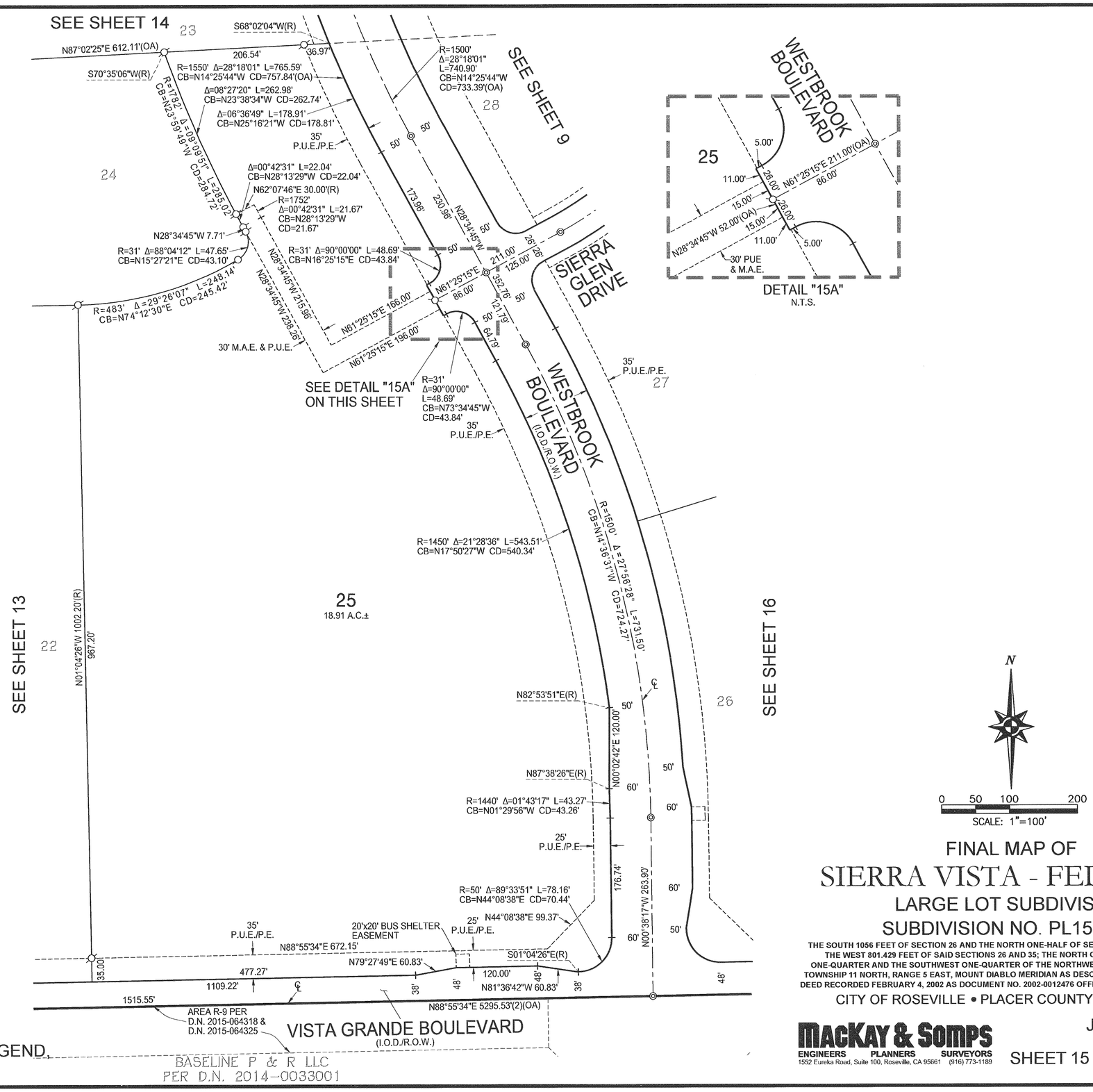

SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

N

0 50 100 200

SCALE: 1"=100'

FINAL MAP OF
SIERRA VISTA - FEDERICO
LARGE LOT SUBDIVISION
SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

CITY OF ROSEVILLE • PLACER COUNTY • CALIFORNIA

JANUARY 2018

MacKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

BOOK EE OF MAPS, PAGE 6

SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

SEE SHEET 17

SEE SHEET 9

SEE SHEET 18

SEE SHEET 19

SEE SHEET 15

SEE SHEET 25

SEE SHEET 34

SIERRA GLEN DRIVE
(I.O.D./R.O.W.)

WESTBROOK BOULEVARD
(I.O.D./R.O.W.)

VISTA PARK DRIVE
(I.O.D./R.O.W.)

VISTA GRANDE BOULEVARD
(I.O.D./R.O.W.)

27
19.23 A.C.±

26
20.46 A.C.±

N87°02'25"E 1106.51'(OA)
927.46'
877.18'

R=600' Δ=36°59'07" L=387.31'
CB=N68°32'51"E CD=380.62'

R=581' Δ=31°36'19" L=320.49'
CB=N71°14'15"E CD=316.44'

R=31' Δ=92°33'17" L=50.08'
CB=N46°40'57"W CD=44.81'

N34°33'54"W(R)
N47°03'37"E 85.00'
N50°03'17"E 102.79'

R=526' Δ=11°21'58" L=104.35'
CB=N55°44'16"E CD=104.17'
R=500' Δ=11°21'58" L=99.19'
CB=N55°44'16"E CD=99.03'

R=31' Δ=90°00'00" L=48.69'
CB=N16°25'15"E CD=43.84'

N28°34'45"W 250.96'
N61°25'15"E 86.00'
211.00'
125.00'
352.76'(OA)
121.79'
64.79'
44.00'

35' P.U.E./P.E.

Δ=11°28'49" L=310.57'
CB=N22°50'20"W CD=310.05'

R=1500' Δ=27°56'28" L=731.50'
CB=N14°36'31"W CD=724.27'

N72°54'04"E(R) 169.56'(OA)
134.56'
35.00'

N88°55'34"E 1154.21'(OA)
1141.71'

R=1550' Δ=25°10'22" L=680.99'(OA)
CB=N15°59'34"W CD=675.53'

Δ=13°41'33" L=370.42'
CB=N10°15'09"W CD=369.54'

R=1585' Δ=16°27'39" L=455.36'
CB=N08°52'06"W CD=453.80'

N86°35'37"E(R)
N11°42'26"W 61.14'
N88°48'58"E(R)
20'x20' BUS SHELTER EASEMENT
R=1560' Δ=00°32'45" L=14.86'
CB=N00°54'39"W CD=14.86'

N00°38'17"W 263.90'
N08°49'27"E 60.83'
105.14'
N00°38'17"W 120.26'

S89°21'43"W(R)
R=50' Δ=90°26'09" L=78.92'
CB=N45°51'22"W CD=70.98'
N45°51'22"W 98.62'

N86°18'37"W 120.42'
220.00'
1515.55'
1317.25'
820.31'
496.93'

N04°16'21"E 110.37'
613.63'
965.14'
N00°24'18"W 1415.68'
351.51'
220.00'

R=31' Δ=89°19'52" L=48.33'
CB=N44°15'38"E CD=43.58'

N88°55'34"E 5295.53'(2)(OA)

AREA R-9 PER D.N. 2015-064318 & D.N. 2015-064325

AREA R-2 PER D.N. 2015-064318 & D.N. 2015-064325

AREA R-10 PER D.N. 2015-064318 & D.N. 2015-064325

BASELINE P & R LLC
PER D.N. 2014-0033001

12.5' P.U.E.
20' P.U.E./P.E.
12.50'

N

0 50 100 200
SCALE: 1"=100'

FINAL MAP OF
SIERRA VISTA - FEDERICO
LARGE LOT SUBDIVISION
SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

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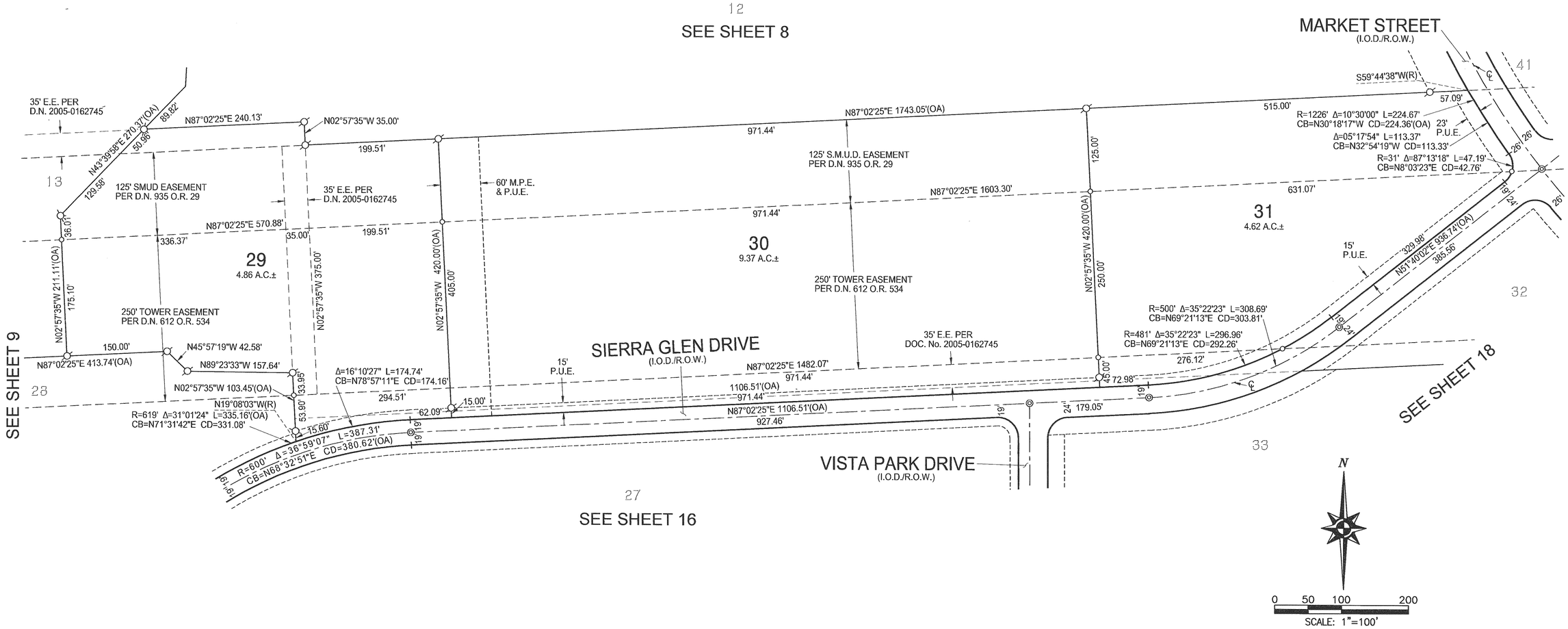
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

JANUARY 2018

 18254.FED



FINAL MAP OF

SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

CITY OF ROSEVILLE • PLACER COUNTY • CALIFORNIA

JANUARY 2018

SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

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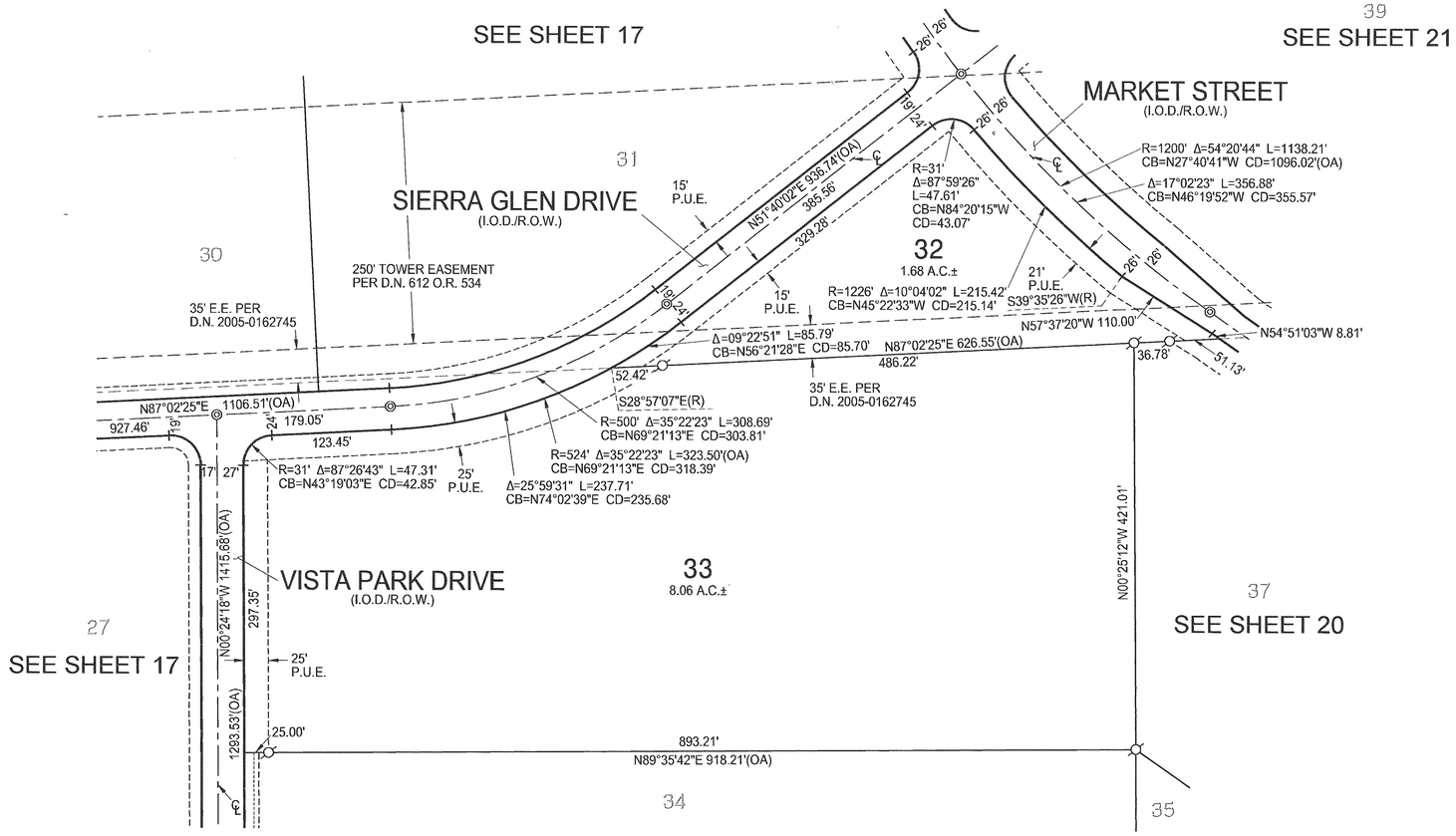

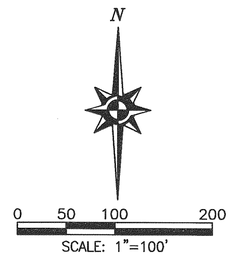

FINAL MAP OF

SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

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SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

SEE SHEET 18

33

25.00'

893.21'

N89°35'42"E 918.21'(OA)

421.01'

N54°51'03"W 525.87'

37

SEE SHEET 20

27

17'

27'

1293.53'(OA)

12.5'
P.U.E.

10'
P.E.
SEE NOTE 4
ON SHEET 4

SEE SHEET 16

N00°24'18"W 1415.68'(OA)

996.18'

34
21.59 A.C.±

N00°25'12"W 1446.95'(OA)

975.94'

129.35'

R=800' Δ=54°25'51" L=760.00'
CB=N27°38'08"W CD=731.74'(OA)

N00°25'12"W 165.80'

391.92'

N89°54'32"W 422.15'(OA)

30.23'

N83°11'08"E(R)

15'
P.U.E.

R=783.00' Δ=054°25'51" L=743.85'(OA)
CB=N27°38'08"W CD=716.19'

Δ=06°23'40" L=87.38'
CB=N03°37'02"W CD=87.34'

VISTA PARK DRIVE
(I.O.D./R.O.W.)

MARKET STREET
(I.O.D./R.O.W.)

136.01'

N03°52'09"E 120.34'

1340.64'(2)(3)(OA)

13
DD MAPS 26

26

17'

35
8.59 A.C.±

N00°25'12"W 723.87'(OA)

544.52'

36
5.71 A.C.±

26'
P.U.E.

545.52'

N00°25'12"W

220.00'

27'

27'

℄

R=31' Δ=90°40'08" L=49.06'
CB=N45°44'22"W CD=44.10'

35'
P.U.E.

VISTA GRANDE BOULEVARD
(I.O.D./R.O.W.)

50'
P.U.E.

40'
P.U.E.

20'x20' BUS SHELTER
EASEMENT

R=31' Δ=90°30'41" L=48.97'
CB=N44°50'08"E CD=44.04'

N80°37'44"E 60.83'

S00°05'28"W(R)

146.74'

120.00'

N80°26'48"W 60.83'

50.00'

50.00'

448.66'

427.77'

1023.16'

438.51'

496.93'

1317.25'

38'

48'

N88°55'34"E 5295.53'(2)(OA)

N89°54'32"W 1320.39(2)

AREA R-10 PER
D.N. 2015-064318 &
D.N. 2015-064325

AREA R-10 PER
D.N. 2015-064323 &
D.N. 2015-064333

AREA E-10 PER
D.N. 2015-064333

AREA R-3 PER
D.N. 2015-064323 &
D.N. 2015-064333

BASELINE P & R LLC
PER D.N. 2014-0033001

BARBACCIA TRUST
PER D.N. 2004-0153428
PARCEL A
15 P.M. 143

DF PROPERTIES
PER 32 O.R. 693
PARCEL B
15 P.M. 143

FD 2" ALUMINUM MONUMENT
STAMPED AS WEST 1/4 COR FOR
SECTION 35 PER(2)

T11N R5E
35 | 36
2005 RCE 45333

RE-SET WITH MONUMENT WELL
STAMPED:

T11N R5E
35 | 36
2017 LS 7944

N

0 50 100 200

SCALE: 1"=100'

SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

FINAL MAP OF
SIERRA VISTA - FEDERICO
LARGE LOT SUBDIVISION
SUBDIVISION NO. PL15-0192

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JANUARY 2018

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SEE SHEET 18

SEE SHEET 21

SEE SHEET 19

N87°02'25"E 100.17'

N87°02'25"E 2050.82'(OA)
1953.60'

35' E.E. PER D.N. 2005-0162745

N87°02'25"E
36.78'
51.13'
35.64'
8.81'
97.22'

60' P.U.E./P.E.

30' P.U.E./P.E. SEE NOTE 4 ON SHEET 4

N54°51'03"W 563.91'
540.17'
548.99'(OA)

MARKET STREET
(I.O.D./R.O.W.)

N00°23'36"E 328.72'
AREA E-20(2)
N00°23'36"E 334.58'

25.00'
100.00'
512.00'(3)
1195.12'
808.12'(3)
N89°36'24"W 1320.12'(2)(3)

268.05'(3)
N00°26'07"W 1333.68'(2)(OA)

N00°25'12"W 1446.95'(OA)
421.01'

1025.94'

N54°51'03"W 525.87'

R=817'
Δ=42°43'20"
L=609.19'
CB=N33°29'23"W
CD=595.18'

629.32'

Δ=48°02'12" L=656.46'
CB=N30°49'58"W CD=637.41'
R=800' Δ=54°25'51" L=760.00'
CB=N27°38'08"W CD=731.74'
R=783' Δ=54°25'51" L=743.85'
CB=N27°38'08"W CD=716.19'(OA)

N77°52'16"E(R)

N00°25'12"W 1340.64'(2)(3)(OA)

SEE DETAIL "20A" ON THIS SHEET

N00°25'12"W 723.87'(OA)
129.35'
594.52'

165.80'
N83°11'08"E(R)
391.92'
N89°54'32"W 422.15'(OA)
15' P.U.E.

Δ=06°23'40" L=87.38'
CB=N03°37'02"W CD=87.34'

32
33
34
35
36
37
38
39
11 DD MAPS 26
12 DD MAPS 26
13 DD MAPS 26
14 DD MAPS 26
9 DD MAPS 26

37
8.74 A.C.±

38
12.06 A.C.±

R=800' Δ=54°25'51" L=760.00'
CB=N27°38'08"W CD=731.74'(OA)
R=783' Δ=54°25'51" L=743.85'
CB=N27°38'08"W CD=716.19'(OA)
N77°52'16"E(R)
N89°54'32"W 422.15'(OA)
30.23'
N83°11'08"E(R)
165.80'
N00°25'12"W 1340.64'(2)(3)(OA)
545.52'

DETAIL "20A"
N.T.S.

N

0 50 100 200
SCALE: 1"=100'

FINAL MAP OF

SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

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SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

BRANSTON DRIVE
(I.O.D./R.O.W.)

SIERRA GLEN DRIVE
(I.O.D./R.O.W.)

SIERRA GLEN DRIVE
(I.O.D./R.O.W.)

MARKET STREET
(I.O.D./R.O.W.)

SEE SHEET 22

SEE SHEET 23

SEE SHEET 18

SEE SHEET 20

SEE SHEET 20

SEE DETAIL "21A" ON THIS SHEET

R=1050' Δ=11°36'41" L=212.79'
CB=N76°22'41"E CD=212.42'

N07°48'59"W 95.49'

R=1050' Δ=22°11'19" L=406.63'
CB=N86°43'20"W CD=404.09'

R=500' Δ=33°21'12" L=291.06'
CB=N68°20'38"E CD=286.97'

N85°01'14"E 103.90'

103.90'

N70°34'20"E 100.00'

100.00'

R=481' Δ=33°21'12" L=280.00'
CB=N68°20'38"E CD=276.07'

R=750' Δ=14°26'53" L=189.13'
CB=N77°47'47"E CD=188.63'

R=769' Δ=14°26'53" L=193.92'
CB=N77°47'47"E CD=193.40'

R=1031' Δ=33°47'59" L=608.21'
CB=N87°28'20"E CD=599.42'

R=1050' Δ=33°47'59" L=619.41'
CB=N87°28'20"E CD=610.47'(OA)

15' P.U.E.

DRAINAGE EASEMENT
PER DOC. No. 2006-0122389
SEE SHEET 23

N75°37'40"W 256.37'

256.37'

N86°25'23"W 152.38'

152.38'

R=750' Δ=10°47'43" L=141.31'
CB=N81°01'32"W CD=141.10'

R=769' Δ=10°47'43" L=144.89'
CB=N81°01'32"W CD=144.67'

R=481' Δ=16°35'06" L=139.23'
CB=N78°07'50"W CD=138.74'

R=500' Δ=15°46'08" L=137.61'
CB=N78°32'19"W CD=137.17'

N87°02'25"E 2169.57'(OA)
2143.66'

125' S.M.U.D. EASEMENT
PER D.N. 935 O.R. 29

N87°02'25"E

250' TOWER EASEMENT
PER D.N. 612 O.R. 534

N87°02'25"E 2050.82'(OA)
1953.60'

35' E.E. PER
D.N. 2005-0162745

N87°02'25"E 100.17'

AREA E-20(2)

N00°23'36"E 328.72'

N00°23'36"E 334.58'

25.00'

100.00'

1195.12'(OA)

512.00'(3)

N89°36'24"W 1320.12'(2)(3)(OA)

N00°26'07"W 1333.68'(2)(3)

168.15'

125.12'

410.40'(3)

250.24'

135.03'

268.05'(3)

N51°40'02"E 996.74'(OA)

493.57'

311.08'

182.49'

25.91'

R=31' Δ=91°57'33" L=49.75'
CB=N05°41'16"E CD=44.58'

23' P.U.E.

R=1174' Δ=10°45'09" L=220.32'
CB=N45°40'05"W CD=220.00'

R=1200' Δ=17°02'23" L=356.88'
CB=N46°19'52"W CD=355.57'

S38°57'20"W(R)

N48°48'10"W 110.00'

35.64'

97.22'

532.46'(OA)
496.82'

N54°51'03"W 563.91'

60' P.U.E./P.E.

41 42 43 40 39 38 32 33 37

40
13.17 A.C.±

39
20.89 A.C.±

DETAIL "21A"
N.T.S.

43 40

N18°35'35"E(R)

446.70'

425.93'(3)

21.11'

20.14'

N19°20'44"E(R)

20.24'

N20°09'42"E(R)

16.06'

152.09'(3)

N00°26'07"W 1333.68'(2)(3)(OA)

R=500' Δ=06°18'11" L=55.00'
CB=N67°30'10"W CD=54.98'(3)(TIE)

N

0 50 100 200
SCALE: 1"=100'

SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

FINAL MAP OF

SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

SUBDIVISION NO. PL15-0192

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1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189

FD 1-1/2" BRASS DISC ON A 3/4" IRON ROD SET IN CONCRETE STAMPED AS SHOWN. ACCEPTED AS SECTION CORNER PER (1)(2)(3)

T11N R5E 26|25 35|36 1967 R C E 13444

RE-SET WITH STANDARD MONUMENT WELL AT CENTERLINE INTERSECTION FOR REFERENCE POINT STAMPED:

T11N R5E 26|25 35|36 2017 RP L S 7944

WESTPARK VILLAGE 10 PHASE 2 BB MAPS 79

WESTPARK VILLAGE 10 PHASE 2 BB MAPS 80

N89°18'15"W 5279.53'(2)(3)(OA)
N89°18'15"W 2639.76(BNDY)
1471.28'

N00°30'19"W 207.94'
24.01'
23.98'
N02°10'00"E 149.66'
57.94'

30' P.U.E./P.E.

MARKET STREET (I.O.D./R.O.W.)

Δ=12°41'42" L=262.12'
CB=N06°51'10"W CD=261.58'

R=1183' Δ=18°41'15" L=385.84'(OA)
CB=N09°50'56"W CD=384.14'

N90°00'00"E 41.70'
N75°34'56"W 129.46'
N59°52'08"W 149.51'
N76°33'23"E 136.57'
N69°56'26"E 154.17'(OA)
123.95'
30.22'

S76°47'59"W(R)
Δ=05°59'32" L=123.72'
CB=N16°11'47"W CD=123.67'
Δ=37°18'21" L=781.33'
CB=N19°09'29"W CD=767.60'
S70°48'26"W(R)
N26°32'48"W 110.00'
S65°28'31"W(R)
21' P.U.E.
R=1174' Δ=10°45'09" L=220.32'
CB=N29°54'04"W CD=220.00'

R=31' Δ=93°03'20" L=50.35'
CB=N81°48'18"W CD=44.99'
N87°02'25"E 186.99'

R=1200' Δ=54°20'44" L=1138.21'
CB=N27°40'41"W CD=1096.02'(OA)

R=1174' Δ=03°42'13" L=75.89'
CB=N33°25'32"W CD=75.87'

Δ=01°17'52" L=11.75'
CB=N52°18'58"E CD=11.75'

15' P.U.E.
492.61'(OA)
364.60'
936.74'(OA)
551.16'
126.01'
N51°40'02"E
125' S.M.U.D. EASEMENT PER D.N. 935 O.R. 29

SIERRA GLEN DRIVE (I.O.D./R.O.W.)

385.56'

Δ=32°03'20" L=290.37'
CB=N68°59'34"E CD=286.60'
R=519' Δ=33°21'12" L=302.12'(OA)
CB=N68°20'38"E CD=297.87'
N37°02'06"W(R)
98.86'(OA)
83.73'
15.13'
12.5' P.U.E.
20' P.E.
R=500' Δ=33°21'12" L=291.06'
CB=N68°20'38"E CD=286.97'

R=731' Δ=14°26'53" L=184.33'
CB=N77°47'47"E CD=183.85'
R=750' Δ=14°26'53" L=189.13'
CB=N77°47'47"E CD=188.63'
R=1050' Δ=11°36'41" L=212.79'
CB=N76°22'41"E CD=212.42'
R=1069' Δ=09°00'22" L=168.03'
CB=N75°04'31"E CD=167.86'

103.90'
N85°01'14"E
103.90'
100.00'
N70°34'20"E
100.00'

23.00'
62.28'
23.00'
N00°41'43"E
62.28'

BRANSTON DRIVE (I.O.D./R.O.W.)

R=1200' Δ=08°30'42" L=178.27'
CB=N03°33'38"W CD=178.11'
R=1223' Δ=08°30'42" L=181.69'
CB=N03°33'38"W CD=181.52'
12.5' P.U.E.
46.63'
N82°11'01"E(R) 4.00'
R=31' Δ=87°23'41" L=47.29'
CB=N35°52'52"E CD=42.83'
N07°48'59"W
95.49'

42
14.51 A.C.±

41
4.35 A.C.±

40
SEE SHEET 21

SEE SHEET 8

SEE SHEET 23

SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

N

0 50 100 200
SCALE: 1"=100'

FINAL MAP OF

SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

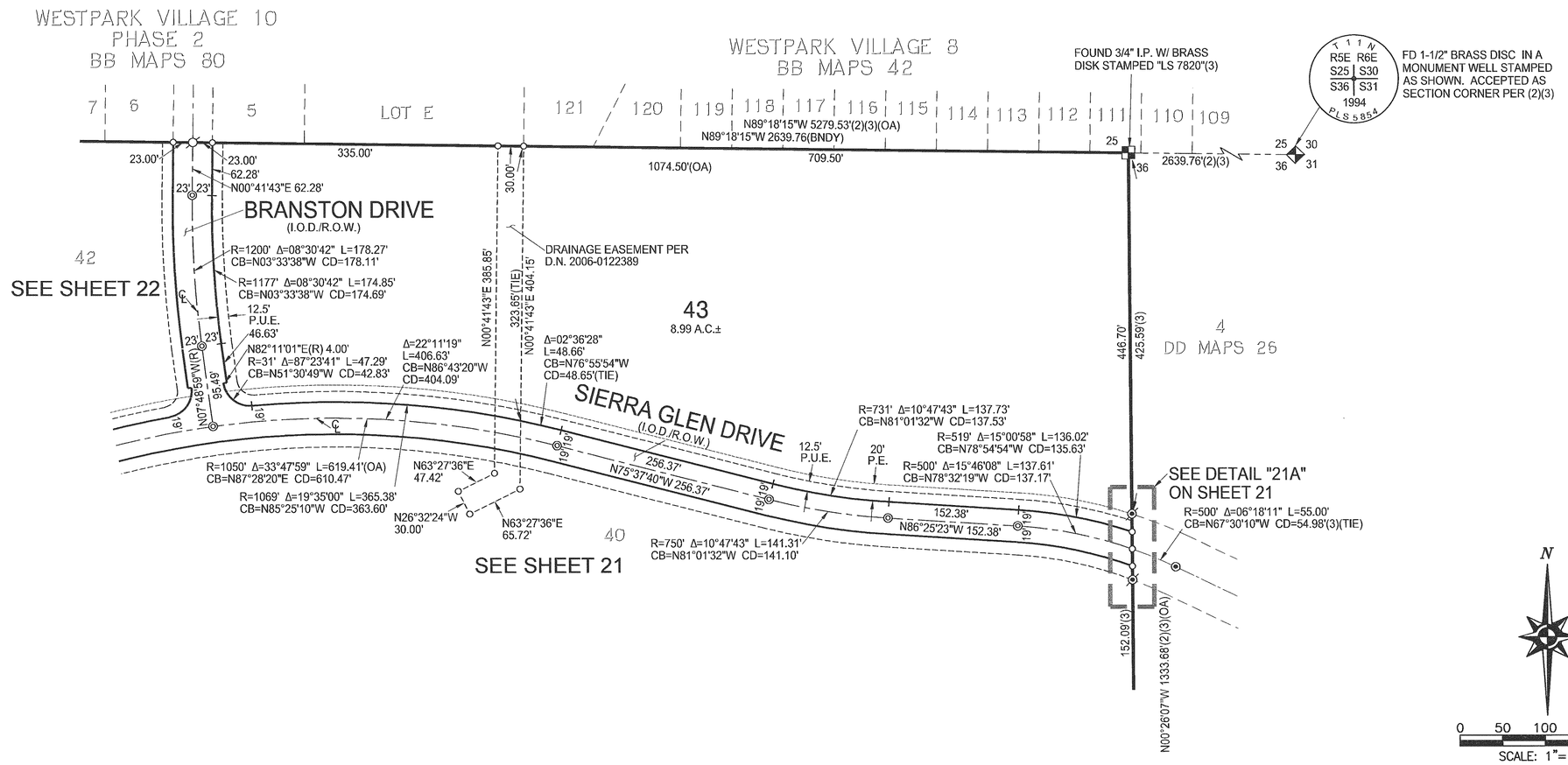
SUBDIVISION NO. PL15-0192

THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

CITY OF ROSEVILLE • PLACER COUNTY • CALIFORNIA

JANUARY 2018

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1552 Eureka Road, Suite 100, Roseville, CA 95661 (916) 773-1189



FINAL MAP OF

SIERRA VISTA - FEDERICO

LARGE LOT SUBDIVISION

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THE SOUTH 1056 FEET OF SECTION 26 AND THE NORTH ONE-HALF OF SECTION 35; EXCEPTING THEREFROM THE WEST 801.429 FEET OF SAID SECTIONS 26 AND 35; THE NORTH ONE-HALF OF THE NORTHWEST ONE-QUARTER AND THE SOUTHWEST ONE-QUARTER OF THE NORTHWEST ONE-QUARTER OF SECTION 36, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN AS DESCRIBED IN THAT CERTAIN QUITCLAIM DEED RECORDED FEBRUARY 4, 2002 AS DOCUMENT NO. 2002-0012476 OFFICIAL RECORDS OF PLACER COUNTY.

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SEE SHEET 4 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

COUNCIL COMMUNICATION

CC #: 1743
File #: 0400-04-09-1

Title:	Federico - Phase 1 - Village 22A - Notice of Completion
Contact:	Andrew Druck 916-223-7577 adruck@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.10.

RECOMMENDATION TO COUNCIL

Staff recommends that the City Council adopt the attached resolution accepting Federico - Phase 1 - Village 22A, CWJ#180111 as complete and authorizing the City Engineer to execute the Notice of Completion.

BACKGROUND

The Engineering Division has made a final inspection of the above project and has found the roadway infrastructure work complete in accordance with the improvement plans and City specifications.

FISCAL IMPACT

The actions requested as part of this action have no impact to the City's General Fund. Construction costs were paid by the developer.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. Approval of a Notice of Completion meets the above criteria and is not subject to CEQA. No additional environmental review is required.

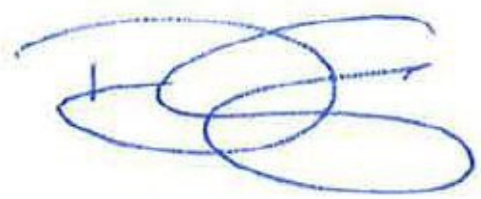
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal F - Invest in well-planned infrastructure and growth

Respectfully Submitted,

Andrew Druck, Construction Inspector

Mike Isom, Development Services Director



_____

Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution No. 21-424

NOC

Exhibit A

Final Map

RESOLUTION NO. 21-424

RESOLUTION OF THE COUNCIL OF THE CITY OF ROSEVILLE ACCEPTING THE PUBLIC WORK KNOWN AS FEDERICO – PHASE 1 – VILLAGE 22A PROJECT, APPROVING THE "NOTICE OF COMPLETION", AND AUTHORIZING AND DIRECTING THE CITY ENGINEER TO EXECUTE SAID NOTICE ON BEHALF OF THE CITY OF ROSEVILLE, THEREFORE, AND ACCEPTING ALL DEDICATIONS OFFERED ON THE RECORDED MAP OF THE SUBDIVISION.

BE IT RESOLVED by the Council of the City of Roseville as follows:

1. The "Notice of Completion" on file in the City Clerk's Department relative to that public work known as the Federico – Phase 1 – Village 22A is hereby approved and the public work accepted.

2. All rights of way and easements as offered on the final map of recorded with Placer County Recorder's Office Book FF of Maps, Page 38 is hereby accepted.

3. The City Engineer is hereby authorized and directed to execute said Notice on behalf of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville this 20th day of October, 2021, by the following vote on roll call:

RECORDING REQUESTED BY AND WHEN
RECORDED MAIL TO:

CITY CLERK
CITY OF ROSEVILLE
311 VERNON STREET
ROSEVILLE, CA 95678

Exempt from recording fees
Pursuant to Gov't Code §27383

NOTICE OF COMPLETION

NOTICE IS HEREBY GIVEN that the public work of improvement known as the _____ Project was completed and accepted by the City of Roseville on _____. The location is situated in the City of Roseville, County of Placer, State of California and is indicated on the attached map, marked as Exhibit "A" and incorporated herein by this reference. The real property herein described is owned by the City of Roseville, 311 Vernon Street, Roseville CA 95678.

The direct/general contractor on said project was _____.

The surety on said project was _____

_____.

_____

City of Roseville
Owner

ATTEST:

_____
Sonia Orozco, City Clerk

State of California)
County of Placer)

I,_____, being first duly sworn, depose and say: I am the _____ of the City of Roseville, a municipal corporation in the State of California, owner of the property described in the above Notice. I am duly authorized to make this verification for and on behalf of the City of Roseville. I have read the Notice of Completion and know its contents and the facts stated therein are true.

_____

City of Roseville

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of Placer)

Subscribed and sworn to (or affirmed) before me on this _____ day of _____,

20___, _____

proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

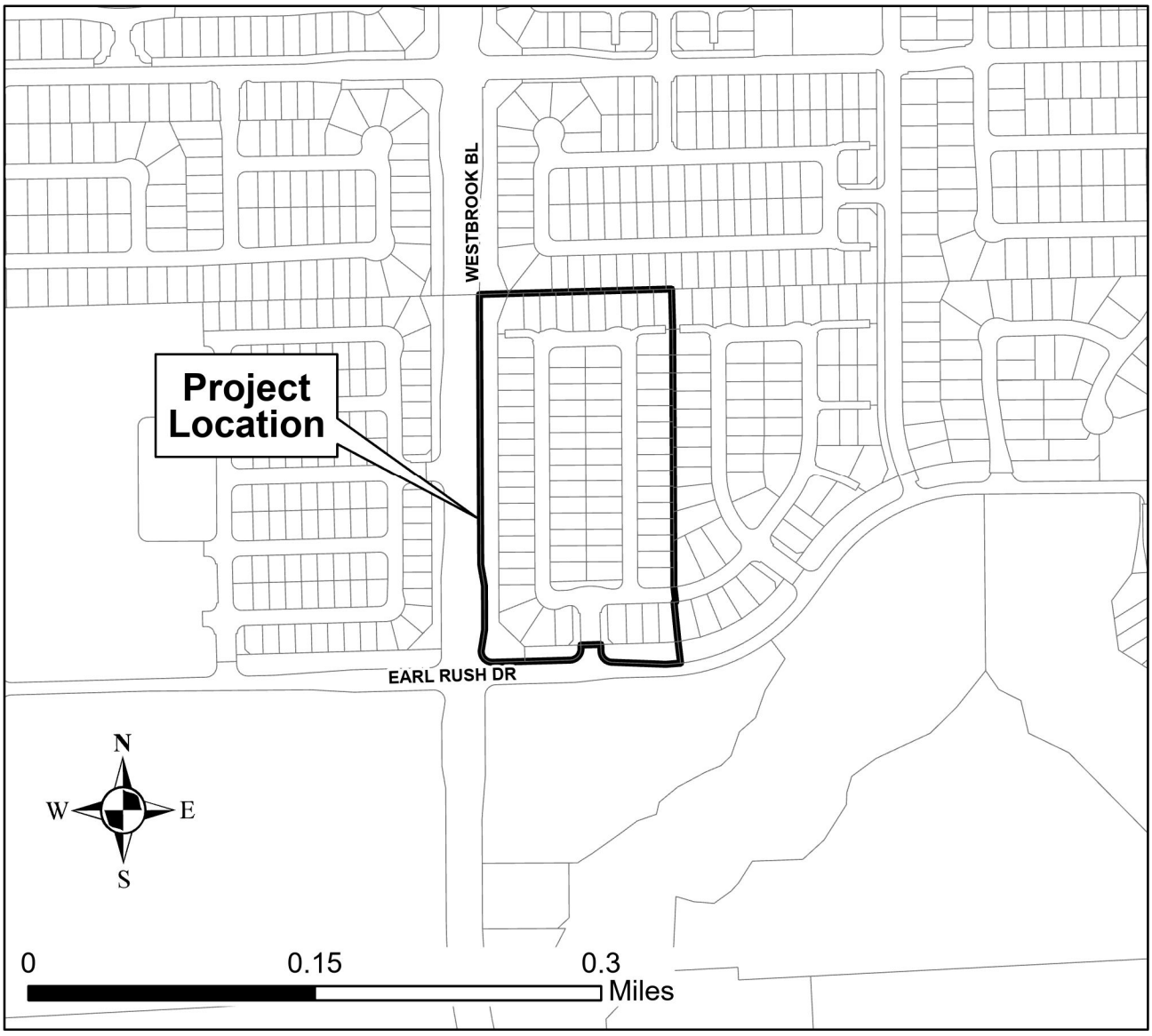
_____

Place Notary Seal and/or Stamp Above

Signature of Notary Public

EXHIBIT A

City of Roseville
Federico - Phase 1
Village 22A



OWNER'S STATEMENT

THE UNDERSIGNED HEREBY CERTIFY THAT THEY ARE THE ONLY PERSONS HAVING ANY RECORD TITLE INTEREST IN THE REAL PROPERTY INCLUDED WITHIN THE SUBDIVISION SHOWN UPON THIS FINAL MAP OF "FEDERICO - PHASE 1 VILLAGE 22A" AND THEY HEREBY CONSENT TO THE PREPARATION AND RECORDATION OF THIS FINAL MAP AND HEREBY OFFER FOR DEDICATION AND DO HEREBY DEDICATE FOR SPECIFIC PURPOSES THE FOLLOWING:

THE REAL PROPERTY DESCRIBED BELOW IS DEDICATED AS EASEMENT FOR PUBLIC PURPOSES:

(A) PUBLIC EASEMENTS FOR THE INSTALLATION AND MAINTENANCE OF, BUT NOT LIMITED TO ELECTROLIERS, WATER AND GAS PIPES, SEWER AND DRAINAGE PIPES, AND FOR UNDERGROUND WIRE AND CONDUITS FOR ELECTRIC, TELEPHONE AND TELEVISION SERVICES AND TRAFFIC CONTROL APPURTENANCES TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO ON, OVER, UNDER AND ACROSS LOTS A, B, C, D, E AND F, THE STREETS SHOWN HEREON AS BOREALIS CIRCLE, LUMINARY DRIVE, SUNSPOT PLACE, WOLF STAR PLACE AND SOLAR WAY, AND THOSE STRIPS OF LAND LYING CONTIGUOUS TO THE RIGHTS-OF-WAY AS SHOWN HEREON AND DESIGNATED "P.U.E." (PUBLIC UTILITY EASEMENT).

THE REAL PROPERTY DESCRIBED BELOW IS DEDICATED IN FEE FOR PUBLIC PURPOSES:

(A) AS PUBLIC RIGHTS-OF-WAY (INCLUDING ALL IMPROVEMENTS THEREON) THE STREETS SHOWN HEREON AS BOREALIS CIRCLE, LUMINARY DRIVE, SOLAR WAY, SUNSPOT PLACE AND WOLF STAR PLACE.

(B) LOTS A, B, C, D, E AND F SHOWN HEREON TO THE CITY OF ROSEVILLE FOR LANDSCAPING AND AS PUBLIC RIGHTS-OF-WAY.

SOLAIRE - ROSEVILLE, L.P., A DELAWARE LIMITED PARTNERSHIP

BY: OCS-HS LOJV GP, LLC, A DELAWARE LIMITED LIABILITY COMPANY
GENERAL PARTNER

BY: OCS-HS LOT OPTION JOINT VENTURE, LLC, A DELAWARE LIMITED LIABILITY COMPANY
SOLE MEMBER

BY: HEARTHSTONE PROFESSIONALS - PI, L.P., A DELAWARE LIMITED PARTNERSHIP
MANAGER

BY: _____
STEVEN C. PORATH
AUTHORIZED PERSON

NOTARY'S ACKNOWLEDGMENT

A NOTARY PUBLIC OR OTHER OFFICER COMPLETING THIS CERTIFICATE VERIFIES ONLY THE IDENTITY OF THE INDIVIDUAL WHO SIGNED THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED, AND NOT THE TRUTHFULNESS, ACCURACY OR VALIDITY OF THAT DOCUMENT.

STATE OF CALIFORNIA

COUNTY OF Los Angeles

ON December 12, 2020 BEFORE ME, Karen Sthornback, A NOTARY PUBLIC

PERSONALLY APPEARED Steven C. Porath

WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND AND OFFICAL SEAL.

Karen Sthornback — Karen Sthornback
SIGNATURE — PRINTED NAME

MY PRINCIPAL PLACE OF BUSINESS IS Ventura COUNTY

MY COMMISSION EXPIRES: July 31, 2022 MY COMMISSION NUMBER: 2251498

KAREN S. HORNBACK
Notary Public - California
Ventura County
Commission # 2251498
My Comm. Expires Jul 31, 2022

BENEFICIARY'S STATEMENT

WESTERN ALLIANCE BANK, AN ARIZONA CORPORATION, AS BENEFICIARY UNDER CONSTRUCTION DEED OF TRUST AND FIXTURE FILING RECORDED OCTOBER 16, 2020 AS DOCUMENT NUMBER 2020-0116866-00, OFFICIAL RECORDS OF PLACER COUNTY, CALIFORNIA, HEREBY CONSENTS TO THE RECORDATION OF THIS MAP AND THE SUBDIVISION OF THE LANDS SHOWN HEREON.

_____ 12/11/2020
NAME: STEVEN M. STRAHLOW DATE
TITLE: VICE PRESIDENT

NOTARY'S ACKNOWLEDGMENT

A NOTARY PUBLIC OR OTHER OFFICER COMPLETING THIS CERTIFICATE VERIFIES ONLY THE IDENTITY OF THE INDIVIDUAL WHO SIGNED THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED, AND NOT THE TRUTHFULNESS, ACCURACY OR VALIDITY OF THAT DOCUMENT.

STATE OF ~~CALIFORNIA~~ ARIZONA

COUNTY OF MARICOPA

ON DECEMBER 11TH, 2020 BEFORE ME, TAMARA S. HUCKABA, NOTARY PUBLIC

PERSONALLY APPEARED STEVEN M. STRAHLOW

WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND AND OFFICAL SEAL.

_____ TAMARA S. HUCKABA
SIGNATURE — PRINTED NAME

MY PRINCIPAL PLACE OF BUSINESS IS PINAL COUNTY

MY COMMISSION EXPIRES: 6/29/2021 MY COMMISSION NUMBER: 295903

Tamara S. Huckaba
Notary Public
Pinal County, Arizona
My Comm. Expires 06-29-2021

SURVEYOR'S STATEMENT

THIS FINAL MAP OF "FEDERICO - PHASE 1 VILLAGE 22A" WAS PREPARED BY ME OR UNDER MY DIRECTION AND IS BASED UPON A FIELD SURVEY IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCES AT THE REQUEST OF MOURIER INVESTMENTS, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY AND WESTPARK SIERRA VISTA LLC, IN NOVEMBER 2017. I HEREBY STATE THAT THIS FINAL MAP SUBSTANTIALLY CONFORMS TO THE APPROVED OR CONDITIONALLY APPROVED TENTATIVE MAP. ALL MONUMENTS SHOWN HEREON ARE OF THE CHARACTER AND WILL OCCUPY THE POSITIONS INDICATED, AND WILL BE SET BY DECEMBER 31, 2022 AND THAT THE MONUMENTS ARE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED.

MACKAY & SOMPS CIVIL ENGINEERS, INC.

Paul Ferguson Jr.
PAUL FERGUSON, JR., PLS 9265
EXPIRATION DATE: MARCH 31, 2022

DATE: 12-4-2020

LICENSED LAND SURVEYOR
PAUL FERGUSON, JR.
3-31-22
No. 9265
STATE OF CALIFORNIA

CITY ENGINEER'S STATEMENT

I HEREBY STATE THAT I HAVE EXAMINED THIS FINAL MAP OF "FEDERICO - PHASE 1 VILLAGE 22A" AND FIND IT TO BE SUBSTANTIALLY THE SAME AS THE TENTATIVE MAP ON FILE AND ANY APPROVED ALTERATIONS THEREOF; THAT ALL PROVISIONS OF THE SUBDIVISION MAP ACT AND ALL APPLICABLE CITY ORDINANCES HAVE BEEN COMPLIED WITH.

_____ DATE: 12/17/20
MARC STOUT, R.C.E. 69879
CITY ENGINEER, CITY OF ROSEVILLE
LICENSE EXPIRES: SEPTEMBER 30, 2022

I HEREBY STATE THAT I AM SATISFIED THIS FINAL MAP OF "FEDERICO - PHASE 1 VILLAGE 22A" IS TECHNICALLY CORRECT.

FOR MARC STOUT, CITY ENGINEER, CITY OF ROSEVILLE

_____ DATE: 12/15/20
TIMOTHY G. BLAIR, PLS 8278
EXPIRES DECEMBER 31, 2021

LICENSED LAND SURVEYOR
TIMOTHY G. BLAIR
Exp. 12-31-21
No. 8278
STATE OF CALIFORNIA

CITY CLERK'S STATEMENT

I HEREBY CERTIFY THAT THE CITY COUNCIL, CITY OF ROSEVILLE, HAS APPROVED THIS FINAL MAP OF "FEDERICO - PHASE 1 VILLAGE 22A", AND HAS ACCEPTED ON BEHALF OF THE PUBLIC THE PUBLIC UTILITY EASEMENTS OFFERED HEREON FOR DEDICATION AND HAS ACCEPTED, SUBJECT TO IMPROVEMENT, LOTS A, B, C, D, E AND F, AND THE RIGHTS-OF-WAY OFFERED HEREON FOR DEDICATION.

_____
CITY CLERK, CITY OF ROSEVILLE

DATE: 12-16-2020 BY: _____
ASSISTANT CITY CLERK

RECORDER'S STATEMENT

FILED THIS 24TH DAY OF DECEMBER, 2020, AT 2:36 P.M. IN BOOK FF OF MAPS, AT PAGE 38, IN THE OFFICE OF THE PLACER COUNTY RECORDER, AT THE REQUEST OF MACKAY & SOMPS CIVIL ENGINEERS, INC.

RYAN RONCO
RECORDER OF PLACER COUNTY
STATE OF CALIFORNIA

DOCUMENT NO.: 2020-0152611

BY: D. Burton
DEPUTY

FEE: $ 95.00

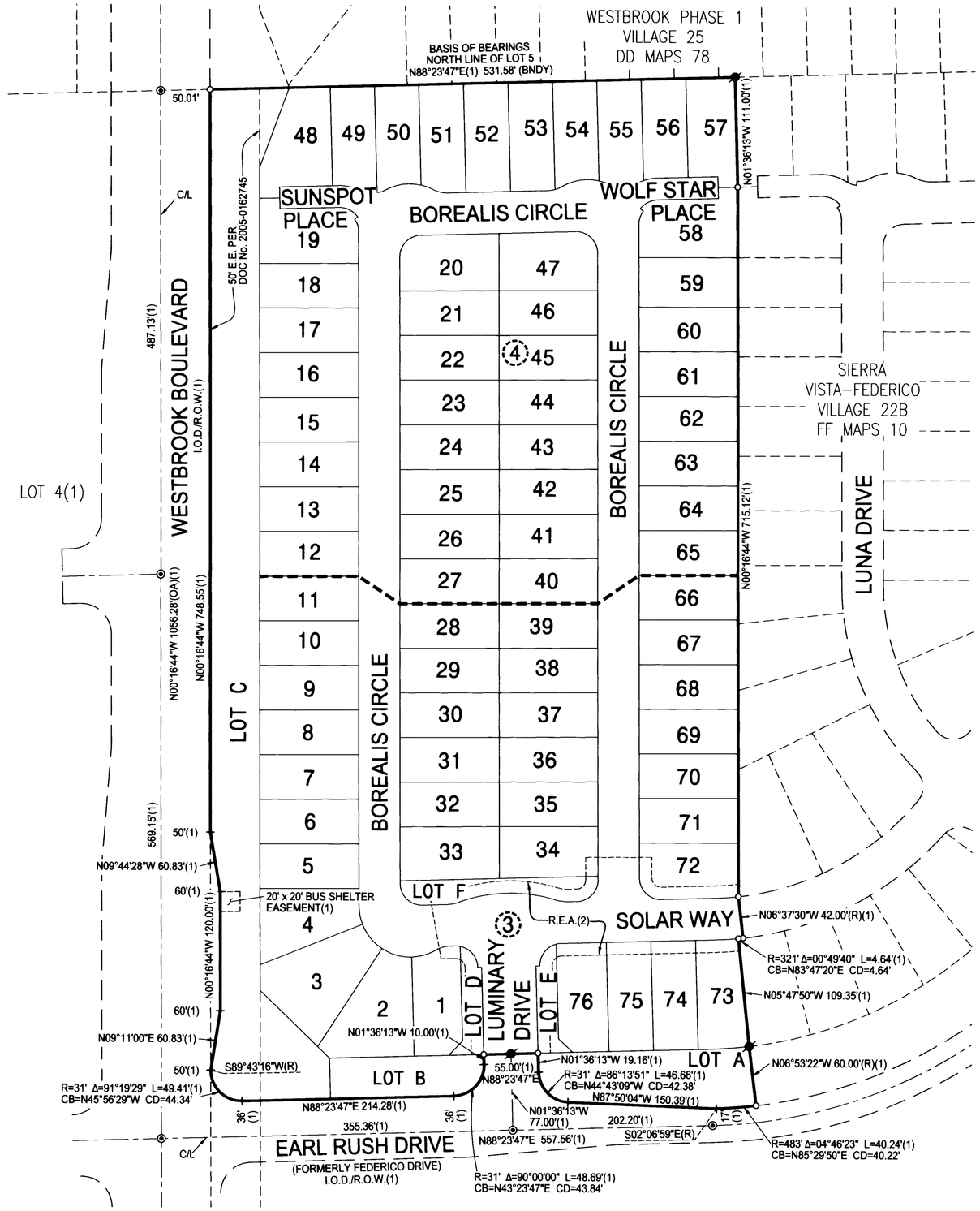
FINAL MAP OF
FEDERICO - PHASE 1
VILLAGE 22A
SUBDIVISION NO. PL17-0024

ALL OF LOT 5 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018, IN BOOK EE OF MAPS, AT PAGE 6, PLACER COUNTY RECORDS, BEING A PORTION OF THE SOUTHEAST ONE-QUARTER OF SECTION 26, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

CITY OF ROSEVILLE • PLACER COUNTY • CALIFORNIA

DECEMBER 2020

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1025 Creekside Ridge Drive, Suite 150, Roseville, CA 95678 (916) 773-1189



NOTES:

1. TOTAL AREA OF THIS SUBDIVISION IS 12.50± ACRES GROSS, CONSISTING OF 76 RESIDENTIAL LOTS AND 6 LANDSCAPE LOTS.
2. ALL CURVES ARE DIMENSIONED WITH RADIUS, DELTA, ARC LENGTH, CHORD BEARING AND CHORD LENGTH. CHORD LENGTHS AND OVERALL DISTANCES MAY CONTAIN SOME ROUNDING ERROR. DISTANCES SHOWN HEREON ARE IN FEET AND DECIMALS THEREOF AND ARE "GROUND" DISTANCES.
3. A PRELIMINARY SOILS REPORT WAS PREPARED BY YOUNGDAHL CONSULTING GROUP, INC. DATED FEBRUARY, 2017; PROJECT NUMBER E 16372.00 AND ON FILE WITH THE CITY OF ROSEVILLE DEVELOPMENT SERVICES - ENGINEERING DEPARTMENT, FILE No. 308-870.
4. ALL FRONT CORNERS ARE MARKED BY A 1" BRASS DISC STAMPED "LS 9265" IN THE SIDEWALK ON THE EXTENSION OF SIDE LOT LINES 1.00' FROM THE PROPERTY LINE. WHERE SIDEWALK DOES NOT EXIST, FRONT CORNERS SHALL BE SET ON A 2.00' EXTENSION IN THE GUTTER PAN, UNLESS OTHERWISE NOTED.
5. ALL REAR CORNERS AND ANGLE POINTS WILL BE SET WITH A 5/8" REBAR AND PLASTIC CAP STAMPED "LS 9265". WHERE A REAR CORNER FALLS WITHIN A MASONRY RETAINING WALL, MASONRY SOUND WALL OR CONCRETE FOOTING, A 5/8" REBAR AND PLASTIC CAP STAMPED "LS 9265" WILL BE SET ON THE SIDE LOT LINE ON A 4.00 FOOT OFFSET TO THE REAR CORNER OR A BRASS DISC STAMPED "LS 9265" WILL BE SET WITH EPOXY TO THE FACE OF THE WALL 2.00 FOOT ABOVE GROUND OR ON THE TOP OF WALL WHERE AN OFFSET MONUMENT CANNOT BE SET.
6. THE TEMPORARY CONSTRUCTION AND ACCESS EASEMENT DESCRIBED IN DOCUMENT NO. 2017-0041424, O.R.P.C., IS FULLY CONTAINED WITHIN LOTS A, B AND C AND SHALL EXPIRE ONE YEAR FROM THE DATE OF THE CITY'S ACCEPTANCE OF IMPROVEMENTS PURSUANT TO THE TERMS OF THE AGREEMENT.
7. THE "RESERVED TEMPORARY ACCESS EASEMENT" DESCRIBED IN DOCUMENT NO. 2019-0032303, O.R.P.C. IS FULLY CONTAINED WITHIN THE WESTBROOK BOULEVARD AND EARL RUSH DRIVE (FORMERLY FEDERICO DRIVE) RIGHTS-OF-WAY AS SHOWN ON EE MAPS 6.
8. PROPERTY SUBJECT TO A TEMPORARY EASEMENT, WITHIN 50 FEET OF THE COMMON BOUNDARY LINE WITH THE SUBDIVISION TO THE EAST - FF MAPS 10) FOR COMMON FENCE IMPROVEMENTS ALONG SAID COMMON BOUNDARY LINE PER DOCUMENT NO. 2020-0004878. SAID TEMPORARY EASEMENT WILL TERMINATE UPON COMPLETION OF THE COMMON FENCE.

BASIS OF BEARINGS:

THE BEARING OF NORTH 88°23'47" EAST ON THE NORTH LINE OF LOT 5 AS SHOWN AND SO DESIGNATED ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO, LARGE LOT SUBDIVISION SUBDIVISION NO. PL15-0192", RECORDED ON FEBRUARY 16, 2018 IN BOOK EE OF MAPS, AT PAGE 6, PLACER COUNTY RECORDS, IS THE BASIS OF BEARINGS FOR THIS MAP.

LEGEND

◉	FOUND COPPERWELD SURVEY MONUMENT WITH CENTER PUNCH IN MONUMENT WELL STAMPED "LS 7944" (1)
◎	SET COPPERWELD SURVEY MONUMENT WITH CENTER PUNCH IN MONUMENT WELL STAMPED "LS 9265" PER CITY OF ROSEVILLE STANDARDS
⌀	FOUND 3/4" IRON PIPE WITH PLASTIC PLUG STAMPED "LS 7944" (1)
o	DIMENSION POINT
CB	CHORD BEARING
CD	CHORD DISTANCE
C/L	CENTERLINE
D.N.	DOCUMENT NUMBER
E.E.	ELECTRICAL EASEMENT
I.O.D.	IRREVOCABLE OFFER OF DEDICATION
(OA)	OVERALL
P.E.	PASEO EASEMENT
P.U.E.	PUBLIC UTILITY EASEMENT
R.E.A.	RECIPROCAL EASEMENT AGREEMENT
R.O.W.	RIGHT-OF-WAY
(R)	RADIAL BEARING
S.F.±	SQUARE FEET
(1)	DENOTES RECORD INFORMATION
(X)	SHEET NUMBER

REFERENCES:

(1) EE MAPS 6
(2) D.N. 2020-0004878

N

0 40 80 160
SCALE: 1"=80'

FINAL MAP OF
FEDERICO - PHASE 1
VILLAGE 22A
SUBDIVISION NO. PL17-0024

ALL OF LOT 5 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018, IN BOOK EE OF MAPS, AT PAGE 6, PLACER COUNTY RECORDS, BEING A PORTION OF THE SOUTHEAST ONE-QUARTER OF SECTION 26, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

CITY OF ROSEVILLE • PLACER COUNTY • CALIFORNIA

DECEMBER 2020

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1025 Creekside Ridge Drive, Suite 150, Roseville, CA 95678 (916) 773-1189

SEE SHEET 4

WESTBROOK BOULEVARD
I.O.D./R.O.W.)(1)

50'(1)
50'E.E. PER D.N. 2005-0162745
N00°16'44"W 748.55'(1)
N00°16'44"W 1056.28'(OA)(1)
569.15'(1)
N09°44'28"W 60.83'(1)
50'(1)
60'(1)
20'x20' BUS SHELTER EASEMENT(1)
50'E.E. PER D.N. 2005-0162745
N00°16'44"W 120.00'(1)
N09°11'00"E 60.83'(1)
60'(1)
50'(1)
S89°43'16"W(R)
R=31' Δ=91°19'29" L=49.41'(1) CB=N45°56'29"W CD=44.34'
89.23'
36'(1)
355.36'(1)

LOT C
1.27 AC.±
P.U.E./P.E.(1)

12
N89°43'16"E
100.00'
11 4,500 S.F.±
N89°43'16"E
100.00'
10 4,500 S.F.±
N89°43'16"E
100.00'
9 4,500 S.F.±
N89°43'16"E
100.00'
8 4,500 S.F.±
N89°43'16"E
100.00'
7 4,500 S.F.±
N89°43'16"E
100.00'
6 4,500 S.F.±
N89°43'16"E
100.00'
5 4,500 S.F.±
N89°43'16"E
100.00'
4 5,738 S.F.±
N89°43'16"E
100.00'
3 7,933 S.F.±
N33°10'40"E(R)
118.49'
Δ=35°19'24" L=32.06' CB=N74°29'03"W CD=31.55'
2 7,132 S.F.±
S02°08'45"E(R)
81.11'
N45°56'29"W 97.84'
16.74'
N00°16'44"W 829.26'
679.52'
N00°16'44"W 717.19'
45.00'
21'
76.74'
17.14'
25.95'
60.00'
631.17'
54.63'

BOREALIS CIRCLE

27
N89°43'16"E
100.00'
28 4,500 S.F.±
N89°43'16"E
100.00'
29 4,500 S.F.±
N89°43'16"E
100.00'
30 4,500 S.F.±
N89°43'16"E
100.00'
31 4,500 S.F.±
N89°43'16"E
100.00'
32 4,500 S.F.±
N89°43'16"E
100.00'
33 5,347 S.F.±

40
N89°43'16"E
100.00'
39 4,500 S.F.±
N89°43'16"E
100.00'
38 4,500 S.F.±
N89°43'16"E
100.00'
37 4,500 S.F.±
N89°43'16"E
100.00'
36 4,500 S.F.±
N89°43'16"E
100.00'
35 4,500 S.F.±
N89°43'16"E
100.00'
34 5,116 S.F.±
100.03'
650.17'
52.31'
12.5' P.U.E.
R.E.A.(2)
2.49'
LOT F
4,054 S.F.±
N88°23'47"E 200.05'
3.51'
P.U.E.
R=154' Δ=36°23'23" L=97.81' CB=N88°23'47"E CD=96.17'
C15 C14 C13 C12
23.03'
8.11'
129.49'
R=52' Δ=119°34'02" L=108.52' CD=89.87'
N68°18'30"E(R)
111.27'
Δ=21°24'46" L=19.43' CB=N10°59'07"W CD=19.32'
Δ=35°07'51" L=31.86' CB=N39°15'25"W CD=31.39'
C1 C2 C3 C4 C5
4.74'
N11°31'58"E(R)
N01°36'13"W 95.28'
N88°23'47"E 4.00'(R)
N01°36'13"W 131.00'
N01°36'13"W 100.00'
N27°42'02" L=25.14' CB=N74°00'14"E CD=24.90'
N01°36'13"W 10.00'(1)
N88°23'47"E 55.00'(1)
N88°23'47"E 156.05'
N01°36'13"W 41.00'
LOT B
6,192 S.F.±
P.U.E./P.E.(1)
R=31' Δ=90°00'00" L=48.69'(1) CB=N43°23'47"E CD=43.84'
125.05'
N88°23'47"E 214.28'(1)
N88°23'47"E 339.19'(OA)
N88°23'47"E 557.56'(1)
EARL RUSH DRIVE
(FORMERLY FEDERICO DRIVE)
I.O.D./R.O.W.)(1)
LOT D
2,219 S.F.±
P.U.E.
N43°23'47"E 20.00'
LUMINARY DRIVE
LOT E
2,219 S.F.±
P.U.E.
N46°36'13"W 20.00'
N01°36'13"W 19.16'(1)
N01°36'13"W 77.00'(1)
N87°50'04"W 150.39'(1)
LOT A
11,754 S.F.±
P.U.E./P.E.(1)
R=31' Δ=86°13'51" L=46.66'(1) CB=N44°43'09"W CD=42.38'
S02°06'59"E(R)
202.20'(1)
17'(1)

BOREALIS CIRCLE

65
N89°43'16"E
100.00'
66 4,500 S.F.±
N89°43'16"E
100.00'
67 4,500 S.F.±
N89°43'16"E
100.00'
68 4,500 S.F.±
N89°43'16"E
100.00'
69 4,500 S.F.±
N89°43'16"E
100.00'
70 4,500 S.F.±
N89°43'16"E
100.00'
71 4,500 S.F.±
N89°43'16"E
100.00'
72 5,511 S.F.±
659.13'
631.17'
50.00'
34.94'
54.07'
R=22' Δ=91°19'29" L=35.07'
12.5' P.U.E.
C11 C10
53.12'
N00°16'44"W 715.12'(1)
N06°37'30"W(R) 42.00'(1)
21.00'
C9
SOLAR WAY
N14°44'25"W(R)
156.20'
112.58'
97.12'
C7 C8
46.00'
45.00'
45.00'
20.20'
R=321' Δ=00°49'40" L=4.64'(1) CB=N83°47'20"E CD=4.64'
N05°47'50"W(R) 109.35'(1)
76 5,509 S.F.±
75 4,950 S.F.±
74 4,950 S.F.±
73 5,238 S.F.±
110.00'
N01°36'13"W
88.00'
N88°23'47"E 4.00'(R)
N88°23'47"E 95.28'
N01°36'13"W 95.28'
C6
C16
12.70'
35.14'
36.86'
N88°23'47"E 174.70'
R=483' Δ=04°46'23" L=40.24'(1) CB=N85°29'50"E CD=40.22'
N06°53'22"W(R) 60.00'(1)

SIERRA VISTA–FEDERICO VILLAGE 22B FF MAPS 10

CURVE TABLE

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	32'	28°14'33"	15.77'	N74°16'30"E	15.61'
C2	22'	90°00'00"	34.56'	N46°36'13"W	31.11'
C3	22'	13°08'12"	5.04'	N85°02'08"W	5.03'
C4	22'	76°51'48"	29.51'	N40°02'08"W	27.35'
C5	22'	90°00'00"	34.56'	N43°23'47"E	31.11'
C6	22'	76°51'48"	29.51'	N36°49'41"E	27.35'
C7	22'	13°08'12"	5.04'	N81°49'41"E	5.03'
C8	321'	04°11'36"	23.49'	N86°17'59"E	23.49'
C9	300'	05°01'16"	26.29'	N85°53'08"E	26.28'
C10	279'	05°01'16"	24.45'	N85°53'08"E	24.44'
C11	22'	91°19'29"	35.07'	N45°56'29"W	31.47'
C12	22'	88°40'31"	34.05'	N44°03'31"E	30.75'
C13	46'	18°11'42"	14.61'	N82°30'23"W	14.55'
C14	46'	18°11'42"	14.61'	N79°17'56"E	14.55'
C15	22'	91°19'29"	35.07'	N45°56'29"W	31.47'
C16	423'	05°17'08"	39.02'	N85°45'13"E	39.01'

N

0 20 40 80
SCALE: 1"=40'

FINAL MAP OF FEDERICO - PHASE 1

VILLAGE 22A

SUBDIVISION NO. PL17-0024

ALL OF LOT 5 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018, IN BOOK EE OF MAPS, AT PAGE 6, PLACER COUNTY RECORDS, BEING A PORTION OF THE SOUTHEAST ONE-QUARTER OF SECTION 26, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

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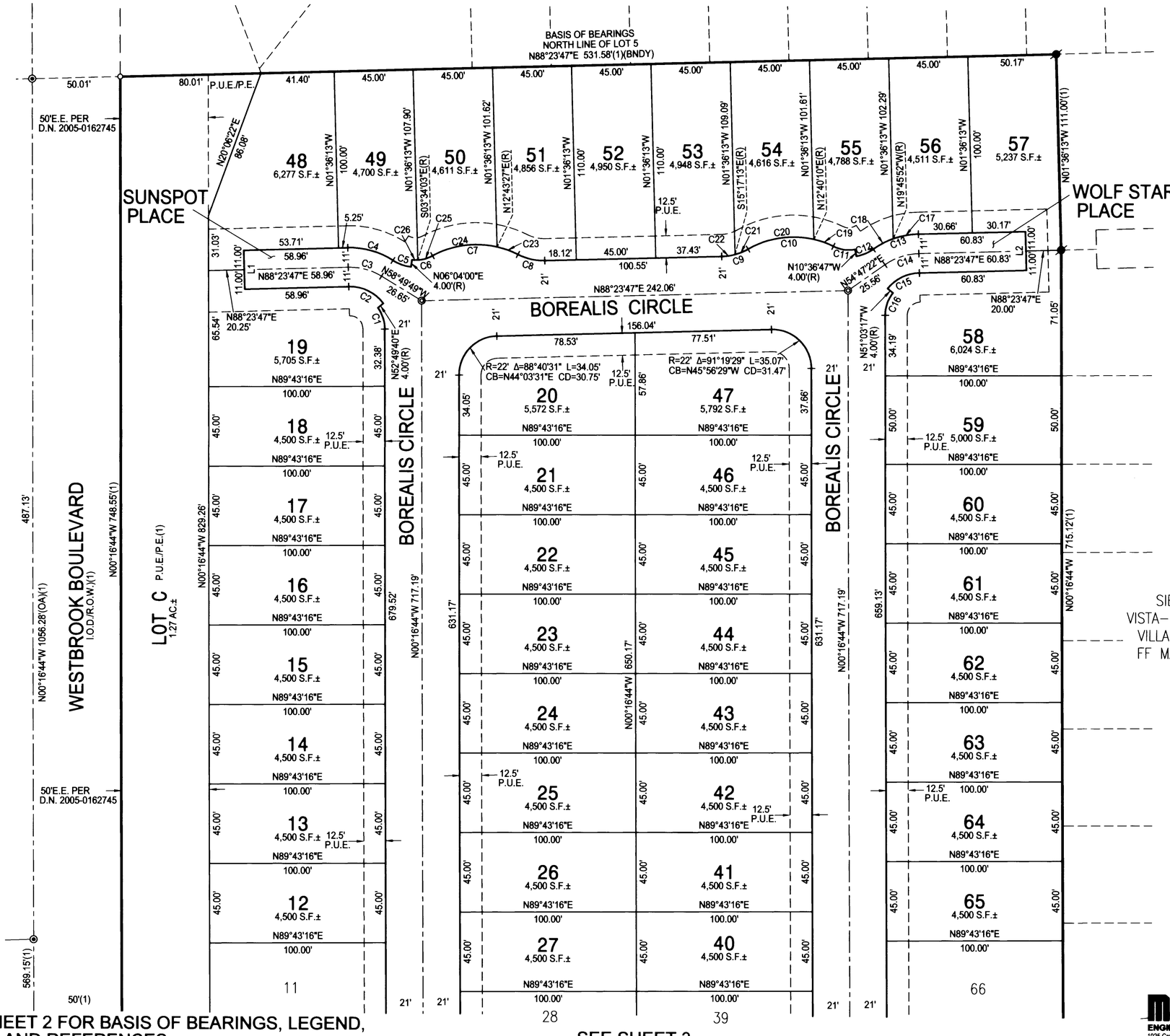
DECEMBER 2020

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1025 Creekside Ridge Drive, Suite 150, Roseville, CA 95678 (916) 773-1189

SEE SHEET 2 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

WESTBROOK PHASE 1
VILLAGE 25
DD MAPS 78



LINE TABLE

#	BEARING	LENGTH
L1	N01°36'13"W	22.00'
L2	N01°36'13"W	22.00'

CURVE TABLE

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	20'	36°53'36"	12.88'	N18°43'32"W	12.66'
C2	24'	54°25'53"	22.80'	N64°23'17"W	21.95'
C3	35'	32°46'24"	20.02'	N75°13'01"W	19.75'
C4	46'	33°55'17"	27.23'	N74°38'35"W	26.84'
C5	24'	26°15'03"	11.00'	N70°48'28"W	10.90'
C6	20'	34°47'10"	12.14'	N78°40'25"E	11.96'
C7	52'	55°21'30"	50.24'	N88°57'35"E	48.31'
C8	32'	28°14'33"	15.77'	N77°28'57"W	15.61'
C9	32'	28°14'33"	15.77'	N74°16'30"E	15.61'
C10	52'	55°29'57"	50.37'	N87°54'12"E	48.42'
C11	20'	36°15'57"	12.66'	N82°28'48"W	12.45'
C12	24'	25°01'49"	10.48'	N66°52'18"E	10.40'
C13	46'	34°02'23"	27.33'	N71°22'35"E	26.93'
C14	35'	33°36'25"	20.53'	N71°35'34"E	20.24'
C15	24'	49°27'04"	20.71'	N63°40'15"E	20.08'
C16	20'	39°13'27"	13.69'	N19°19'59"E	13.43'
C17	46'	18°09'39"	14.58'	N79°18'57"E	14.52'
C18	46'	15°52'44"	12.75'	N62°17'46"E	12.71'
C19	52'	12°59'00"	11.78'	N70°50'20"W	11.76'
C20	52'	42°30'57"	38.59'	N81°24'42"E	37.71'
C21	32'	14°33'34"	8.13'	N67°26'00"E	8.11'
C22	32'	13°40'59"	7.64'	N81°33'17"E	7.62'
C23	52'	13°54'52"	12.63'	N70°19'06"W	12.60'
C24	52'	41°26'37"	37.61'	N82°00'09"E	36.80'
C25	20'	25°09'07"	8.78'	N73°51'24"E	8.71'
C26	20'	09°38'03"	3.36'	N88°45'01"W	3.36'

FINAL MAP OF
FEDERICO - PHASE 1
VILLAGE 22A
SUBDIVISION NO. PL17-0024

ALL OF LOT 5 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018, IN BOOK EE OF MAPS, AT PAGE 6, PLACER COUNTY RECORDS, BEING A PORTION OF THE SOUTHEAST ONE-QUARTER OF SECTION 26, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

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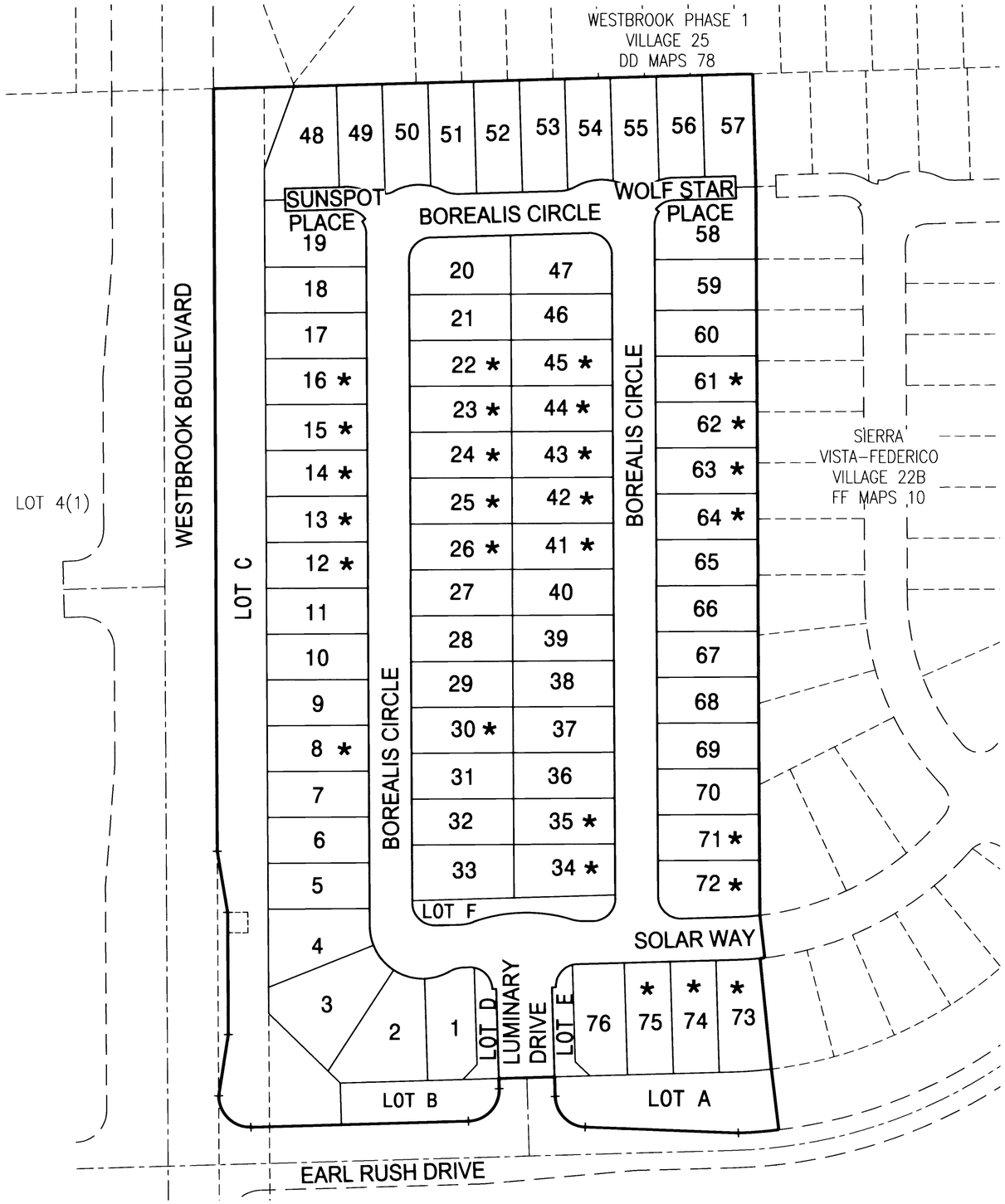
SEE SHEET 2 FOR BASIS OF BEARINGS, LEGEND, NOTES AND REFERENCES.

SEE SHEET 3



ADDITIONAL INFORMATION FOR INFORMATIONAL PURPOSE ONLY PURSUANT TO SECTION 66434.2 OF THE GOVERNMENT CODE

EACH RESIDENTIAL DWELLING CONSTRUCTED ON ANY OF THE LOTS INDICATED SHALL BE FITTED WITH A SEWER BACKFLOW PREVENTER VALVE AS APPROVED BY THE CITY OF ROSEVILLE. IT SHALL BE THE RESPONSIBILITY OF THE LOT OWNER OF SAID DWELLING TO MAINTAIN THE VALVE AND PREVENT DAMAGE FROM OCCURRING THERETO. THE CITY OF ROSEVILLE SHALL NOT BE RESPONSIBLE FOR THE MAINTENANCE OR PERFORMANCE OF THE VALVE, AND THE CITY OF ROSEVILLE SHALL NOT BE LIABLE FOR ANY DAMAGE OCCURRING TO ANY SUCH DWELLING OR ITS CONTENTS DUE TO FAILURE OF THE VALVE FOR ANY REASON WHATSOEVER.

LEGEND

* DENOTES SEWER BACKFLOW PREVENTER VALVE REQUIRED ON SANITARY SEWER CONNECTION BY THE CITY OF ROSEVILLE WITH THE BUILDING PERMIT AND MAINTAINED THEREAFTER BY THE LOT OWNER.

N

0 40 80 160

SCALE: 1"=80'

FINAL MAP OF
FEDERICO - PHASE 1
VILLAGE 22A
SUBDIVISION NO. PL17-0024

ALL OF LOT 5 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018, IN BOOK EE OF MAPS, AT PAGE 6, PLACER COUNTY RECORDS, BEING A PORTION OF THE SOUTHEAST ONE-QUARTER OF SECTION 26, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

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DECEMBER 2020

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ENGINEERS PLANNERS SURVEYORS
1025 Creekside Ridge Drive, Suite 150, Roseville, CA 95678 (916) 773-1189

COUNCIL COMMUNICATION

CC #: 1746
File #: 0400-04-12-1 & 0400-07

Title:	Federico - Phase 2 - Village 1 Subdivision - Final Map and Subdivision Agreement
Contact:	David Samuelson 916-774-5442 dsamuelson@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.11.

RECOMMENDATION TO COUNCIL

It is recommended that the City Council take the following actions:

1. Approve the final map on file with the City Clerk and accept on behalf of the public, Lots A, B, C, D, E, F, G, and H, and the public easements offered thereon; and approve the abandonment of the easements listed thereon; and

2. Adopt the attached resolution approving a Subdivision Agreement with Taylor Morrison of California, LLC for the Federico Phase 2 Village 1 subdivision and authorizing the City Manager to execute it on behalf of the City.

BACKGROUND

The Development Services, Engineering section has reviewed the subject parcel map and found that it is in compliance with the Subdivision Map Act and the City's Subdivision Ordinance, and all conditions of the tentative map have been met. The map will create 74 residential lots.

FISCAL IMPACT

There is no fiscal impact to the City's General Fund associated with this approval.

ENVIRONMENTAL REVIEW

Approval of the Federico - Phase 2 Village 1 final map is an action that is subject to California Environmental Quality Act (CEQA). Project level CEQA compliance for the Federico - Phase 2 Village 1 final map was accomplished with preparation of the Sierra Vista Specific Plan EIR (Adopted: May 5, 2010) (SCH#2008032017) and the Mitigated Negative Declaration (MND) and associated Mitigation Monitoring Program approved by the City of Roseville on June 6, 2012. Because the Federico - Phase 2 Village 1 final map is consistent with the project evaluated in the

Sierra Vista Specific Plan Environmental Impact Report (EIR), no new effects would be expected to occur and all applicable mitigation measures from the Sierra Vista Specific Plan EIR will be implemented. As such, no additional CEQA action is required at this time.

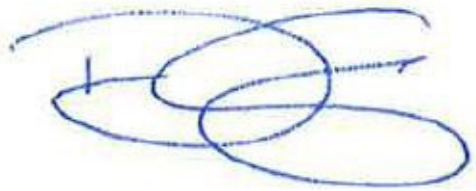
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal F - Invest in well-planned infrastructure and growth

Respectfully Submitted,

David Samuelson, Associate Engineer

Mike Isom, Development Services Director



_____
Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution 21-426

subdivision agreement

final map

RESOLUTION NO. 21-426

APPROVING A SUBDIVISION AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND TAYLOR MORRISON OF CALIFORNIA, LLC, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE

WHEREAS, a subdivision agreement, by and between the City of Roseville and Taylor Morrison of California, LLC, for the Federico Phase 2 Village 1 Subdivision, has been reviewed by the City Council; and

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Roseville that said agreement is approved and that the City Manager is authorized to execute it on behalf of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville this____day of _____, 20_, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

RECORDING REQUESTED BY AND WHEN RECORDED, PLEASE RETURN TO:

City Clerk
CITY OF ROSEVILLE
311 Vernon Street
Roseville, CA 95678

Exempt from recording fees
Pursuant to Govt. Code §27383

SUBDIVISION AGREEMENT

Federico Phase 2 Village 1 SUBDIVISION

THIS AGREEMENT, made and entered into this ___ day of _____, 20__, by and between the CITY OF ROSEVILLE, a municipal corporation ("CITY"), and Taylor Morrison of California _____, a Limited Liability Company _____, ("SUBDIVIDER"),

W I T N E S S E T H:

WHEREAS, SUBDIVIDER is possessed of a tract of land lying in the City of Roseville, County of Placer, known as "Federico Phase 2 Village 1 _____ Subdivision" (Subdivision no. PL20-0113; "the Subdivision"); and

WHEREAS, a tentative map of the Subdivision was approved by the City Planning Commission on the 10 day of SEPTEMBER, 2020, and the final map of the Subdivision has been approved subject to the execution of this Agreement; and

WHEREAS, the final map has been filed on the ____ day of _____, 20__ in Book _____ of Parcel/Subdivision Maps at Page _____ in the Official Records, Placer County Recorder, file no. _____; and

WHEREAS, Section 18.20.110 of the Roseville Municipal Code, regulating the subdivision of land in the City, requires that SUBDIVIDER shall execute and file an agreement between itself and CITY relating to the improvements to be made in a subdivision, prior to the approval by the City Council of the final map.

NOW, THEREFORE, the parties agree as follows:

1. Rights-of-Way. Except as otherwise provided by this Agreement, CITY rejects all lands, right-of-ways, and easements offered for dedication on the final map of the Subdivision. All such offers shall, however, remain open, and shall constitute irrevocable offers of dedication in accordance with Government Code Section 66477.2. All such offers may be accepted by CITY in its sole discretion at any later date without further notice to SUBDIVIDER as provided by law.

By way of explanation only, it is the current intention of CITY to accept all or part of such irrevocable offers to dedicate upon acceptance of the improvements called for in this Agreement.

2. Improvements - Time Limit. SUBDIVIDER agrees to cause all improvements to be made and constructed in the Subdivision to fully comply with the requirements of the Roseville Municipal Code and the Subdivision Map Act of the State of California according to the improvement plans for the Subdivision prepared by Mackay and Somps, dated March 2021 and approved by the City Engineer and including any changes or

alterations to such improvements required by the City Engineer, and to install, on or before December 31st, 2022, such survey monuments as may be required by the City Engineer ("the Work"). SUBDIVIDER agrees to pay for any materials, provisions or other supplies used in, upon, for or about the performance of the Work, or for any work or labor of any kind done in connection with the Work, or for any amounts due under the Unemployment Insurance Act with respect to such work or labor.

SUBDIVIDER agrees to complete all of the Work on or before twenty-four (24) months from the date of this Agreement. If in the opinion of the City Engineer of CITY, an extension of this Agreement is not detrimental to the public welfare, he or she is, in his or her sole discretion, hereby authorized to extend the time within which the Work shall be completed for a period not to exceed twelve (12) months. Upon a written application made by SUBDIVIDER, further extensions, not to exceed an additional six (6) months, shall be reviewed and approved at the discretion of the City Engineer of CITY. Any such application extension request by SUBDIVIDER shall fully state the grounds and facts relied upon for the granting of additional extensions.

In the event that SUBDIVIDER shall fail to complete the Work within the time provided by this Agreement, CITY may, in its sole discretion and in addition to any other remedy provided in this Agreement or by law, enter upon the Subdivision and complete the Work and recover the full cost and expense of such construction from SUBDIVIDER, SUBDIVIDER's successors and assigns, or from the then owner of the Subdivision, and/or place a lien upon the Subdivision for such cost and expense.

If at anytime prior to the expiration of the time provided by this Agreement the City Engineer of CITY determines that a safety hazard exists within an existing public right-of-

way, the City Engineer shall give written notice to SUBDIVIDER to eliminate the safety hazard. If SUBDIVIDER fails to eliminate the safety hazard within five (5) calendar days of the written notice, CITY may, in its sole discretion and in addition to any other remedy provided in this Agreement or by law, eliminate the safety hazard and recover the full cost and expense of such work from SUBDIVIDER, SUBDIVIDER's successors and assigns, or from the then owner of the Subdivision, and/or place a lien upon the Subdivision for such cost and expense.

3. Acquisition and Dedication of Easements or Rights-of-Ways. If any of the Work is to be constructed or installed on land not within the Subdivision or already existing public right-of-way, no construction or installation shall be commenced before:

a. The irrevocable offer of dedication or conveyance to CITY of appropriate right-of-ways, easements or other interest in real property, and appropriate authorization from the property owner to allow construction or installation of the improvements or work; or

b. The issuance of an order of possession by a court of competent jurisdiction pursuant to the State Eminent Domain Law. SUBDIVIDER shall comply in all respects with any such order of possession.

Nothing in this Section 3 shall be construed as authorizing or granting an extension of time to SUBDIVIDER for completion of the Work.

4. Inspection Fees and Costs. The City Engineer shall inspect all of the Work improvements made in the Subdivision to see that they comply with CITY's subdivision regulations and specifications. SUBDIVIDER shall deposit the estimated inspection fee and reimburse CITY for the cost of such inspections in accordance with Roseville Municipal Code section 18.20.070.

5. Securities.

a. SUBDIVIDER shall file with this Agreement two (2) improvement securities as set forth in Roseville Municipal Code Sections 18.20.150 and 18.20.160. Each security shall be in the amount of one hundred percent (100%) of the total estimated cost of the Work as determined by the City Engineer which amount is the sum of $2,156,707. One improvement security shall secure faithful performance of this Agreement as required by Section 66499.3(a) of the Government Code of the State of California (the "faithful performance" security). The second improvement security shall, as required by Section 66499.3(b) of the Government Code of the State of California, secure the obligations set forth in Title 15 (commencing with Section 3082) of Part 4 of Division 3 of the Civil Code of the State of California for payment to the contractor, his subcontractors and to persons renting equipment or furnishing labor or materials to them for the Work (the "payment security"). The improvement securities required under this paragraph shall also secure placement of monumentation and guarantee payment therefor as provided by California Government Code section 66496.

b. SUBDIVIDER shall also file with this Agreement a "guarantee and warranty security" in the amount of ten percent (10%) of the City Engineer's estimated cost of the Work as set forth in Section 18.20.170 of the Roseville Municipal Code to guarantee and warrant the Work for a period of one year following its completion and acceptance against any defective work or labor done, or defective materials furnished, as required by Section 66499(a)(5) of the Government Code of the State of California. The guarantee and warranty security shall be released upon SUBDIVIDER's request following expiration of the warranty period and subject to the reasonable determination of the City Engineer that SUBDIVIDER's warranty obligations have been satisfied.

c. Any bonds submitted as security pursuant to this section shall be executed by a surety company authorized to transact a surety business in the State of California. All required securities shall be in a form approved by the City Attorney of CITY.

6. Successors and Assigns – Covenant Running with the Land. This Agreement shall inure to the benefit of, and be binding upon, the successors and assigns of the respective parties. It shall be recorded in the Office of the Recorder of Placer County concurrently with the final map of the Subdivision, and shall constitute a covenant running with the land and an equitable servitude upon the real property within the Subdivision.

7. Acceptance of Improvements Upón Completion. Upon satisfactory completion of the Work, in accordance with this Agreement, CITY agrees to accept the Work and its improvements and the offers of dedication described in paragraph 1, subject to the provisions of paragraphs 1 and 10 of this Agreement.

8. Notice Regarding Construction. SUBDIVIDER shall notify the City Engineer of CITY in writing three (3) days prior to the commencement of construction of the Work.

9. Subdivider's Obligation to Warn Public During Construction. Until final acceptance of the Work, SUBDIVIDER shall give good and adequate warning to the public of each and every dangerous condition which may exist in the Work, and will take all reasonable actions to protect the public from any such dangerous condition.

10. Warranty.

a. SUBDIVIDER guarantees and warrants the public improvements which constitute the Work required by this Agreement, and agrees to remedy any defects in the improvements or the Work arising from faulty or defective materials or construction of said improvements or the Work occurring within twelve (12) months after their acceptance by CITY.

SUBDIVIDER agrees to permit inspection of all improvements in the Subdivision by the City Engineer of CITY for such period, and to reimburse CITY for the cost of such inspections.

b. If, within the warranty period, the Work or improvement or any part of the Work done, furnished, installed, or constructed fails to fulfill any of the requirements of this Agreement or the improvement plans and specifications, SUBDIVIDER shall, without delay or cost to CITY, repair, replace or reconstruct any defective or otherwise unsatisfactory part or parts of the Work. CITY may, at its sole option, perform such repair or replacement itself if SUBDIVIDER has failed to commence such repair within twenty (20) days after CITY has mailed written notice of default to SUBDIVIDER and to SUBDIVIDER'S Surety. In such event, SUBDIVIDER agrees to pay the cost of such repair and replacement by CITY and CITY may, at its option, recover such cost as a lien against the Subdivision should the cost exceed the inspection fee deposited pursuant to paragraph 4 of this Agreement.

Should CITY determine that the public safety requires repairs or replacements to be made before SUBDIVIDER can be notified, CITY may, in its sole discretion, make the necessary repairs or replacement or perform the necessary work. SUBDIVIDER shall pay to CITY the cost of such repairs and CITY may at its option recover such cost as a lien against the Subdivision.

11. Indemnification. To the fullest extent allowed by law, SUBDIVIDER shall defend, indemnify, and save and hold harmless CITY, its officers, agents, employees and volunteers from any claims, suits or actions of every name, kind and description brought forth, or on account of, injuries to or death of any person (including but not limited to workers and the public), or damage to property, resulting from or arising out of SUBDIVIDER 's willful misconduct or negligent act or omission while engaged in the performance of obligations or

exercise of rights created by this Agreement, except those matters arising from CITY's sole or active negligence or willful misconduct. The parties intend that this provision shall be broadly construed.

SUBDIVIDER's responsibility for such defense and indemnity obligations shall survive the termination or completion of this Agreement for the full period of time allowed by law. The defense and indemnity obligations of this Agreement are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained in this Agreement.

12. Insurance. SUBDIVIDER agrees to continuously maintain, in full force and effect, at a minimum the following policies of insurance during the term of this Agreement.

COVERAGE	LIMITS OF LIABILITY
General Liability	$2,000,000 per occurrence $4,000,000 aggregate Personal Injury: $2,000,000 per occurrence $4,000,000 aggregate
Automobile Liability	$1,000,000 combined single limit
Workers' Compensation	Statutory

a. Form. SUBDIVIDER shall submit a certificate evidencing such coverage for the period covered by this Agreement in a form satisfactory to Risk Management and the City Attorney, prior to undertaking any work hereunder. Any insurance written on a claims made basis is subject to the approval of Risk Management and the City Attorney.

b. Additional Insureds. SUBDIVIDER shall also provide a separate endorsement form or section of the policy showing CITY, its officers, agents, employees and volunteers as additional insureds for each type of coverage, except for Workers' Compensation, for ongoing and completed operations. Such insurance shall specifically cover the contractual

liability of SUBDIVIDER. The additional insured coverage under the SUBDIVIDER's policy shall be primary and noncontributory, as evidenced by a separate endorsement or section of the policy, and shall not seek contribution from CITY's insurance or self-insurance. In addition, the additional insured coverage shall be at least as broad as the Insurance Services Office ("ISO") CG 20 01 Endorsement. Any available insurance proceeds in excess of the specified minimum insurance coverage requirements and limits shall be available to the additional insureds. Furthermore, the requirements for coverage and limits shall be: (1) the minimum coverage and limits specified in this Agreement; or (2) the full coverage and maximum limits of any insurance proceeds available to the named insureds, whichever is greater.

c. Cancellation/Modification. SUBDIVIDER shall provide ten (10) days written notice to CITY prior to cancellation or modification of any insurance required by this Agreement.

d. Umbrella/Excess Insurance. The limits of insurance required in this Agreement may be satisfied by a combination of primary and excess insurance. Any excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and noncontributory basis for the benefit of CITY (if agreed to in a written contract) before CITY's own insurance shall be called upon to protect it as a named insured.

e. Self-Insured Retentions. All self-insured retentions ("SIR") must be disclosed to Risk Management for approval and shall not reduce the limits of liability. Policies containing any SIR provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named insured or CITY. CITY reserves the right to obtain a full certified copy of any insurance policy and endorsements. The failure to exercise this right shall not constitute a waiver of such right.

f. Waiver of Subrogation. SUBDIVIDER hereby agrees to waive subrogation which any insurer of SUBDIVIDER may acquire from SUBDIVIDER by virtue of the payment of any loss under a Workers Compensation, Commercial General Liability or Automobile Liability policy. All Workers Compensation, Commercial General Liability and Automobile Liability policies shall be endorsed with a waiver of subrogation in favor of CITY, its officers, agents, employees and volunteers for all worked performed by SUBDIVIDER, its employees, agents and subcontractors.

g. Liability/Remedies. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve SUBDIVIDER of liability in excess of such coverage, nor shall it preclude CITY from taking such other actions as are available to it under any other provisions of this Agreement or law.

13. Irrevocability of Security. The improvement securities furnished pursuant to paragraph 5 shall be irrevocable, shall not be limited as to time (except as to the one-year guarantee and warranty period specified in paragraph 10) and shall provide that they may be released, in whole or part, only upon the written approval of the City Engineer of CITY.

14. Attorney's Fees; Venue; Governing Law. Any action by any party to this Agreement, or any action concerning a security furnished pursuant to paragraph 5, shall be brought in the appropriate court of competent jurisdiction within the County of Placer, State of California, notwithstanding any other provision of law which may provide that such action may be brought in some other location. In the event it becomes necessary for either party to bring an action with respect to enforcement of the provisions of this Agreement, or the security therefor, the prevailing party in such action shall be awarded a reasonable attorney's fee, as may be

determined by the Court. This Agreement shall be governed by and construed in accordance with the laws of the State of California.

15. Release of Faithful Performance Security. Release of faithful performance security shall be in compliance with and pursuant to the procedures set forth in Government Code Section 66499.7. Upon the completion of all secured Work by SUBDIVIDER and written acceptance of that completed Work by CITY, and the furnishing of the warranty security as required by paragraph 5(b), the City Engineer shall authorize the release of the remaining faithful performance security.

16. Release of Payment Security. Thirty-five (35) days after a notice of completion is recorded with respect to the Work, the City Engineer of CITY may authorize the release of the payment security, in the event that no claims have been filed against said security. In the event that claims or actions are filed against the security, the City Engineer may release so much of such security as is in excess of the total of the claims made against it, plus a reasonable amount of costs and attorney's fees.

17. Automatic Termination Upon Completion and Sale of Residential Unit. This Agreement and any lien pursuant hereto shall automatically be terminated, without any further action by either party or need to record any additional document, with respect to any single-family residential lot within a parcel designated by the Specific Plan for residential use, upon completion of construction and issuance by the City of a final inspection for a dwelling unit upon such residential lot and conveyance of such improved residential lot to a bona-fide good faith purchaser thereof. In connection with its issuance of a final inspection for such improved lot, City shall confirm that: (i) all improvements which are required to serve the lot, as determined by City, have been accepted by City; (ii) the lot is included within the Maintenance CFD required

by Section 3.20 or other financing mechanism acceptable to the City, to the extent required hereby; and (iii) if and to the extent applicable to such lot, an affordable purchase or rental housing agreement has been recorded on the lot. Termination of this Agreement for any such residential lot as provided for in this section shall not in any way be construed to terminate or modify any assessment district or Mello-Roos Community Facilities District lien affecting such lot at the time of termination.

18. Failure of Performance. In addition to any other remedies provided in this Agreement or by law, in the event SUBDIVIDER fails to perform one or more of the covenants or conditions of this Agreement, CITY shall have recourse to the security given to guarantee the performance of such acts. CITY may do, or cause to be done, those acts required of SUBDIVIDER, and shall have recourse against so much of the security as is necessary to discharge the responsibility of SUBDIVIDER. In the event CITY seeks recourse against a security, CITY shall also have recourse against SUBDIVIDER for any and all amounts necessary to complete the obligations of SUBDIVIDER in the event the security is insufficient to pay such amounts. All administrative costs, including reasonable attorney's fees pursuant to Section 66499.4 of the Government Code, incurred by CITY, in addition to the costs of the improvements, shall be a proper charge against the security and SUBDIVIDER.

19. Integration. This Agreement is an integrated agreement. It supersedes all prior negotiations, representations, or agreements, either written or oral.

20. Modification. This Agreement and each provision contained herein may be waived, amended, supplemented or eliminated only by mutual written agreement of the parties.

21. Notices. Any notices sent to the parties relating to this Agreement shall be sent by first class mail, postage prepaid or delivered to the following addresses:

Marc Stout, City Engineer
City of Roseville
311 Vernon Street
Roseville, CA 95678

Kevin Vas Dias, Land Specialist
Taylor Morrison of California
81 Blue Ravine Road, Suite 220
Folsom, CA 93405

Either party may amend its address by giving written notice to the other.

22. Severability. If any of the provisions contained in this Agreement are for any reason held invalid or unenforceable, such holding shall not affect the remaining provisions or the validity and enforceability of the Agreement as a whole.

IN WITNESS WHEREOF, the City of Roseville, a municipal corporation, has authorized the execution of this Agreement in duplicate by its City Manager and attestation by its City Clerk under authority of Resolution No. ____, adopted by the Council of the City of Roseville on the ___ day of _____, 20__, and SUBDIVIDER has caused this Agreement to be executed.

CITY OF ROSEVILLE, a municipal corporation,

BY: _____
DOMINICK CASEY
City Manager

ATTEST:

BY: _____
SONIA OROZCO
City Clerk

Taylor Morrison of California,
a Limited Liability Corporation

BY: _____
Print name: Jay Paulk
Title: Vice President

and

BY: _____
Print name: Aren Brazeau
Title: Vice President

(NOTARIZATION REQUIRED)

[L:\agreement\form agreements\subdivision agmt.docx; 6/29/2021]

APPROVED AS TO FORM:

BY:_____
MICHELLE SHEIDENBERGER
City Attorney

APPROVED AS TO SUFFICIENCY:

BY: _____
MARC STOUT
City Engineer

CALIFORNIA ALL PURPOSE ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document, to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF California)SS
COUNTY OF Sacramento)

On August 24, 2021, before me, L. Hall, Notary Public, personally appeared Aren Bazzocco and Jay Pawlek, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature L. Hall

L. HALL
Notary Public - California
Sacramento County
Commission # 2249285
My Comm. Expires Aug 5, 2022

My Commission Expires: August 5, 2022 *This area for official notarial seal*

Notary Name: L. Hall
Notary Registration Number: 2249285
Notary Phone: 916-355-8900
County of Principal Place of Business: Sacramento

BOOK_____ OF MAPS, PAGE_____

OWNER'S STATEMENT

THE UNDERSIGNED HEREBY CERTIFY THAT THEY ARE THE ONLY PERSONS HAVING ANY RECORD TITLE INTEREST IN THE REAL PROPERTY INCLUDED WITHIN THE SUBDIVISION SHOWN UPON THIS FINAL MAP OF "FEDERICO PHASE 2 - VILLAGE 1" AND THEY HEREBY CONSENT TO THE PREPARATION AND RECORDATION OF THIS FINAL MAP AND HEREBY OFFER FOR DEDICATION AND DO HEREBY DEDICATE FOR SPECIFIC PURPOSES THE FOLLOWING:

THE REAL PROPERTY DESCRIBED BELOW IS DEDICATED AS EASEMENTS FOR PUBLIC PURPOSES:

(A) PUBLIC EASEMENTS FOR THE INSTALLATION AND MAINTENANCE OF, BUT NOT LIMITED TO ELECTROLIERS, WATER AND GAS PIPES, SEWER AND DRAINAGE PIPES, AND FOR UNDERGROUND WIRE AND CONDUITS FOR ELECTRIC, TELEPHONE AND TELEVISION SERVICES AND TRAFFIC CONTROL APPURTENANCES TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO ON, OVER, UNDER AND ACROSS LOTS A, B, C, D, E, F, G, H, THE STREETS SHOWN HEREON AS EARL RUSH DRIVE, SUPER MOON WAY, SKYWARD WAY, STAR SHOWER DRIVE AND SUMMERSCAPE DRIVE AND THOSE STRIPS OF LAND LYING CONTIGUOUS TO THE RIGHTS-OF-WAY AS SHOWN HEREON AND DESIGNATED "P.U.E." (PUBLIC UTILITY EASEMENT).

(B) A PUBLIC EASEMENT FOR PEDESTRIAN / BICYCLE ACCESS AND THE INSTALLATION, REPAIR, REMOVAL OR REPLACEMENT OF LANDSCAPING TOGETHER WITH ANY AND ALL APPURTENANCES THERETO ON, OVER, UNDER AND ACROSS LOTS A, B, C, D, E, F, G AND H SHOWN HEREON AND DESIGNATED "PASEO EASEMENT" (P.E.).

THE REAL PROPERTY DESCRIBED BELOW IS DEDICATED IN FEE FOR PUBLIC PURPOSES:

(A) AS PUBLIC RIGHTS-OF-WAY (INCLUDING ALL IMPROVEMENTS THEREON) THE STREETS SHOWN HEREON AS EARL RUSH DRIVE, STAR SHOWER DRIVE, SUMMERSCAPE DRIVE, SKYWARD WAY AND SUPER MOON WAY.

(B) LOTS A, B, C, D, E, F, G, AND H SHOWN HEREON TO THE CITY OF ROSEVILLE FOR LANDSCAPING AND AS PUBLIC RIGHTS-OF-WAY.

TAYLOR MORRISON OF CALIFORNIA, LLC
A CALIFORNIA LIMITED LIABILITY COMPANY

BY:_____ BY:_____

NAME:_____ NAME:_____

NAME:_____ NAME:_____

NOTARY'S ACKNOWLEDGMENT

A NOTARY PUBLIC OR OTHER OFFICER COMPLETING THIS CERTIFICATE VERIFIES ONLY THE IDENTITY OF THE INDIVIDUAL WHO SIGNED THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED, AND NOT THE TRUTHFULNESS, ACCURACY OR VALIDITY OF THAT DOCUMENT.

STATE OF CALIFORNIA

COUNTY OF _____

ON_____ BEFORE ME,_____A NOTARY PUBLIC

PERSONALLY APPEARED _____
WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND AND OFFICIAL SEAL.

_____
SIGNATURE PRINTED NAME

MY PRINCIPAL PLACE OF BUSINESS IS _____COUNTY

MY COMMISSION EXPIRES: _____ MY COMMISSION NUMBER: _____

SURVEYOR'S STATEMENT

THIS FINAL MAP OF "FEDERICO PHASE 2 - VILLAGE 1" WAS PREPARED BY ME OR UNDER MY DIRECTION AND IS BASED UPON A FIELD SURVEY IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCES AT THE REQUEST OF MOURIER INVESTMENTS, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY AND WESTPARK SIERRA VISTA LLC, IN NOVEMBER 2017. I HEREBY STATE THAT THIS FINAL MAP SUBSTANTIALLY CONFORMS TO THE APPROVED OR CONDITIONALLY APPROVED TENTATIVE MAP. ALL MONUMENTS SHOWN HEREON ARE OF THE CHARACTER AND WILL OCCUPY THE POSITIONS INDICATED, AND WILL BE SET BY DECEMBER 31, 2022 AND THAT THE MONUMENTS ARE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED.

MACKAY & SOMPS CIVIL ENGINEERS, INC.

Preliminary

07/15/2021 2:13:47 PM

PAUL FERGUSON, JR., PLS 9265
EXPIRATION DATE: MARCH 31, 2022

DATE: _____

LICENSED LAND SURVEYOR
PAUL FERGUSON, JR.
No. 9265
STATE OF CALIFORNIA

CITY ENGINEER'S STATEMENT

I HEREBY STATE THAT I HAVE EXAMINED THIS FINAL MAP OF "FEDERICO PHASE 2 - VILLAGE 1" AND FIND IT TO BE SUBSTANTIALLY THE SAME AS THE TENTATIVE MAP ON FILE AND ANY APPROVED ALTERATIONS THEREOF; THAT ALL PROVISIONS OF THE SUBDIVISION MAP ACT AND ALL APPLICABLE CITY ORDINANCES HAVE BEEN COMPLIED WITH.

_____ DATE: _____

MARC STOUT, R.C.E. 69879
CITY ENGINEER, CITY OF ROSEVILLE
LICENSE EXPIRES: SEPTEMBER 30, 2022

I HEREBY STATE THAT I AM SATISFIED THIS FINAL MAP OF "FEDERICO PHASE 2 - VILLAGE 1" IS TECHNICALLY CORRECT.
FOR MARC STOUT, CITY ENGINEER, CITY OF ROSEVILLE

_____ DATE: _____

TIMOTHY G. BLAIR, PLS 8278
EXPIRES DECEMBER 31, 2021

LICENSED LAND SURVEYOR
TIMOTHY G. BLAIR
Exp. 12-31-21
No. 8278
STATE OF CALIFORNIA

CITY CLERK'S STATEMENT

I HEREBY CERTIFY THAT THE CITY COUNCIL, CITY OF ROSEVILLE, HAS APPROVED THIS FINAL MAP OF "FEDERICO PHASE 2 - VILLAGE 1", AND HAS ACCEPTED ON BEHALF OF THE PUBLIC THE EASEMENTS OFFERED HEREON FOR DEDICATION AND HAVE ACCEPTED, SUBJECT TO IMPROVEMENT, LOTS A, B, C, D, E, F, G, H, AND THE RIGHTS-OF-WAY OFFERED HEREON FOR DEDICATION.

_____
CITY CLERK, CITY OF ROSEVILLE

DATE: _____ BY: _____
ASSISTANT CITY CLERK

RECORDER'S STATEMENT

FILED THIS _____ DAY OF _____, 2021, AT _____ .M. IN BOOK _____ OF MAPS, AT PAGE _____, IN THE OFFICE OF THE PLACER COUNTY RECORDER, AT THE REQUEST OF MACKAY & SOMPS CIVIL ENGINEERS, INC.

_____ DOCUMENT NO.: _____
RECORDER OF PLACER COUNTY
STATE OF CALIFORNIA

BY:_____ FEE: $ _____
DEPUTY

FINAL MAP OF

FEDERICO PHASE 2
VILLAGE 1

SUBDIVISION NO. PL20-0113

ALL OF LOT 1 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018 IN BOOK EE OF MAPS AT PAGE 6, PLACER COUNTY RECORDS, BEING A PORTION OF THE SOUTHWEST ONE-QUARTER OF SECTION 26, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

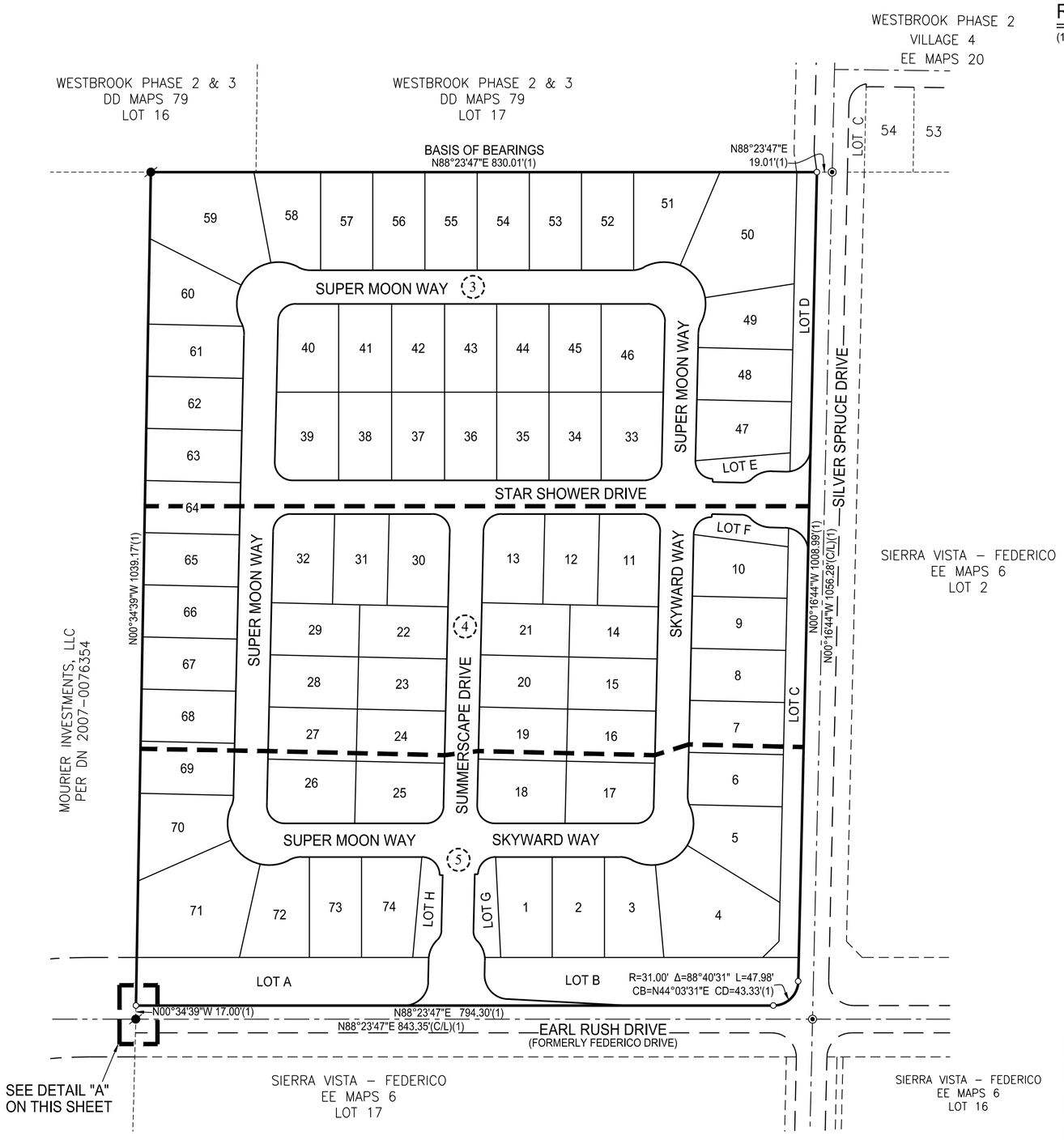
CITY OF ROSEVILLE • PLACER COUNTY • CALIFORNIA

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1025 Creekside Ridge Drive, Suite 150, Roseville, CA 95678 (916) 773-1189

AUGUST 2021

 18254.FED.01

BOOK_____OF MAPS, PAGE_____



REFERENCES:

(1) EE MAPS 6

LEGEND:

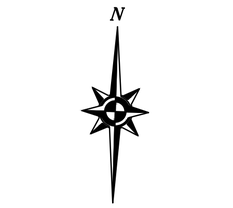
◉	FOUND COPPERWELD SURVEY MONUMENT WITH CENTER PUNCH IN MONUMENT WELL STAMPED "LS 7944"(1)
⦿	FOUND 3/4" IRON PIPE WITH PLASTIC PLUG STAMPED "LS 7944"(1)
◎	SET COPPERWELD SURVEY MONUMENT WITH CENTER PUNCH IN MONUMENT WELL STAMPED "LS 9265" PER CITY OF ROSEVILLE STANDARDS
○	DIMENSION POINT
CB	CHORD BEARING
CD	CHORD DISTANCE
C/L	CENTERLINE
DN	DOCUMENT NUMBER
I.O.D.	IRREVOCABLE OFFER OF DEDICATION
(OA)	OVERALL
P.E.	PASEO EASEMENT
P.U.E.	PUBLIC UTILITY EASEMENT
(R)	RADIAL BEARING
S.F.	SQUARE FEET
(1)	DENOTES RECORD INFORMATION
(X)	SHEET INDEX NUMBER

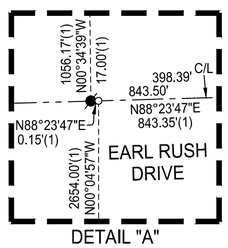
BASIS OF BEARINGS:

THE BEARING N 88°23'47" E, BEING THE NORTH LINE OF LOT 1 AS SHOWN AND SO DESIGNATED ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO, LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018 IN BOOK EE OF MAPS, AT PAGE 6, PLACER COUNTY RECORDS. DISTANCES SHOWN HEREON ARE GROUND DISTANCES.

NOTES

1. TOTAL AREA OF THIS SUBDIVISION IS 19.728± ACRES GROSS, CONSISTING OF 74 RESIDENTIAL LOTS AND 8 LANDSCAPE LOTS.
2. ALL CURVES ARE DIMENSIONED WITH RADIUS, DELTA, ARC LENGTH, CHORD BEARING AND CHORD LENGTH. DISTANCES SHOWN HEREON ARE IN FEET AND DECIMALS THEREOF AND ARE "GROUND" DISTANCES. DUE TO ROUNDING, THE SUM OF INDIVIDUAL DIMENSIONS MAY NOT EQUAL THE OVERALL DIMENSION.
3. A PRELIMINARY SOILS REPORT WAS PREPARED BY YOUNGDAHL CONSULTING GROUP, INC. DATED FEBRUARY, 2017; PROJECT NUMBER E 16372.00 AND ON FILE WITH THE CITY OF ROSEVILLE DEVELOPMENT SERVICES - ENGINEERING DEPARTMENT, FILE No. 308-870.
4. ALL FRONT CORNERS ARE MARKED BY A 1" BRASS TAG STAMPED "LS 9265" IN THE SIDEWALK ON THE EXTENSION OF SIDE LOT LINES 1.00' FROM THE PROPERTY LINE. WHERE SIDEWALK DOES NOT EXIST, FRONT CORNERS SHALL BE SET ON 2.00' EXTENSION IN THE GUTTER PAN, UNLESS OTHERWISE NOTED.
5. ALL REAR CORNERS AND ANGLE POINTS WILL BE SET WITH A 5/8" REBAR AND PLASTIC CAP STAMPED "LS 9265". WHERE A REAR CORNER FALLS WITHIN A MASONRY RETAINING WALL, MASONRY SOUND WALL OR CONCRETE FOOTING, A 5/8" REBAR WITH PLASTIC CAP STAMPED "LS 9265" WILL BE SET ON THE SIDE LOT LINE WITH A 4.00 FOOT OFFSET TO THE REAR CORNER OR A BRASS TAG STAMPED "LS 9265" WILL BE SET WITH EPOXY TO THE FACE OF WALL 2.00 FEET ABOVE GROUND OR ON TOP OF THE WALL WHERE AN OFFSET MONUMENT CANNOT BE SET.
7. THIS PROPERTY IS SUBJECT TO THE TERMS, CONDITIONS AND COVENANTS OF A RECIPROCAL EASEMENT AGREEMENT FOR TEMPORARY ACCESS AND TEMPORARY CONSTRUCTION PURPOSES RECORDED ON JUNE 6, 2017 AS DOC. NO. 2017-0041424. SAID EASEMENT, NOT SHOWN HEREON, LIES ENTIRELY WITHIN LOTS A, B, C AND D.
8. PURSUANT TO SECTION 66499.20.2 OF THE GOVERNMENT CODE, THE LANDS SHOWN HEREON, ARE HEREBY MERGED AND RESUBDIVIDED, AND THE FOLLOWING IRREVOCABLE OFFERS OF DEDICATION AND DRAINAGE EASEMENT THAT AFFECT THIS MAP ARE HEREBY ABANDONED:
   A. 12.5' P.U.E. ALONG WESTERLY RIGHT-OF-WAY OF SILVER SPRUCE DRIVE, WITHIN LOT 1 PER LARGE LOT FINAL MAP EE MAPS 6.





DETAIL "A"
N.T.S.

FINAL MAP OF

FEDERICO PHASE 2 VILLAGE 1

SUBDIVISION NO. PL20-0113

ALL OF LOT 1 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018 IN BOOK EE OF MAPS AT PAGE 6, PLACER COUNTY RECORDS, BEING A PORTION OF THE SOUTHWEST ONE-QUARTER OF SECTION 26, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

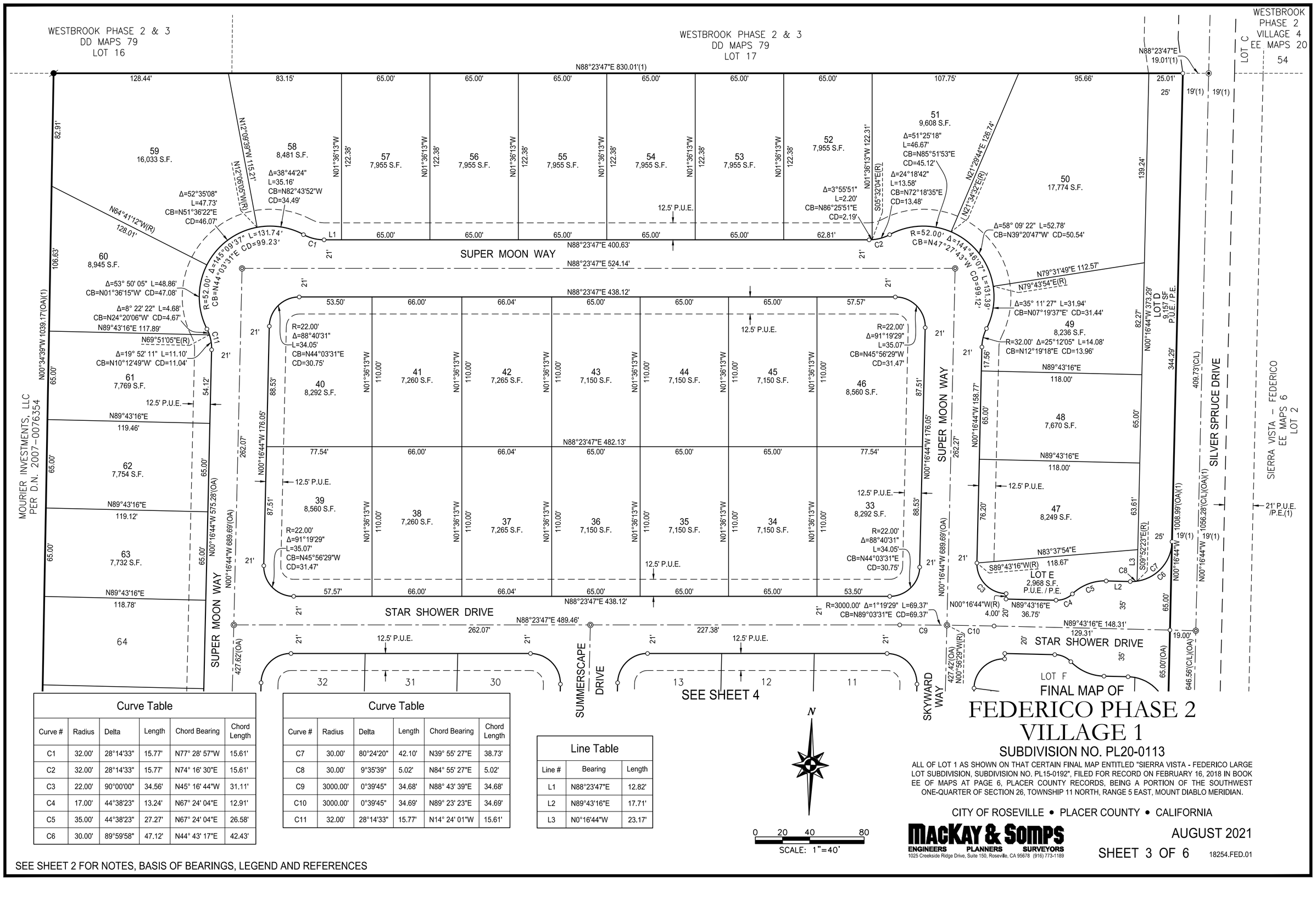
CITY OF ROSEVILLE • PLACER COUNTY • CALIFORNIA

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1025 Creekside Ridge Drive, Suite 150, Roseville, CA 95678 (916) 773-1189

AUGUST 2021

 18254.FED.01

BOOK____OF MAPS, PAGE____



Curve Table					
Curve #	Radius	Delta	Length	Chord Bearing	Chord Length
C1	32.00'	28°14'33"	15.77'	N77° 28' 57"W	15.61'
C2	32.00'	28°14'33"	15.77'	N74° 16' 30"E	15.61'
C3	22.00'	90°00'00"	34.56'	N45° 16' 44"W	31.11'
C4	17.00'	44°38'23"	13.24'	N67° 24' 04"E	12.91'
C5	35.00'	44°38'23"	27.27'	N67° 24' 04"E	26.58'
C6	30.00'	89°59'58"	47.12'	N44° 43' 17"E	42.43'

Curve Table					
Curve #	Radius	Delta	Length	Chord Bearing	Chord Length
C7	30.00'	80°24'20"	42.10'	N39° 55' 27"E	38.73'
C8	30.00'	9°35'39"	5.02'	N84° 55' 27"E	5.02'
C9	3000.00'	0°39'45"	34.68'	N88° 43' 39"E	34.68'
C10	3000.00'	0°39'45"	34.69'	N89° 23' 23"E	34.69'
C11	32.00'	28°14'33"	15.77'	N14° 24' 01"W	15.61'

Line Table		
Line #	Bearing	Length
L1	N88°23'47"E	12.82'
L2	N89°43'16"E	17.71'
L3	N0°16'44"W	23.17'

N

0 20 40 80

SCALE: 1"=40'

FINAL MAP OF
FEDERICO PHASE 2
VILLAGE 1

SUBDIVISION NO. PL20-0113

ALL OF LOT 1 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018 IN BOOK EE OF MAPS AT PAGE 6, PLACER COUNTY RECORDS, BEING A PORTION OF THE SOUTHWEST ONE-QUARTER OF SECTION 26, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

CITY OF ROSEVILLE • PLACER COUNTY • CALIFORNIA

MACKAY & SOMPS
ENGINEERS PLANNERS SURVEYORS
1025 Creekside Ridge Drive, Suite 150, Roseville, CA 95678 (916) 773-1189

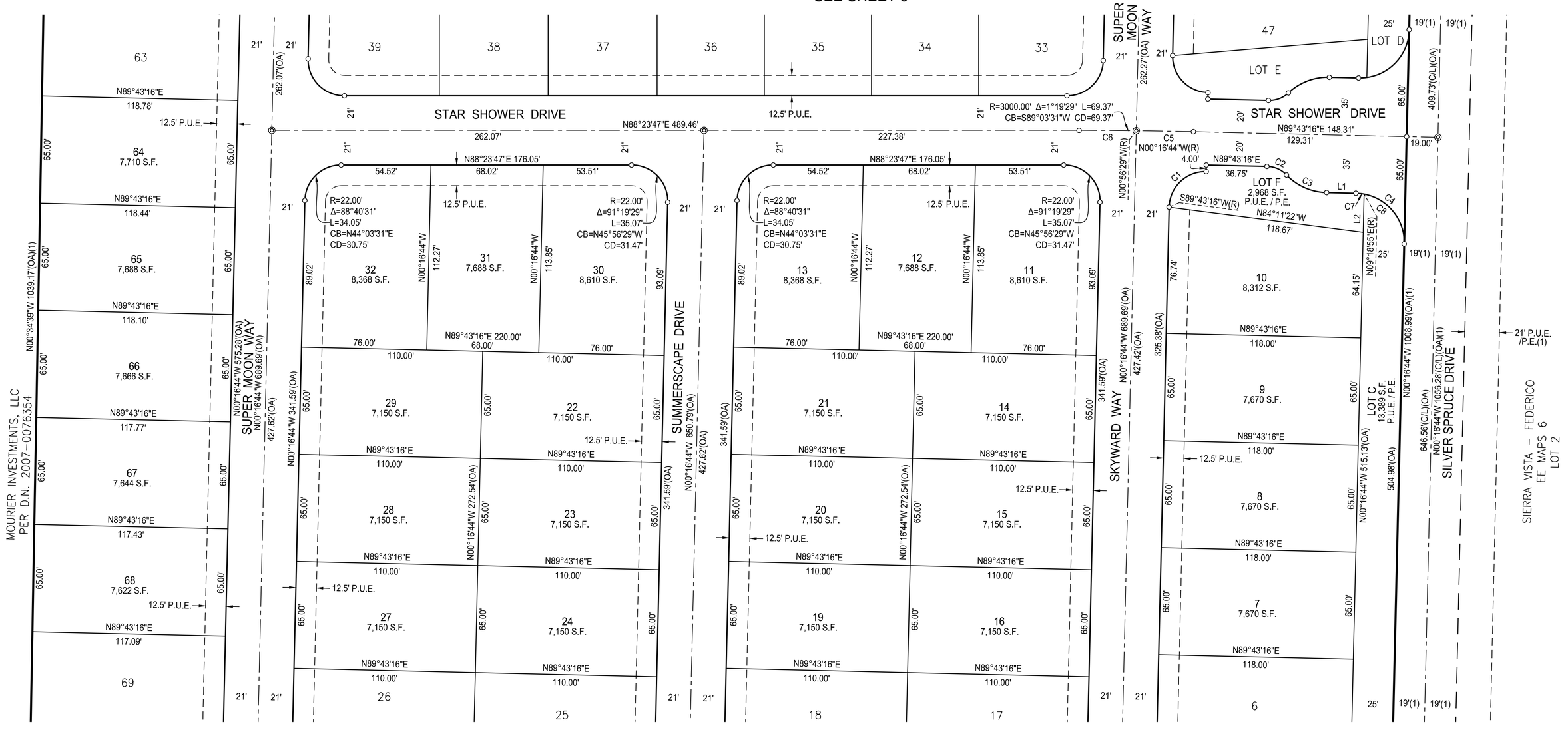
AUGUST 2021

 18254.FED.01

SEE SHEET 2 FOR NOTES, BASIS OF BEARINGS, LEGEND AND REFERENCES

BOOK____OF MAPS, PAGE____

SEE SHEET 3



SEE SHEET 5

Curve Table					
Curve #	Radius	Delta	Length	Chord Bearing	Chord Length
C1	22.00'	90°00'00"	34.56'	N44° 43' 16"E	31.11'
C2	17.00'	44°38'23"	13.24'	N67° 57' 32"W	12.91'
C3	35.00'	44°38'23"	27.27'	N67° 57' 32"W	26.58'
C4	30.00'	90°00'00"	47.12'	N45° 16' 44"W	42.43'
C5	3000.00'	0°39'45"	34.69'	N89° 23' 23"E	34.69'
C6	3000.00'	0°39'45"	34.68'	N88° 43' 39"E	34.68'
C7	30.00'	9°35'39"	5.02'	N85° 28' 55"W	5.02'
C8	30.00'	80°24'21"	42.10'	N40° 28' 55"W	38.73'

Line Table		
Line #	Bearing	Length
L1	N89°43'16"E	17.71'
L2	N0°16'44"W	23.17'

SEE SHEET 2 FOR NOTES, BASIS OF BEARINGS, LEGEND AND REFERENCES

N

0 20 40 80

SCALE: 1"=40'

FINAL MAP OF

FEDERICO PHASE 2 VILLAGE 1

SUBDIVISION NO. PL20-0113

ALL OF LOT 1 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018 IN BOOK EE OF MAPS AT PAGE 6, PLACER COUNTY RECORDS, BEING A PORTION OF THE SOUTHWEST ONE-QUARTER OF SECTION 26, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

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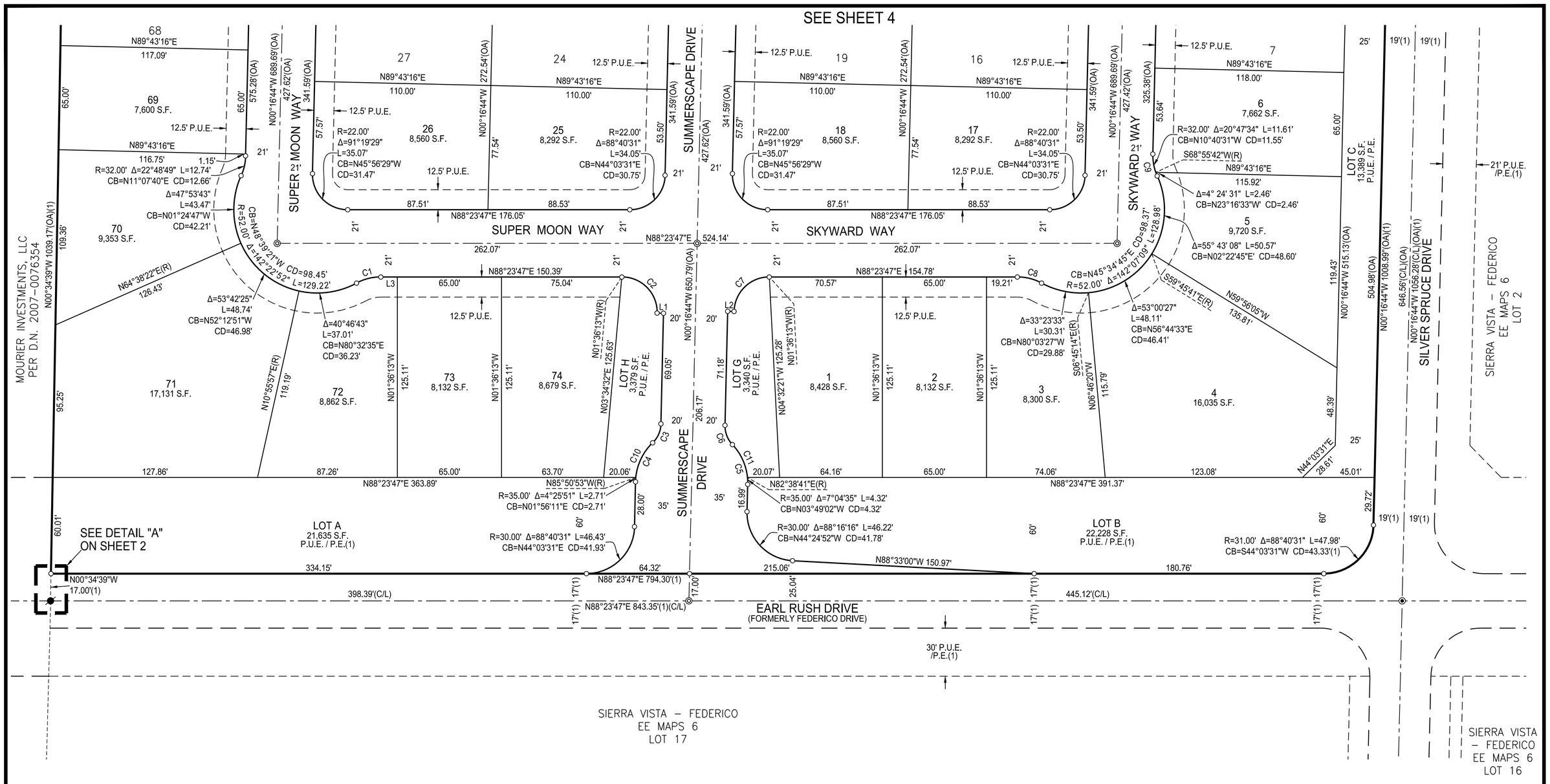
BOOK____ OF MAPS, PAGE____



Line Table		
Line #	Bearing	Length
L1	N89°43'16"E(R)	4.00'
L2	N89°43'16"E(R)	4.00'
L3	N88°23'47"E	10.35'

Curve Table					
Curve #	Radius	Delta	Length	Chord Bearing	Chord Length
C1	32.00'	28°14'33"	15.77'	N74° 16' 30"E	15.61'
C2	22.00'	91°19'29"	35.07'	N45° 56' 29"W	31.47'
C3	17.00'	44°38'23"	13.24'	N22° 02' 28"E	12.91'
C4	35.00'	40°12'32"	24.56'	N24° 15' 23"E	24.06'
C5	35.00'	44°38'23"	27.27'	N22° 35' 56"W	26.58'
C6	17.00'	44°38'23"	13.24'	N22° 35' 56"W	12.91'

Curve Table					
Curve #	Radius	Delta	Length	Chord Bearing	Chord Length
C7	22.00'	88°40'31"	34.05'	N44° 03' 31"E	30.75'
C8	32.00'	28°14'33"	15.77'	N77° 28' 57"W	15.61'
C9	32.00'	25°12'05"	14.08'	N12° 52' 47"W	13.96'
C10	35.00'	40°12'32"	24.56'	N24° 15' 23"E	24.06'
C11	35.00'	37°33'48"	22.95'	N26° 08' 13"W	22.54'

SEE SHEET 2 FOR NOTES, BASIS OF BEARINGS, LEGEND AND REFERENCES

N

0 20 40 80

SCALE: 1"=40'

FINAL MAP OF

FEDERICO PHASE 2 VILLAGE 1

SUBDIVISION NO. PL20-0113

ALL OF LOT 1 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018 IN BOOK EE OF MAPS AT PAGE 6, PLACER COUNTY RECORDS, BEING A PORTION OF THE SOUTHWEST ONE-QUARTER OF SECTION 26, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

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ADDITIONAL INFORMATION FOR INFORMATIONAL PURPOSES ONLY PURSUANT TO SECTION 66434.2 OF THE GOVERNMENT CODE

EACH RESIDENTIAL DWELLING CONSTRUCTED ON ANY OF THE LOTS INDICATED SHALL BE FITTED WITH A SEWER BACKFLOW PREVENTER VALVE AS APPROVED BY THE CITY OF ROSEVILLLE. IT SHALL BE THE RESPONSIBILITY OF THE OWNER OF SAID DWELLING TO MAINTAIN THE VALVE AND PREVENT DAMAGE FROM OCCURRING THERETO. THE CITY OF ROSEVILLE SHALL NOT BE RESPONSIBLE FOR THE MAINTENANCE OR PERFORMANCE OF THE VALVE, AND THE CITY OF ROSEVILLE SHALL NOT BE LIABLE FOR ANY DAMAGE OCCURRING TO ANY SUCH DWELLING OR ITS CONTENTS DUE TO FAILURE OF THE VALVE FOR ANY REASON WHATSOEVER.

LEGEND

* DENOTES SEWER BACKFLOW PREVENTER VALVE REQUIRED ON SANITARY SEWER CONNECTION BY THE CITY OF ROSEVILLE WITH THE BUILDING PERMIT AND MAINTAINED THEREAFTER BY THE OWNER.

N

0 50 100 200

SCALE: 1"=100'

FINAL MAP OF

FEDERICO PHASE 2 VILLAGE 1

SUBDIVISION NO. PL20-0113

ALL OF LOT 1 AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - FEDERICO LARGE LOT SUBDIVISION, SUBDIVISION NO. PL15-0192", FILED FOR RECORD ON FEBRUARY 16, 2018 IN BOOK EE OF MAPS AT PAGE 6, PLACER COUNTY RECORDS, BEING A PORTION OF THE SOUTHWEST ONE-QUARTER OF SECTION 26, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

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AUGUST 2021

 18254.FED.01

COUNCIL COMMUNICATION

CC #: 1753
File #: 0400-04-12-1 & 0400-07

Title:	Sierra Vista KT-1B Subdivision - Final Map and Subdivision Agreement
Contact:	Kerry Andrews 916-774-5346 kandrews@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.12.

RECOMMENDATION TO COUNCIL

Staff recommends that the City Council take the following actions:

1. Approve the final map on file with the City Clerk and accept on behalf of the public the public utility easements offered thereon and accept, subject to improvement, Lots A, B, and C and all rights of way offered thereon; and
2. Adopt the attached resolution approving the Subdivision Agreement and authorize the City Manager to execute the agreement on behalf of the City.

BACKGROUND

The Development Services, Engineering section, has reviewed the subject final map and found that it is in compliance with the Subdivision Map Act and the City's Subdivision Ordinance and all conditions of the tentative map have been met. This map will create 95 residential lots and 3 public landscape lots.

FISCAL IMPACT

There is no fiscal impact to the City's General Fund associated with this approval.

ENVIRONMENTAL REVIEW

Approval of the Sierra Vista KT-1B final map is an action that is subject to California Environmental Quality Act (CEQA). Project level CEQA compliance for the Sierra Vista KT-1B final map was accomplished with preparation of the Sierra Vista Specific Plan EIR (Adopted: May 5, 2010) (SCH#2008032017) and the Mitigated Negative Declaration (MND) and associated Mitigation Monitoring Program approved by the City of Roseville on June 6, 2012. Because the Sierra Vista KT-1B final map is consistent with the project evaluated in the Sierra Vista Specific Plan Environmental Impact Report (EIR), no new effects would be expected to occur and all applicable mitigation measures from the Sierra Vista Specific Plan EIR will be implemented. As such, no additional CEQA action is required at this time.

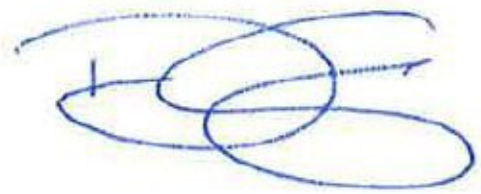
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal F - Invest in well-planned infrastructure and growth

Respectfully Submitted,

Kerry Andrews, Assistant Engineer

Mike Isom, Development Services Director



_____

Dominick Casey, City Manager

ATTACHMENTS:

Description

Final Map

Resolution 21-431

Subdivision Agreement

BOOK_____ OF MAPS, PAGE_____

OWNER'S STATEMENT

THE UNDERSIGNED HEREBY CERTIFY THAT THEY ARE THE ONLY PERSONS HAVING ANY RECORD TITLE INTEREST IN THE REAL PROPERTY INCLUDED WITHIN THE SUBDIVISION SHOWN UPON THIS FINAL MAP OF "SIERRA VISTA KT-1B" AND THEY HEREBY CONSENT TO THE PREPARATION AND RECORDATION OF THIS FINAL MAP AND HEREBY OFFER FOR DEDICATION AND DO HEREBY DEDICATE FOR PARTICULAR PURPOSES THE FOLLOWING:

THE REAL PROPERTY DESCRIBED BELOW IS DEDICATED AS EASEMENT FOR PUBLIC PURPOSES:

(A) PUBLIC EASEMENTS FOR THE INSTALLATION AND MAINTENANCE OF, BUT NOT LIMITED TO ELECTROLIERS, WATER AND GAS PIPES, SEWER AND DRAINAGE PIPES, AND FOR UNDERGROUND WIRE AND CONDUITS, ABOVE GROUND APPURTENANCES FOR ELECTRIC, TELEPHONE AND TELEVISION SERVICES AND TRAFFIC CONTROL APPURTENANCES TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO ON, OVER, UNDER AND ACROSS GRAYS PEAK COURT, GARIBALDI DRIVE, BLUE RANGE WAY, FAIRWEATHER WAY, LA SAL WAY, MERU WAY, STAUNING WAY, LOT A, LOT B, LOT C AND THOSE STRIPS OF LAND LYING CONTIGUOUS TO THE RIGHT OF WAY AS SHOWN HEREON AND DESIGNATED "P.U.E." (PUBLIC UTILITY EASEMENT).

THE REAL PROPERTY DESCRIBED BELOW IS DEDICATED IN FEE FOR PUBLIC PURPOSES:

(A) AS PUBLIC RIGHT OF WAY (INCLUDING IMPROVEMENTS THEREON), LOT A, LOT B AND LOT C AND THE STREETS SHOWN HEREON AS GRAYS PEAK COURT, GARIBALDI DRIVE, BLUE RANGE WAY, FAIRWEATHER WAY, LA SAL WAY, MERU WAY, STAUNING WAY, .

SIERRA VISTA COMMUNITIES, LLC
A CALIFORNIA LIMITED LIABILITY COMPANY

BY: AKT INVESTMENTS, INC., A CALIFORNIA CORPORATION

BY: _____ BY: _____

NAME: NAME:
TITLE: TITLE:

BY: LENNAR HOMES CALIFORNIA INC., A CALIFORNIA CORPORATION

BY: _____ BY: _____

NAME: LARRY GUALCO NAME:
TITLE: VICE PRESIDENT TITLE:

NOTARY'S ACKNOWLEDGMENT

A NOTARY PUBLIC OR OTHER OFFICER COMPLETING THIS CERTIFICATE VERIFIES ONLY THE IDENTITY OF THE INDIVIDUAL WHO SIGNED THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED, AND NOT THE TRUTHFULNESS, ACCURACY, OR VALIDITY OF THAT DOCUMENT.

STATE OF _____)
) SS
COUNTY OF _____)

ON _____ BEFORE ME,_____

PERSONALLY APPEARED,_____
WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND: _____

PRINTED NAME: _____

MY PRINCIPAL PLACE OF BUSINESS IS THE

COUNTY OF: _____

MY COMMISSION EXPIRES: _____

MY COMMISSION NO.: _____

NOTARY'S ACKNOWLEDGMENT

A NOTARY PUBLIC OR OTHER OFFICER COMPLETING THIS CERTIFICATE VERIFIES ONLY THE IDENTITY OF THE INDIVIDUAL WHO SIGNED THE DOCUMENT TO WHICH THIS CERTIFICATE IS ATTACHED, AND NOT THE TRUTHFULNESS, ACCURACY, OR VALIDITY OF THAT DOCUMENT.

STATE OF _____)
) SS
COUNTY OF _____)

ON _____ BEFORE ME,_____

PERSONALLY APPEARED,_____
WHO PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

I CERTIFY UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE FOREGOING PARAGRAPH IS TRUE AND CORRECT.

WITNESS MY HAND: _____

PRINTED NAME: _____

MY PRINCIPAL PLACE OF BUSINESS IS THE

COUNTY OF: _____

MY COMMISSION EXPIRES: _____

MY COMMISSION NO.: _____

SURVEYOR'S STATEMENT

THIS FINAL MAP OF "SIERRA VISTA KT-1B" WAS PREPARED BY ME OR UNDER MY DIRECTION AND IS BASED UPON A FIELD SURVEY IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCES AT THE REQUEST OF SIERRA VISTA COMMUNITIES, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY, IN DECEMBER 2019. I HEREBY STATE THAT THIS FINAL MAP SUBSTANTIALLY CONFORMS TO THE APPROVED OR CONDITIONALLY APPROVED TENTATIVE MAP. ALL MONUMENTS SHOWN HEREON ARE OF THE CHARACTER AND WILL OCCUPY THE POSITIONS INDICATED, AND WILL BE SET BY DECEMBER 31, 2022 AND THAT THE MONUMENTS ARE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED.

R.E.Y. ENGINEERS, INC.

_____

CRAIG E. SPIESS, PLS 7944
EXPIRATION DATE: DECEMBER 31, 2021

DATE: _____

LICENSED LAND SURVEYOR
CRAIG E. SPIESS
No. 7944
STATE OF CALIFORNIA

CITY ENGINEER'S STATEMENT

I HEREBY STATE THAT I HAVE EXAMINED THIS FINAL MAP OF "SIERRA VISTA KT-1B" AND FIND IT TO BE SUBSTANTIALLY THE SAME AS THE TENTATIVE MAP ON FILE AND ANY APPROVED ALTERATIONS THEREOF; THAT ALL PROVISIONS OF THE SUBDIVISION MAP ACT AND ALL APPLICABLE CITY ORDINANCES HAVE BEEN COMPLIED WITH.

_____ DATE: _____

MARC STOUT, R.C.E. 69879
CITY ENGINEER, CITY OF ROSEVILLE
LICENSE EXPIRES: SEPTEMBER 30, 2022

I HEREBY STATE THAT I AM SATISFIED WITH THIS FINAL MAP OF "SIERRA VISTA - VILLAGE KT-1B" IS TECHNICALLY CORRECT.

FOR MARC STOUT, CITY ENGINEER, CITY OF ROSEVILLE

_____ DATE: _____

TIMOTHY G. BLAIR, PLS 8278
EXPIRES DECEMBER 31, 2021

LICENSED LAND SURVEYOR
TIMOTHY G BLAIR
Exp. 12-31-21
No. 8278
STATE OF CALIFORNIA

CITY CLERK'S STATEMENT

I HEREBY CERTIFY THAT THE CITY COUNCIL OF THE CITY OF ROSEVILLE, HAS APPROVED THIS FINAL MAP OF "SIERRA VISTA KT-1B", AND HAS ACCEPTED ON BEHALF OF THE PUBLIC THE PUBLIC UTILITY EASEMENTS OFFERED HEREON FOR DEDICATIONS, AND HAS ACCEPTED, SUBJECT TO IMPROVEMENT, LOTS A, B, C AND ALL RIGHTS-OF-WAY OFFERED HEREON FOR DEDICATION IN ACCORDANCE WITH THE TERMS OF THAT OFFER.

_____
CITY CLERK, CITY OF ROSEVILLE

DATE: _____ BY: _____
ASSISTANT CITY CLERK

RECORDER'S STATEMENT

FILED THIS _____ DAY OF _____, 2021, AT _____ .M. IN BOOK _____ OF MAPS, AT PAGE _____, IN THE OFFICE OF THE PLACER COUNTY RECORDER, STATE OF CALIFORNIA, AT THE REQUEST OF R.E.Y. ENGINEERS, INC.

_____ DOCUMENT NO.: _____
RECORDER OF PLACER COUNTY
STATE OF CALIFORNIA

FEE: $ _____

BY: _____
DEPUTY

FINAL MAP OF
SIERRA VISTA
KT-1B
SUBDIVISION No. PL17-0305

BEING A SUBDIVISION OF LOT 5 AS SHOWN AND SO DESIGNATED ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - KT PROPERTIES PHASE 2 LARGE LOT SUBDIVISION SUBDIVISION NUMBER PL 15-0192", FILED FOR RECORD ON OCTOBER 1, 2020 IN BOOK FF OF MAPS, AT PAGE 18, PLACER COUNTY RECORDS, SECTION 34 & 35, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

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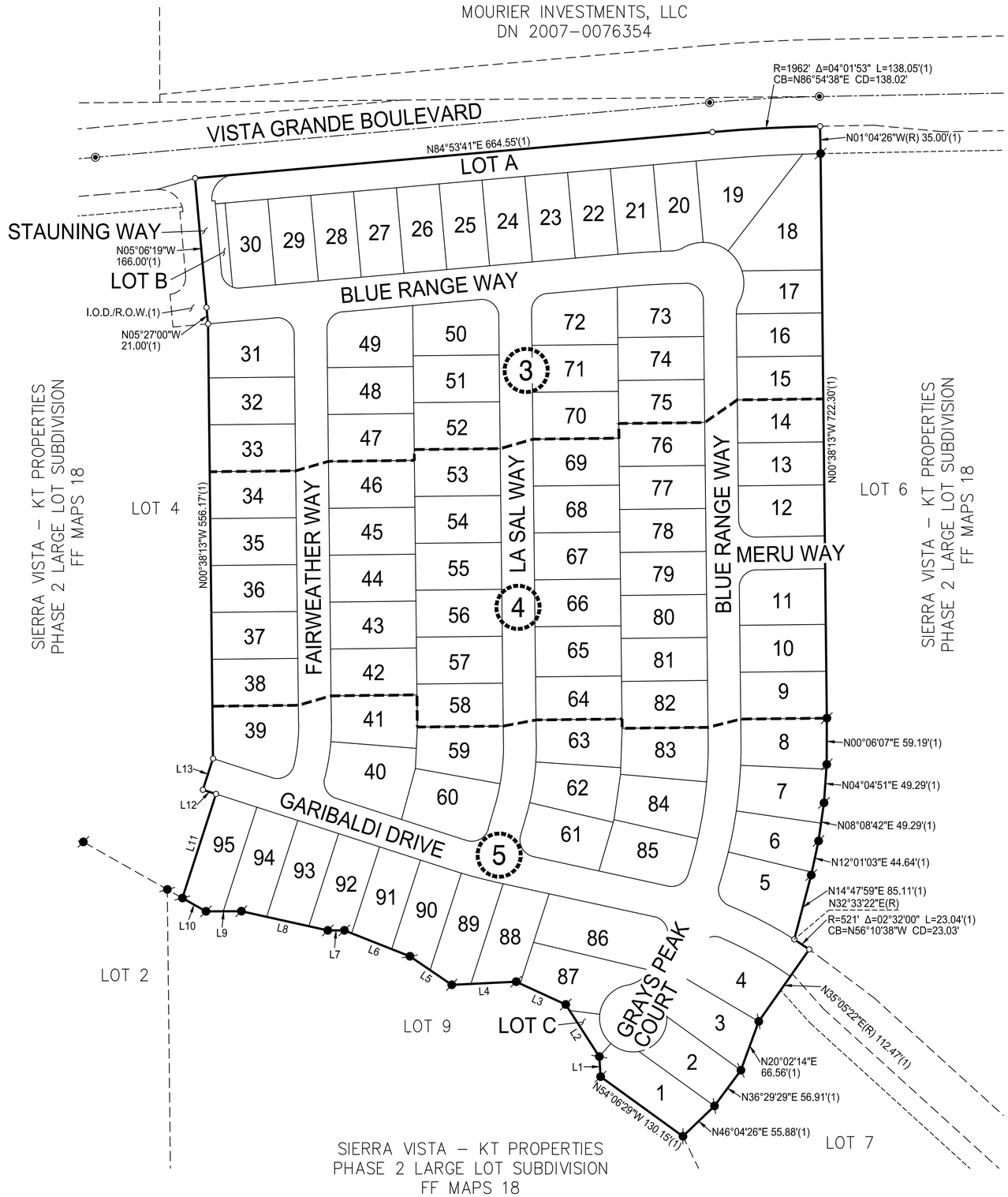
R. E. Y. ENGINEERS, Inc.
Civil Engineers / Land Surveyors
905 Sutter St. Ste 200 Folsom CA 95630
(916) 366-3040 Fax (916) 366-3303

OCTOBER 2021

SHEET 1 OF 6 7310.024

BOOK_____ OF MAPS, PAGE_____

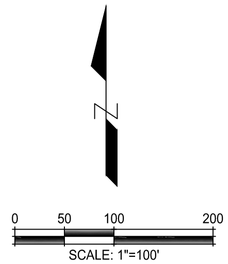


REFERENCES:

(1) FF MAPS 18

LINE TABLE(1)

#	BEARING	LENGTH
L1	N03°32'08"W	25.76'
L2	N32°49'57"W	79.22'
L3	N65°17'08"W	69.96'
L4	N87°12'50"E	82.49'
L5	N55°41'55"W	64.66'
L6	N68°23'31"W	90.30'
L7	N89°46'48"E	21.20'
L8	N77°28'09"W	113.27'
L9	N89°46'48"E	45.30'
L10	N60°30'20"W	34.65'
L11	N17°53'28"E	139.79'
L12	N72°06'32"W	17.61'
L13	N17°53'28"E	42.00'



BASIS OF BEARINGS:

THE BEARING N84°53'41"E, AS SHOWN BETWEEN FOUND MONUMENTS ALONG THE CENTERLINE OF VISTA GRANDE BOULEVARD AS SHOWN ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - KT PROPERTIES PHASE 2 LARGE LOT SUBDIVISION SUBDIVISION NUMBER PL 15-0192" FILED FOR RECORD ON _____, 2020 IN BOOK ___ OF MAPS, AT PAGE ___, PLACER COUNTY RECORDS. DISTANCES SHOWN HEREON ARE GROUND DISTANCES.

LEGEND

●	FOUND 5/8" REBAR WITH PLASTIC PLUG STAMPED "LS 7944"
◉	FOUND COPPERWELD SURVEY MONUMENT WITH CENTER PUNCH IN MONUMENT WELL STAMPED "LS 7944"
◎	SET COPPERWELD SURVEY MONUMENT WITH CENTER PUNCH IN MONUMENT WELL STAMPED "LS 7944"
○ |	DIMENSION POINT NOTHING FOUND OR SET
AC.	ACRE
CB	CHORD BEARING
CD	CHORD DISTANCE
(OA)	OVERALL
P.E.	PEDESTRAIN EASEMENT
P.U.E.	PUBLIC UTILITY EASEMENT
(R)	RADIAL
S.F.	SQUARE FEET
( )	DENOTES RECORD INFORMATION
(1)	SHEET NUMBER

NOTES:

1. THE TOTAL AREA OF THIS SUBDIVISION IS 19.56 ACRES +/-, GROSS, CONSISTING OF 95 RESIDENTIAL LOTS AND 3 LANDSCAPE LOTS.
2. ALL CURVES ARE DIMENSIONED WITH RADIUS, DELTA, ARC LENGTH, CHORD BEARING AND CHORD LENGTH. CHORD LENGTHS MAY CONTAIN SOME ROUNDING ERROR. DISTANCES SHOWN HEREON ARE IN FEET AND DECIMALS THEREOF AND ARE "GROUND" DISTANCES.
3. A PRELIMINARY SOILS REPORT WAS PREPARED BY WALLACE KUHL & ASSOCIATES DATED FEBRUARY 12, 2018; PROJECT NUMBER WKA NO. 11712.02P AND ON FILE WITH THE CITY OF ROSEVILLE DEVELOPMENT - ENGINEERING DEPARTMENT FILE #308-876.
4. ALL FRONT CORNERS ARE MARKED BY A 1" BRASS MARKER STAMPED "LS 7944" IN THE SIDEWALK ON THE EXTENSION OF SIDE LOT LINES 1.00' FROM THE PROPERTY LINE UNLESS OTHERWISE NOTED.
5. ALL REAR CORNERS AND ANGLE POINTS WILL BE SET WITH A 5/8" REBAR AND PLASTIC CAP STAMPED "LS 7944", WHERE REAR CORNER FALLS WITHIN A MASONRY RETAINING WALL, MASONRY SOUND WALL OR CONCRETE FOOTING, A 5/8" REBAR WITH PLASTIC CAP STAMPED "LS 7944" WILL BE SET ON THE SIDE LOT LINE 4.00 FOOT OFFSET TO THE REAR CORNER OR A BRASS TAG STAMPED "LS 7944" WILL BE SET WITH EPOXY TO THE FACE WALL 2.00 FOOT ABOVE GROUND OR ON TOP OF WALL WHERE AS OFFSET MONUMENT CANNOT BE SET.
6. THE I.O.D./R.O.W. ON LOT 5 AS SHOWN AND SO DESIGNATED ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - KT PROPERTIES PHASE 2 LARGE LOT SUBDIVISION SUBDIVISION NUMBER PL 15-0192", FILED FOR RECORD ON OCTOBER 1, 2020 IN BOOK FF OF MAPS, AT PAGE 18, PLACER COUNTY RECORDS, IS FULLY CONTAINED WITHIN THE RIGHT OF WAY SHOWN HEREON.
7. COVENANTS, CONDITIONS AND RESTRICTIONS AFFECTING THE LOTS SHOWN HEREON ARE RECORDED AS DOCUMENT NO. 2020-0042952 OFFICIAL RECORDS OF PLACER COUNTY.

FINAL MAP OF
SIERRA VISTA
KT-1B
SUBDIVISION No. PL17-0305

BEING A SUBDIVISION OF LOT 5 AS SHOWN AND SO DESIGNATED ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - KT PROPERTIES PHASE 2 LARGE LOT SUBDIVISION SUBDIVISION NUMBER PL 15-0192", FILED FOR RECORD ON OCTOBER 1, 2020 IN BOOK FF OF MAPS, AT PAGE 18, PLACER COUNTY RECORDS, SECTION 34 & 35, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

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R. E. Y. ENGINEERS, Inc.
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905 Sutter St. Ste 200 Folsom CA 95630
(916) 366-3040 Fax (916) 366-3303

OCTOBER 2021

7310.024

BOOK_____ OF MAPS, PAGE_____

MOURIER INVESTMENTS, LLC
DN 2007-0076354

AREA R-1 PER DOC #
2015-064321 & 2015-064331

VISTA GRANDE BOULEVARD
(I.O.D./R.O.W.)(1)

STAUNING WAY

BLUE RANGE WAY

FAIRWEATHER WAY

LA SAL WAY

LOT A
27,161 S.F.±

LOT B
1,278 S.F.±

19 9,695 S.F.±
18 11,550 S.F.±
17 5,694 S.F.±
16 6,050 S.F.±
15 6,050 S.F.±
14
20 5,975 S.F.±
21 6,066 S.F.±
22 6,050 S.F.±
23 6,050 S.F.±
24 6,050 S.F.±
25 6,050 S.F.±
26 6,050 S.F.±
27 6,050 S.F.±
28 6,050 S.F.±
29 6,050 S.F.±
30 6,043 S.F.±
31 7,963 S.F.±
32 6,600 S.F.±
33 6,600 S.F.±
34
46
47 6,600 S.F.±
48 6,600 S.F.±
49 8,030 S.F.±
50 7,413 S.F.±
51 6,600 S.F.±
52 6,600 S.F.±
53
69
70 6,600 S.F.±
71 6,600 S.F.±
72 7,480 S.F.±
73 7,281 S.F.±
74 6,050 S.F.±
75 6,050 S.F.±
76

SEE SHEET 4

SIERRA VISTA – KT PROPERTIES
PHASE 2 LARGE LOT SUBDIVISION
FF MAPS 18

LOT 4

LOT 6

CURVE TABLE

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	22'	90°00'00"	34.56'	N39°53'41"E	31.11'
C2	22'	64°25'01"	24.73'	N27°06'12"E	23.45'
C3	22'	64°25'01"	24.73'	N37°18'50"W	23.45'
C4	1021'	00°47'30"	14.11'	N87°53'07"E	14.11'
C5	52'	29°20'10"	26.62'	N75°31'09"E	26.33'
C6	32'	28°14'33"	15.77'	N13°29'04"E	15.61'

SCALE: 1"=40'

FINAL MAP OF
SIERRA VISTA
KT-1B
SUBDIVISION No. PL17-0305

BEING A SUBDIVISION OF LOT 5 AS SHOWN AND SO DESIGNATED ON THAT CERTAIN FINAL MAP ENTITLED "SIERRA VISTA - KT PROPERTIES PHASE 2 LARGE LOT SUBDIVISION SUBDIVISION NUMBER PL 15-0192", FILED FOR RECORD ON OCTOBER 1, 2020 IN BOOK FF OF MAPS, AT PAGE 18, PLACER COUNTY RECORDS, SECTION 34 & 35, TOWNSHIP 11 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

CITY OF ROSEVILLE • PLACER COUNTY • CALIFORNIA

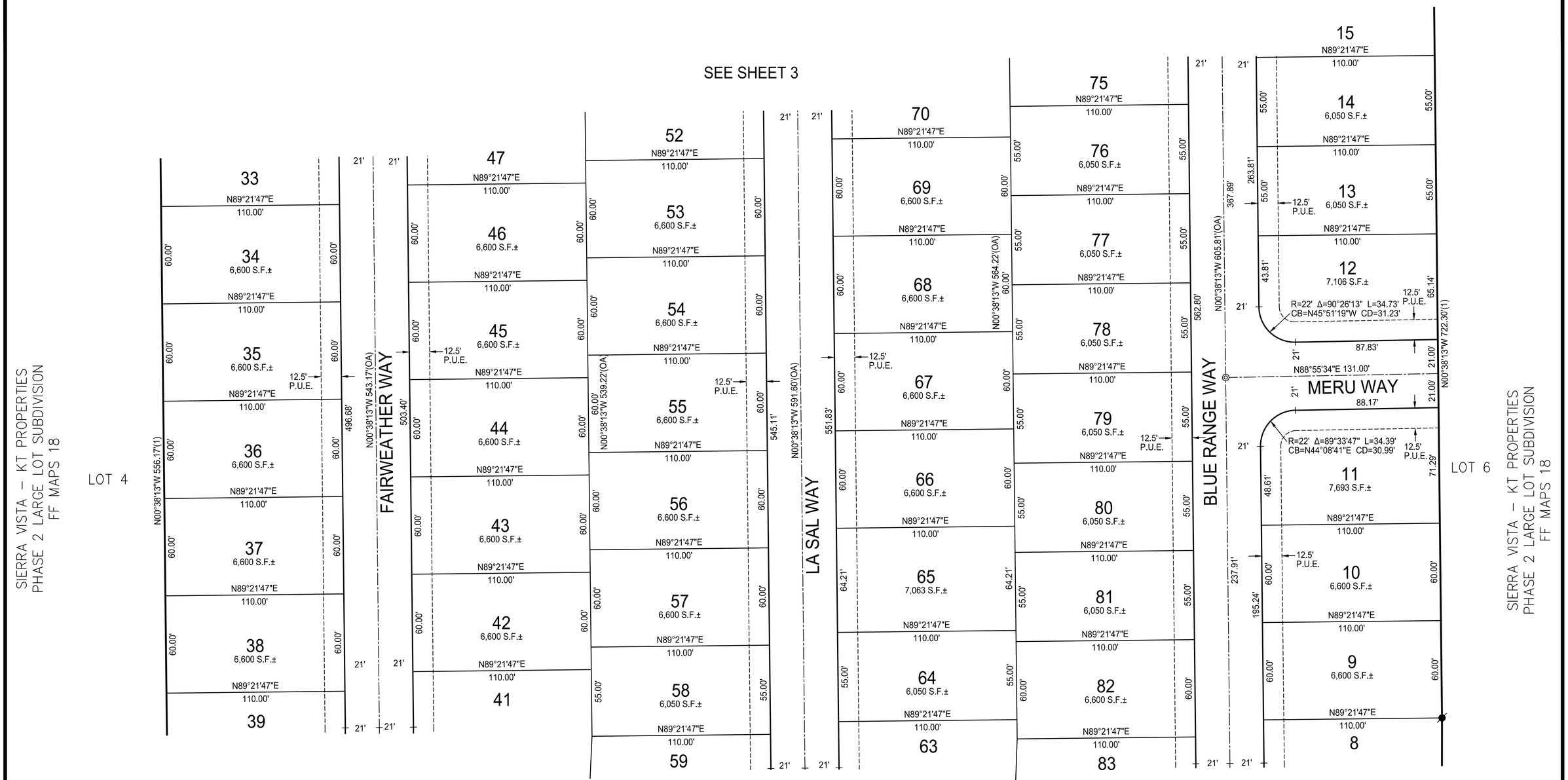
R. E. Y. ENGINEERS, Inc.
Civil Engineers / Land Surveyors
905 Sutter St. Ste 200 Folsom CA 95630
(916) 366-3040 Fax (916) 366-3303

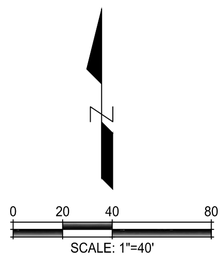
OCTOBER 2021

 7310.024

SEE SHEET 2 FOR BASIS OF BEARINGS, LEGEND, NOTES & REFERENCES

BOOK_____OF MAPS, PAGE_____





FINAL MAP OF

SIERRA VISTA

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SHEET 4 OF 6

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SEE SHEET 2 FOR BASIS OF BEARINGS, LEGEND, NOTES & REFERENCES

SEE SHEET 4

SIERRA VISTA – KT PROPERTIES
PHASE 2 LARGE LOT SUBDIVISION
FF MAPS 18

LOT 4

38
N89°21'47"E
110.00'
8,912 S.F.±
12.5' P.U.E.
12.5' P.U.E.
39
41
42
40
58
59
60
61
62
63
64
82
83
84
85
9
8
6,831 S.F.±
7
7,021 S.F.±
6
6,439 S.F.±
5
8,132 S.F.±
95
7,881 S.F.±
94
7,325 S.F.±
93
6,985 S.F.±
92
6,615 S.F.±
91
6,487 S.F.±
90
6,787 S.F.±
89
7,511 S.F.±
88
7,587 S.F.±
86
10,500 S.F.±
87
8,298 S.F.±
6,954 S.F.±
6,710 S.F.±
7,333 S.F.±
7,435 S.F.±
7,069 S.F.±
6,354 S.F.±
7,139 S.F.±
6,995 S.F.±
8,720 S.F.±
8,169 S.F.±
6,907 S.F.±
4
8,026 S.F.±
3
6,907 S.F.±
2
6,310 S.F.±
1
7,785 S.F.±
LOT C
1,313 S.F.±

FAIRWEATHER WAY
LA SAL WAY
GARIBALDI DRIVE
GRAYS PEAK COURT

SEE DETAIL "A"

N00°38'13"W 556.17'(1)
N00°38'13"W 543.17'(OA)
N00°38'13"W 539.22'(OA)
N00°38'13"W 591.60'(OA)
N00°38'13"W 564.22'(OA)
N00°38'13"W 605.81'(OA)
N00°38'13"W 179.57'
N00°06'07"E 59.19'(1)
N04°04'51"E 49.29'(1)
N08°08'42"E 49.29'(1)
N12°01'03"E 44.64'(1)
N14°47'59"E 85.11'(1)
N72°06'32"W 17.61'(1)
N17°53'28"E 42.00'(1)
N17°53'28"E 139.79'(1)
N60°30'20"W 34.65'(1)
N89°46'48"E 45.30'(1)
N89°46'48"E 21.20'(1)
N68°23'31"W 90.30'(1)
N55°41'55"W 64.66'(1)
N87°12'50"E 82.49'(1)
N65°17'08"W 69.96'(1)
N32°49'57"W 79.22'(1)
N03°32'08"W 25.76'
N54°06'29"W 130.15'(1)
N46°04'26"E 55.88'(1)
N36°29'29"E 56.91'(1)
N20°02'14"E 66.56'(1)
N35°05'22"E 112.47'(R)(1)

CURVE TABLE

#	RADIUS	DELTA	LENGTH	CHORD BEARING	CHORD LENGTH
C1	500'	05°18'36"	46.34'	N74°45'50"W	46.32'
C2	271'	14°21'43"	67.93'	N28°37'36"E	67.75'

LOT 9

SIERRA VISTA – KT PROPERTIES
PHASE 2 LARGE LOT SUBDIVISION
FF MAPS 18

LOT 6

LOT 7

SIERRA VISTA – KT PROPERTIES
PHASE 2 LARGE LOT SUBDIVISION
FF MAPS 18

PORTION OF 25' ROADWAY & UTILITY EASEMENT PER 2989 O.R. 335 AND 25' PG&E EASEMENT PER 3060 O.R. 329. SAID EASEMENTS TO BE QUIT CLAIMED PRIOR TO ISSUING BUILDING PERMIT.

DETAIL "A"
N.T.S.

FINAL MAP OF
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KT-1B
SUBDIVISION No. PL17-0305

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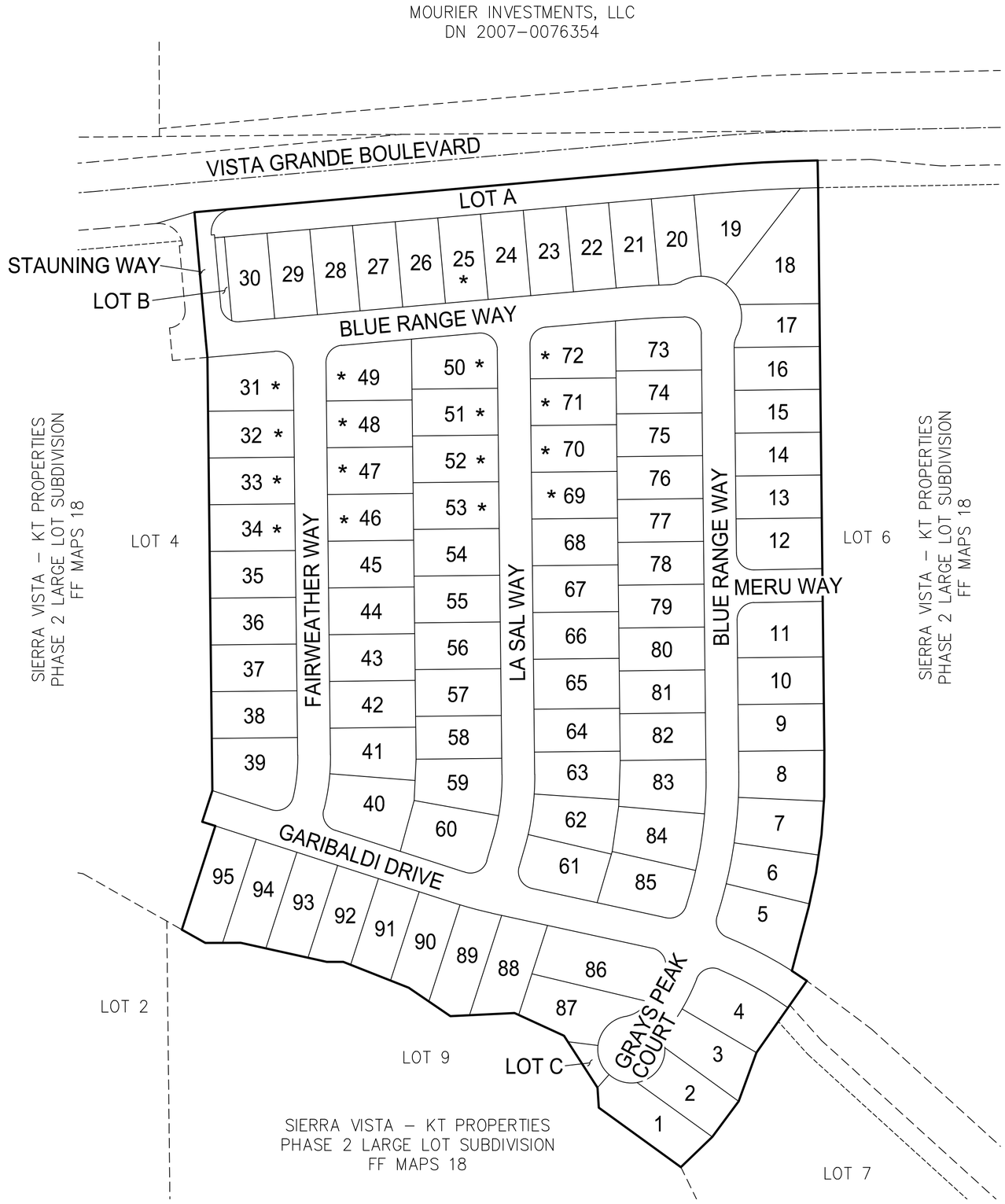
OCTOBER 2021

 7310.024

SCALE: 1"=40'

SEE SHEET 2 FOR BASIS OF BEARINGS, LEGEND, NOTES & REFERENCES



ADDITIONAL INFORMATION FOR INFORMATIONAL PURPOSE ONLY PURSUANT TO SECTION 66434.2 OF THE GOVERNMENT CODE

EACH RESIDENTIAL DWELLING CONSTRUCTED ON ANY OF THE LOTS INDICATED SHALL BE FITTED WITH A SEWER BACKFLOW PREVENTER VALVE AS APPROVED BY THE CITY OF ROSEVILLLE. IT SHALL BE THE RESPONSIBILITY OF THE OWNER OF SAID DWELLING TO MAINTAIN THE VALVE AND PREVENT DAMAGE FROM OCCURRING THERETO. THE CITY OF ROSEVILLE SHALL NOT BE RESPONSIBLE FOR THE MAINTENANCE OR PERFORMANCE OF THE VALVE, AND THE CITY OF ROSEVILLE SHALL NOT BE LIABLE FOR ANY DAMAGE OCCURRING TO ANY SUCH DWELLING OR ITS CONTENTS DUE TO FAILURE OF THE VALVE FOR ANY REASON WHATSOEVER.

LEGEND

* DENOTES SEWER BACKFLOW PREVENTER VALVE REQUIRED ON SANITARY SEWER CONNECTION BY THE CITY OF ROSEVILLE WITH THE BUILDING PERMIT AND MAINTAINED THEREAFTER BY THE OWNER.

N

0 50 100 200
SCALE: 1"=100'

FINAL MAP OF

SIERRA VISTA

KT-1B

SUBDIVISION No. PL17-0305

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OCTOBER 2021

 7310.024

RESOLUTION NO. 21-431

APPROVING A SUBDIVISION AGREEMENT, BY AND BETWEEN THE CITY OF ROSEVILLE AND SIERRA VISTA COMMUNITIES, LLC, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE

WHEREAS, a subdivision agreement, by and between the City of Roseville and Sierra Vista Communities, LLC, for the Sierra Vista KT-1B Subdivision, has been reviewed by the City Council; and

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Roseville that said agreement is approved and that the City Manager is authorized to execute it on behalf of the City of Roseville.

PASSED AND ADOPTED by the Council of the City of Roseville this____day of _____, 20_, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

RECORDING REQUESTED BY AND WHEN RECORDED, PLEASE RETURN TO:

City Clerk
CITY OF ROSEVILLE
311 Vernon Street
Roseville, CA 95678

Exempt from recording fees
Pursuant to Govt. Code §27383

SUBDIVISION AGREEMENT

Sierra Vista KT-1B SUBDIVISION

THIS AGREEMENT, made and entered into this ___ day of _____, 20__, by and between the CITY OF ROSEVILLE, a municipal corporation ("CITY"), and Sierra Vista Communities, LLC, a California Limited Liability Company, ("SUBDIVIDER"),

W I T N E S S E T H:

WHEREAS, SUBDIVIDER is possessed of a tract of land lying in the City of Roseville, County of Placer, known as "Sierra Vista Village KT -1B Subdivision" (Subdivision no. PL17-0305; "the Subdivision"); and

WHEREAS, a tentative map of the Subdivision was approved by the City Planning Commission on the ___ day of _____, 20__, and the final map of the Subdivision has been approved subject to the execution of this Agreement; and

WHEREAS, the final map has been filed on the ____ day of _____, 20__ in Book _____ of Parcel/Subdivision Maps at Page _____ in the Official Records, Placer County Recorder, file no. _____; and

WHEREAS, Section 18.20.110 of the Roseville Municipal Code, regulating the subdivision of land in the City, requires that SUBDIVIDER shall execute and file an agreement between itself and CITY relating to the improvements to be made in a subdivision, prior to the approval by the City Council of the final map.

NOW, THEREFORE, the parties agree as follows:

1. Rights-of-Way. Except as otherwise provided by this Agreement, CITY rejects all lands, right-of-ways, and easements offered for dedication on the final map of the Subdivision. All such offers shall, however, remain open, and shall constitute irrevocable offers of dedication in accordance with Government Code Section 66477.2. All such offers may be accepted by CITY in its sole discretion at any later date without further notice to SUBDIVIDER as provided by law.

By way of explanation only, it is the current intention of CITY to accept all or part of such irrevocable offers to dedicate upon acceptance of the improvements called for in this Agreement.

2. Improvements - Time Limit. SUBDIVIDER agrees to cause all improvements to be made and constructed in the Subdivision to fully comply with the requirements of the Roseville Municipal Code and the Subdivision Map Act of the State of California according to the improvement plans for the Subdivision prepared by R.E.Y. Engineers Inc, dated March 19, 2021 and approved by the City Engineer and including any changes or

alterations to such improvements required by the City Engineer, and to install, on or before December 31, 2022, such survey monuments as may be required by the City Engineer ("the Work"). SUBDIVIDER agrees to pay for any materials, provisions or other supplies used in, upon, for or about the performance of the Work, or for any work or labor of any kind done in connection with the Work, or for any amounts due under the Unemployment Insurance Act with respect to such work or labor.

SUBDIVIDER agrees to complete all of the Work on or before twenty-four (24) months from the date of this Agreement. If in the opinion of the City Engineer of CITY, an extension of this Agreement is not detrimental to the public welfare, he or she is, in his or her sole discretion, hereby authorized to extend the time within which the Work shall be completed for a period not to exceed twelve (12) months. Upon a written application made by SUBDIVIDER, further extensions, not to exceed an additional six (6) months, shall be reviewed and approved at the discretion of the City Engineer of CITY. Any such application extension request by SUBDIVIDER shall fully state the grounds and facts relied upon for the granting of additional extensions.

In the event that SUBDIVIDER shall fail to complete the Work within the time provided by this Agreement, CITY may, in its sole discretion and in addition to any other remedy provided in this Agreement or by law, enter upon the Subdivision and complete the Work and recover the full cost and expense of such construction from SUBDIVIDER, SUBDIVIDER's successors and assigns, or from the then owner of the Subdivision, and/or place a lien upon the Subdivision for such cost and expense.

If at anytime prior to the expiration of the time provided by this Agreement the City Engineer of CITY determines that a safety hazard exists within an existing public right-of-

way, the City Engineer shall give written notice to SUBDIVIDER to eliminate the safety hazard. If SUBDIVIDER fails to eliminate the safety hazard within five (5) calendar days of the written notice, CITY may, in its sole discretion and in addition to any other remedy provided in this Agreement or by law, eliminate the safety hazard and recover the full cost and expense of such work from SUBDIVIDER, SUBDIVIDER's successors and assigns, or from the then owner of the Subdivision, and/or place a lien upon the Subdivision for such cost and expense.

3. Acquisition and Dedication of Easements or Rights-of-Ways. If any of the Work is to be constructed or installed on land not within the Subdivision or already existing public right-of-way, no construction or installation shall be commenced before:

a. The irrevocable offer of dedication or conveyance to CITY of appropriate right-of-ways, easements or other interest in real property, and appropriate authorization from the property owner to allow construction or installation of the improvements or work; or

b. The issuance of an order of possession by a court of competent jurisdiction pursuant to the State Eminent Domain Law. SUBDIVIDER shall comply in all respects with any such order of possession.

Nothing in this Section 3 shall be construed as authorizing or granting an extension of time to SUBDIVIDER for completion of the Work.

4. Inspection Fees and Costs. The City Engineer shall inspect all of the Work improvements made in the Subdivision to see that they comply with CITY's subdivision regulations and specifications. SUBDIVIDER shall deposit the estimated inspection fee and reimburse CITY for the cost of such inspections in accordance with Roseville Municipal Code section 18.20.070.

5. Securities.

a. SUBDIVIDER shall file with this Agreement two (2) improvement securities as set forth in Roseville Municipal Code Sections 18.20.150 and 18.20.160. Each security shall be in the amount of one hundred percent (100%) of the total estimated cost of the Work as determined by the City Engineer which amount is the sum of $2,317,430.12. One improvement security shall secure faithful performance of this Agreement as required by Section 66499.3(a) of the Government Code of the State of California (the "faithful performance" security). The second improvement security shall, as required by Section 66499.3(b) of the Government Code of the State of California, secure the obligations set forth in Title 15 (commencing with Section 3082) of Part 4 of Division 3 of the Civil Code of the State of California for payment to the contractor, his subcontractors and to persons renting equipment or furnishing labor or materials to them for the Work (the "payment security"). The improvement securities required under this paragraph shall also secure placement of monumentation and guarantee payment therefor as provided by California Government Code section 66496.

b. SUBDIVIDER shall also file with this Agreement a "guarantee and warranty security" in the amount of ten percent (10%) of the City Engineer's estimated cost of the Work as set forth in Section 18.20.170 of the Roseville Municipal Code to guarantee and warrant the Work for a period of one year following its completion and acceptance against any defective work or labor done, or defective materials furnished, as required by Section 66499(a)(5) of the Government Code of the State of California. The guarantee and warranty security shall be released upon SUBDIVIDER's request following expiration of the warranty period and subject to the reasonable determination of the City Engineer that SUBDIVIDER's warranty obligations have been satisfied.

c. Any bonds submitted as security pursuant to this section shall be executed by a surety company authorized to transact a surety business in the State of California. All required securities shall be in a form approved by the City Attorney of CITY.

6. Successors and Assigns – Covenant Running with the Land. This Agreement shall inure to the benefit of, and be binding upon, the successors and assigns of the respective parties. It shall be recorded in the Office of the Recorder of Placer County concurrently with the final map of the Subdivision, and shall constitute a covenant running with the land and an equitable servitude upon the real property within the Subdivision.

7. Acceptance of Improvements Upon Completion. Upon satisfactory completion of the Work, in accordance with this Agreement, CITY agrees to accept the Work and its improvements and the offers of dedication described in paragraph 1, subject to the provisions of paragraphs 1 and 10 of this Agreement.

8. Notice Regarding Construction. SUBDIVIDER shall notify the City Engineer of CITY in writing three (3) days prior to the commencement of construction of the Work.

9. Subdivider's Obligation to Warn Public During Construction. Until final acceptance of the Work, SUBDIVIDER shall give good and adequate warning to the public of each and every dangerous condition which may exist in the Work, and will take all reasonable actions to protect the public from any such dangerous condition.

10. Warranty.

a. SUBDIVIDER guarantees and warrants the public improvements which constitute the Work required by this Agreement, and agrees to remedy any defects in the improvements or the Work arising from faulty or defective materials or construction of said improvements or the Work occurring within twelve (12) months after their acceptance by CITY.

SUBDIVIDER agrees to permit inspection of all improvements in the Subdivision by the City Engineer of CITY for such period, and to reimburse CITY for the cost of such inspections.

b. If, within the warranty period, the Work or improvement or any part of the Work done, furnished, installed, or constructed fails to fulfill any of the requirements of this Agreement or the improvement plans and specifications, SUBDIVIDER shall, without delay or cost to CITY, repair, replace or reconstruct any defective or otherwise unsatisfactory part or parts of the Work. CITY may, at its sole option, perform such repair or replacement itself if SUBDIVIDER has failed to commence such repair within twenty (20) days after CITY has mailed written notice of default to SUBDIVIDER and to SUBDIVIDER'S Surety. In such event, SUBDIVIDER agrees to pay the cost of such repair and replacement by CITY and CITY may, at its option, recover such cost as a lien against the Subdivision should the cost exceed the inspection fee deposited pursuant to paragraph 4 of this Agreement.

Should CITY determine that the public safety requires repairs or replacements to be made before SUBDIVIDER can be notified, CITY may, in its sole discretion, make the necessary repairs or replacement or perform the necessary work. SUBDIVIDER shall pay to CITY the cost of such repairs and CITY may at its option recover such cost as a lien against the Subdivision.

11. Indemnification. To the fullest extent allowed by law, SUBDIVIDER shall defend, indemnify, and save and hold harmless CITY, its officers, agents, employees and volunteers from any claims, suits or actions of every name, kind and description brought forth, or on account of, injuries to or death of any person (including but not limited to workers and the public), or damage to property, resulting from or arising out of SUBDIVIDER 's willful misconduct or negligent act or omission while engaged in the performance of obligations or

exercise of rights created by this Agreement, except those matters arising from CITY's sole or active negligence or willful misconduct. The parties intend that this provision shall be broadly construed.

SUBDIVIDER's responsibility for such defense and indemnity obligations shall survive the termination or completion of this Agreement for the full period of time allowed by law. The defense and indemnity obligations of this Agreement are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained in this Agreement.

12. Insurance. SUBDIVIDER agrees to continuously maintain, in full force and effect, at a minimum the following policies of insurance during the term of this Agreement.

COVERAGE	LIMITS OF LIABILITY
General Liability	$2,000,000 per occurrence $4,000,000 aggregate Personal Injury: $2,000,000 per occurrence $4,000,000 aggregate
Automobile Liability	$1,000,000 combined single limit
Workers' Compensation	Statutory

a. Form. SUBDIVIDER shall submit a certificate evidencing such coverage for the period covered by this Agreement in a form satisfactory to Risk Management and the City Attorney, prior to undertaking any work hereunder. Any insurance written on a claims made basis is subject to the approval of Risk Management and the City Attorney.

b. Additional Insureds. SUBDIVIDER shall also provide a separate endorsement form or section of the policy showing CITY, its officers, agents, employees and volunteers as additional insureds for each type of coverage, except for Workers' Compensation, for ongoing and completed operations. Such insurance shall specifically cover the contractual

liability of SUBDIVIDER. The additional insured coverage under the SUBDIVIDER's policy shall be primary and noncontributory, as evidenced by a separate endorsement or section of the policy, and shall not seek contribution from CITY's insurance or self-insurance. In addition, the additional insured coverage shall be at least as broad as the Insurance Services Office ("ISO") CG 20 01 Endorsement. Any available insurance proceeds in excess of the specified minimum insurance coverage requirements and limits shall be available to the additional insureds. Furthermore, the requirements for coverage and limits shall be: (1) the minimum coverage and limits specified in this Agreement; or (2) the full coverage and maximum limits of any insurance proceeds available to the named insureds, whichever is greater.

c. Cancellation/Modification. SUBDIVIDER shall provide ten (10) days written notice to CITY prior to cancellation or modification of any insurance required by this Agreement.

d. Umbrella/Excess Insurance. The limits of insurance required in this Agreement may be satisfied by a combination of primary and excess insurance. Any excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and noncontributory basis for the benefit of CITY (if agreed to in a written contract) before CITY's own insurance shall be called upon to protect it as a named insured.

e. Self-Insured Retentions. All self-insured retentions ("SIR") must be disclosed to Risk Management for approval and shall not reduce the limits of liability. Policies containing any SIR provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named insured or CITY. CITY reserves the right to obtain a full certified copy of any insurance policy and endorsements. The failure to exercise this right shall not constitute a waiver of such right.

f. Waiver of Subrogation. SUBDIVIDER hereby agrees to waive subrogation which any insurer of SUBDIVIDER may acquire from SUBDIVIDER by virtue of the payment of any loss under a Workers Compensation, Commercial General Liability or Automobile Liability policy. All Workers Compensation, Commercial General Liability and Automobile Liability policies shall be endorsed with a waiver of subrogation in favor of CITY, its officers, agents, employees and volunteers for all worked performed by SUBDIVIDER, its employees, agents and subcontractors.

g. Liability/Remedies. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve SUBDIVIDER of liability in excess of such coverage, nor shall it preclude CITY from taking such other actions as are available to it under any other provisions of this Agreement or law.

13. Irrevocability of Security. The improvement securities furnished pursuant to paragraph 5 shall be irrevocable, shall not be limited as to time (except as to the one-year guarantee and warranty period specified in paragraph 10) and shall provide that they may be released, in whole or part, only upon the written approval of the City Engineer of CITY.

14. Attorney's Fees; Venue; Governing Law. Any action by any party to this Agreement, or any action concerning a security furnished pursuant to paragraph 5, shall be brought in the appropriate court of competent jurisdiction within the County of Placer, State of California, notwithstanding any other provision of law which may provide that such action may be brought in some other location. In the event it becomes necessary for either party to bring an action with respect to enforcement of the provisions of this Agreement, or the security therefor, the prevailing party in such action shall be awarded a reasonable attorney's fee, as may be

determined by the Court. This Agreement shall be governed by and construed in accordance with the laws of the State of California.

15. Release of Faithful Performance Security. Release of faithful performance security shall be in compliance with and pursuant to the procedures set forth in Government Code Section 66499.7. Upon the completion of all secured Work by SUBDIVIDER and written acceptance of that completed Work by CITY, and the furnishing of the warranty security as required by paragraph 5(b), the City Engineer shall authorize the release of the remaining faithful performance security.

16. Release of Payment Security. Thirty-five (35) days after a notice of completion is recorded with respect to the Work, the City Engineer of CITY may authorize the release of the payment security, in the event that no claims have been filed against said security. In the event that claims or actions are filed against the security, the City Engineer may release so much of such security as is in excess of the total of the claims made against it, plus a reasonable amount of costs and attorney's fees.

17. Automatic Termination Upon Completion and Sale of Residential Unit. This Agreement and any lien pursuant hereto shall automatically be terminated, without any further action by either party or need to record any additional document, with respect to any single-family residential lot within a parcel designated by the Specific Plan for residential use, upon completion of construction and issuance by the City of a final inspection for a dwelling unit upon such residential lot and conveyance of such improved residential lot to a bona-fide good faith purchaser thereof. In connection with its issuance of a final inspection for such improved lot, City shall confirm that: (i) all improvements which are required to serve the lot, as determined by City, have been accepted by City; (ii) the lot is included within the Maintenance CFD required

by Section 3.20 or other financing mechanism acceptable to the City, to the extent required hereby; and (iii) if and to the extent applicable to such lot, an affordable purchase or rental housing agreement has been recorded on the lot. Termination of this Agreement for any such residential lot as provided for in this section shall not in any way be construed to terminate or modify any assessment district or Mello-Roos Community Facilities District lien affecting such lot at the time of termination.

18. Failure of Performance. In addition to any other remedies provided in this Agreement or by law, in the event SUBDIVIDER fails to perform one or more of the covenants or conditions of this Agreement, CITY shall have recourse to the security given to guarantee the performance of such acts. CITY may do, or cause to be done, those acts required of SUBDIVIDER, and shall have recourse against so much of the security as is necessary to discharge the responsibility of SUBDIVIDER. In the event CITY seeks recourse against a security, CITY shall also have recourse against SUBDIVIDER for any and all amounts necessary to complete the obligations of SUBDIVIDER in the event the security is insufficient to pay such amounts. All administrative costs, including reasonable attorney's fees pursuant to Section 66499.4 of the Government Code, incurred by CITY, in addition to the costs of the improvements, shall be a proper charge against the security and SUBDIVIDER.

19. Integration. This Agreement is an integrated agreement. It supersedes all prior negotiations, representations, or agreements, either written or oral.

20. Modification. This Agreement and each provision contained herein may be waived, amended, supplemented or eliminated only by mutual written agreement of the parties.

21. Notices. Any notices sent to the parties relating to this Agreement shall be sent by first class mail, postage prepaid or delivered to the following addresses:

Marc Stout, City Engineer
City of Roseville
311 Vernon Street
Roseville, CA 95678

Sierra Vista Communities LLC
c/o Lennar Homes
1025 Creekside Ridge Dr. #240
Roseville CA 95678

Either party may amend its address by giving written notice to the other.

22. Severability. If any of the provisions contained in this Agreement are for any reason held invalid or unenforceable, such holding shall not affect the remaining provisions or the validity and enforceability of the Agreement as a whole.

IN WITNESS WHEREOF, the City of Roseville, a municipal corporation, has authorized the execution of this Agreement in duplicate by its City Manager and attestation by its City Clerk under authority of Resolution No. ____, adopted by the Council of the City of Roseville on the ___ day of _____, 20__, and SUBDIVIDER has caused this Agreement to be executed.

CITY OF ROSEVILLE, a municipal corporation,

BY:_____
DOMINICK CASEY
City Manager

ATTEST:

BY:_____
SONIA OROZCO
City Clerk

Sierra Vista Communities LLC,
a California Limited Liability Company
By: Lennar Homes of California, Inc.
Its Managing Member

BY:_____
Print name: Larry Gualco
its: Vice President

and

BY:_____
Print name: Earl Keith
its: Controller, Vice President

(NOTARIZATION REQUIRED)

APPROVED AS TO FORM:

BY: _____
MICHELLE SHEIDENBERGER
City Attorney

APPROVED AS TO SUFFICIENCY:

BY: _____
MARC STOUT
City Engineer

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Placer } ss.

On September 24, 2021 before me, Monique Reynolds,

Notary Public, personally appeared Larry Gualco and Earl Keith

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signatures(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

MONIQUE REYNOLDS
Notary Public - California
Placer County
Commission # 2337907
My Comm. Expires Nov 24, 2024

Monique Reynolds
Signature

(seal)

OPTIONAL INFORMATION

Date of Document Sierra Vista KT 1B SIA

Type or Title of Document

Number of Pages in Document

Document in a Foreign Language

Thumbprint of Signer

Type of Satisfactory Evidence:
_____ Personally Known with Paper Identification
_____ Paper Identification
_____ Credible Witness(es)

☐ Check here if no thumbprint or fingerprint is available.

Capacity of Signer:
_____ Trustee
_____ Power of Attorney
_____ CEO / CFO / COO
_____ President / Vice-President / Secretary / Treasurer
_____ Other:

Other Information:

COUNCIL COMMUNICATION

CC #: 1750
File #: 0113-02 & 0201-01

Title:	Community Development Block Grant - Budget Adjustment
Contact:	Kristine Faelz 916-774-5451 kpfaelz@roseville.ca.us Claudia Carreno 916-774-5276 ccarreno@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.13.

RECOMMENDATION TO COUNCIL

Staff requests that the City Council adopt an ordinance approving a budget adjustment to increase revenues and expenditures in the Community Development Block Grant (CDBG) Fund.

BACKGROUND

The City became a CDBG entitlement jurisdiction in 1986. These annual grants fund affordable housing, public facilities and improvements, planning, program administration, and public service activities. The annual grant funding is allocated from the federal Department of Housing and Urban Development (HUD), and the amount awarded to each is subject to the federal budgeting process.

In March 2021, HUD awarded the City of Roseville $736,721 for its entitlement grant for FY2021-22. In May 2021, the City received notification from HUD that an error in the formula calculations was discovered, which led to an adjustment in funding and increased the grant for FY2021-22 to $747,577. The City Council approved the $736,721 amount in the budget for FY2021-22. However, the costs associated with public improvements and public services were not identified in detail at that time since HUD has the final approval of CDBG annual spending. HUD typically approves the CDBG annual spending plan in August, and that approval/plan outlines how the entitlement grant will be spent in detail. Following HUD's approval, Housing Division staff requests a budget adjustment in October of each year to finalize the budget based on HUD's approval.

Additionally, as in previous years, entitlement funding is available to be drawn down from HUD that was not spent in the previous year. Staff completed an analysis at year-end and determined that $217,613 of council-approved expenditures have not been completed and therefore needed to be re-budgeted for FY2021-22. Furthermore, staff is estimating that an additional $30,000 of program income will be received during FY2021-22, which will be added to the adopted budget of $120,000 for a total of $150,000 of program income. Eighty percent of the program income funds can be used for owner-occupied rehab loans with the balance for administrative costs.

In May of 2020, a budget adjustment for the federal Coronavirus Aid, Relief and Economic

Security Act (CARES Act) funding awarded to the City in the amount of $417,412 was approved by Council. These funds, also known as CDBG-CV1, must be used to prevent, prepare for and respond to the coronavirus. Funds from this funding allocation are being used towards the Small Business Loan Program, which will grant and loan up to $20,000 per business in CDBG funds. Unexpended funds from this grant allocation total $85,961. A budget adjustment is recommended to appropriate these unexpended funds in FY2021-22.

In September of 2020, the City received an additional allocation of CARES Act funding, also known as CDBG-CV3, totaling $795,721. In February of 2021, Council approved a CDBG Plan amendment that included a budget adjustment for the CARES Act CDBG-CV3 in the amount of $437,610. These funds provide money for COVID-19-related projects, including Project Sentinel's Fair Housing services program, the AMI Housing rental assistance program, the Placer County Office of Education After School Care for Homeless Students program, and the Project Roomkey program run by Placer County. Aside from the $24,000 awarded to Placer County for the Project Roomkey program and $2,728 in administrative costs, the remaining programs using the CARES Act CV3 funding are still underway. This leaves $410,882 of CV3 funds to carry forward into FY2021-22. Another Notice of Funding Availability (NOFA) for the unbudgeted CV3 funds totaling $358,111 will be released later this year to determine how these funds will be allocated and spent.

The total expenditures in the attached budget adjustment are $755,312 and will be added to the adopted budget of $733,642 for a total of $1,488,954. The total revenues in the attached budget adjustment total $755,312 and will be added to the adopted budget of $856,721 for a total of $1,612,033.

The attached budget adjustment details the specific planned expenditures and revenues, ties these items to specific accounts, and includes descriptions of the items.

FISCAL IMPACT

The source of funds for the CDBG program expenditures is federal grants. This budget adjustment has no impact to the General Fund.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. Approval of a budget adjustment meets the above criteria and is not subject to CEQA. No additional environmental review is required.

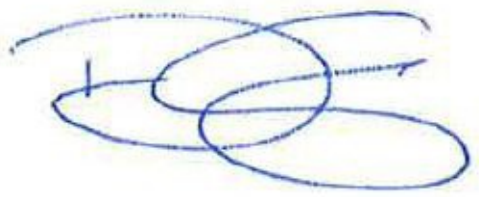
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal C - Maintain a safe and healthy community

Respectfully Submitted,

Kristine Faelz, Housing Analyst

Ryan DeVore, Economic Development Director



_____

Dominick Casey, City Manager

ATTACHMENTS:

Description

Ordinance 6403

CDBG Budget Adjustment Form

ORDINANCE NO. 21-429

ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE

THE CITY OF ROSEVILLE ORDAINS:

SECTION 1. The City of Roseville Annual Budget, Fiscal Year 2021-22, is hereby amended as listed on the attached budget adjustment for the Community Development Block Grant fund.

SECTION 2. This ordinance is hereby declared to be an appropriation measure, immediately effective pursuant to the provisions of Section 5.03 of the Charter.

SECTION 3. The City Clerk is hereby authorized and directed to post a true copy of the foregoing ordinance in each of three (3) conspicuous locations in the City and she shall immediately after such posting enter in the ordinance book, under the record of the ordinance, a certificate under her hand stating the time and place of such publication by posting.

PASSED AND ADOPTED by the Council of the City of Roseville, this _____ day of _____, 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

REQUEST FOR BUDGET ADJUSTMENT

REQUESTER NAME & TITLE:	Claudia Carreno Management Analyst	FISCAL YEAR:	FY2021-22
PREPARER NAME & TITLE:	Claudia Carreno Management Analyst	COUNCIL DATE (if applicable):	10/20/21
DEPARTMENT/DIVISION:	Economic Development - Housing	ORDINANCE:	

EXPENDITURES/EXPENSES/TRANSFERS OUT

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
2201	5301	54011		25,000	Increase Expenditure Budget for Labor Compliance Monitoring
2201	5301	54011		9,900	Increase Expenditure Budget for CDBG On-Call Consulting Services
2201	5301	54011		5,000	Increase Expenditure Budget for Miscellaneous Professional Services
2201	5570	54011		475,072	Increase Expenditure Budget for Grants for Owner Occupied Housing Rehab Projects
2201	5573	54011		240,340	Deferred loans for CDBG rehab projects & small business loans.
			TOTAL	755,312	

REVENUES/TRANSFERS IN

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
2201	4401	54011		10,856	Increase Revenue Budget for HUD Award 2021-22
2201	4401	54011		496,843	Increase Revenue Budget for CDBG Unexpended Cares Act Funding
2201	4401	54011		217,613	Increase Revenue Budget for CDBG Unexpended Availability
2201	4735	54011		30,000	Increase Revenue Budget for Program Income from Payoff
			TOTAL	755,312	

NET ADJUSTMENT	-	

FUND BALANCE

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
			TOTAL	-	

Justification for Budget Adjustment:

This budget adjustment is recommended to increase the expenditure budget in the Community Development Block Grant fund (CDBG) by $755,312 for labor compliance monitoring, on-call consulting services, professional services, and rehabilitation projects. These expenditures are being funded by additional grant funding, unexpended entitlement funding from FY2020-21, and additional program income in the CDBG fund. The identified revenues include $10,856 of additional entitlement grant from the Department of Housing and Urban Development (HUD) due to a recalculation of the original grant estimate and $217,613 in unspent entitlement funding available from the prior fiscal year. The City is also appropriating $85,961 of unspent CARES Act CV1 funding and $410,882 of unspent CARES Act CV3 funding, for a total of $496,843 in CARES Act money. Additionally, the City has identified $30,000 program income from loans payoffs that can be used for administrative costs. The requested changes in available CDBG funding levels will result in an overall increase to the FY2021-22 budget of $755,312 from $733,642 to $1,488,954

REQUIRED APPROVALS:

REQUESTING DEPARTMENT HEAD / DESIGNEE	DATE	BUDGET MANAGER / DESIGNEE	DATE
CHIEF FINANCIAL OFFICER / DESIGNEE	DATE	CITY MANAGER / DESIGNEE	DATE

BUDGET DEPARTMENT USE ONLY:

POSTED BY	DATE

Revised: June 24, 2019

COUNCIL COMMUNICATION

CC #: 1758
File #: 0900-04-01 & 0201-01

Title:	Regional Transportation Funding and Financing Plan for Riego Road/Baseline Road Improvements - Memorandum of Understanding and Budget Adjustment
Contact:	Lainie Anderson 916-774-5331 landerson@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.14.

RECOMMENDATION TO COUNCIL

Staff recommends the City Council:

- Adopt a resolution authorizing the City Manager to execute the Memorandum of Understanding (MOU) regarding the development of a Regional Transportation Funding and Financing Plan and an Implementation Plan for Riego/Baseline Road; and

- Adopt an ordinance to approve a budget adjustment of $20,000 from the City/County Mitigation Fee Fund to reimburse the Placer County Transportation Planning Agency (PCTPA) for completing this first phase of work.

BACKGROUND

In January 2020, staff from Placer County, Sutter County, the City of Roseville, and PCTPA formed a Project Development Team (PDT) to initiate a Project Study Report (PSR) to scope Riego Road/Baseline Road improvements from SR 99 to Foothills Boulevard. In conjunction with the PDT, a Strategy Team was formed, consisting of corridor development interests. The PSR, approved in October of 2020, indicated that Riego Road/Baseline Road needs to be widened and improved to support future planned and approved development and provide a reliable and safe east-west connection to meet anticipated traffic demands in the South Placer and South Sutter region. The PSR process also established a high-level project cost estimate and timeline for the project's environmental review process, the subsequent engineering and design phase, and a construction start date. Completing the PSR allows the Participating Agencies and PCTPA to pursue local, state, and federal funding for environmental, design, right-of-way, and construction of the Riego Road/Baseline Road improvements.

At the conclusion of the PSR, the PDT recognized that it would be in their best interest to continue to work cooperatively to design, fund, finance, and determine the timing of construction of Riego Road/Baseline Road improvements located in their respective jurisdictions. The PDT also recognized that it would be in their best interest to work cooperatively to obtain State and federal

transportation funding and develop a fair and equitable method to fund and finance costs of certain regional transportation improvements necessary to address cumulative traffic impacts within the South Placer and South Sutter region. These regional transportation improvements could include Riego Road/Baseline Road, State Route 99/70, Watt Avenue, and Placer/Sutter Parkway.

The purpose of the attached MOU is to facilitate a proactive multi-jurisdictional approach amongst the Participating Agencies and PCTPA to address cumulative transportation impacts from pending and approved land development within the South Placer and Sutter region. Three tasks are required to advance a regional transportation funding and financing plan and construct future improvements on Riego Road/Baseline Road. These tasks are:

- Task 1: To meet and confer to develop options and a mutually agreed upon scope and structure of a regional transportation funding and financing plan.
- Task 2: To mutually develop the analysis and related reports necessary to adopt a regional transportation funding and financing plan.
- Task 3: To develop an implementation plan for the Riego Road/Baseline Road project, including the Project Approval and Environmental Document (PA&ED) development phase.

To complete these tasks, the Participating Agencies and PCTPA agree to form a Project Development Team (PDT). The PDT will meet as necessary to administer and implement this Agreement and take such action(s) as it deems appropriate to advance a regional transportation funding and financing plan and construct improvements on Riego Road/Baseline Road. A majority of the members of the PDT will constitute a quorum, and a consensus of all Participating Agency representatives will be required for decisions of the PDT. If a consensus cannot be reached, a meeting will be held among the representatives to resolve the disagreement.
Further, the Participating Agencies authorize PCTPA to perform the following work in support of Task 1:

1. Coordinate the efforts amongst the Participating Agencies to evaluate options and develop a regional transportation funding and financing plan for the South Placer and South Sutter region. PCTPA will schedule and facilitate PDT meetings and synthesize data to identify a mutually agreeable plan. Upon consensus of the plan by the PDT, PCTPA will develop an RFP for any needed consultant services, schedule, and cost estimate to prepare an analysis and reports in support of the plan and permit consideration of the plan by the Participating Agencies' elected bodies.
2. PCTPA's cost for this initial work is estimated not to exceed $60,000, which shall be shared equally by the Participating Agencies subject to unanimous PDT approval of PCTPA's proposed budget. The total contribution by each Participating Agency shall not exceed $20,000.

Subsequent MOUs will be required to initiate Tasks 2 and 3 above. As such, the MOU does not bind the Participating Agencies to take any future action beyond Task 1.

FISCAL IMPACT

Funds to cover the $20,000 cost will come from the City/County Mitigation Fee Fund, and there is no impact to the General Fund.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. Approval of a Memorandum of Understanding and a budget adjustment meet the above criteria and are not subject to CEQA. No additional environmental review is required at this time.

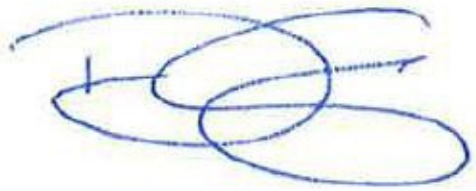
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal A - Remain fiscally responsible in a changing world
Goal F - Invest in well-planned infrastructure and growth

Respectfully Submitted,

Lainie Anderson, Administrative Assistant

Jason Shykowski, Public Works Director



_____
Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution 21-434

MOU RTFFP Riego - Baseline

Ordinance 6305

RiegoBaseline Budget Adjustment

RESOLUTION NO. 21-434

APPROVING A MEMORANDUM OF UNDERSTANDING BETWEEN COUNTY OF PLACER, THE CITY OF ROSEVILLE, AND THE COUNTY OF SUTTER (COLLECTIVELY THE "PARTICIPATING AGENCIES"), AND THE PLACER COUNTY TRANSPORTATION PLANNING AGENCY ("PCTPA")., AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE

WHEREAS, a Memorandum of Understanding for the Regional Transportation Funding and Financing Plan for South Placer and South Sutter Region and an Implementation Plan for Riego Road/Baseline Road, between the County of Placer, the City of Roseville, and the County of Sutter (collectively the "Participating Agencies"), and the Placer County Transportation Planning Agency ("PCTPA")., has been reviewed by the City Council;

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Roseville that said Memorandum of Understanding is approved and that the City Manager is authorized to execute it on behalf of the City of Roseville.

PASSED AND ADOPTED by the City Council of the City of Roseville this_____day of_____, 20___, by the following vote on roll call:

AYES COUNCIL MEMBER:

NOES COUNCIL MEMBER:

ABSENT COUNCIL MEMBER:

_____
Mayor

ATTEST:

_____
City Clerk

MEMORANDUM OF UNDERSTANDING
REGIONAL TRANSPORTATION FUNDING AND FINANCING PLAN
FOR SOUTH PLACER AND SOUTH SUTTER REGION
AND
AN IMPLEMENTATION PLAN FOR RIEGO ROAD/BASELINE ROAD

THIS MEMORANDUM OF UNDERSTANDING ("Agreement") is made and entered into this ___ day of ____, 2021, ("Execution Date") by and between the County of Placer, the City of Roseville, and the County of Sutter (collectively the "Participating Agencies"), and the Placer County Transportation Planning Agency ("PCTPA").

RECITALS

Common Interests

WHEREAS, improved traffic circulation between South Placer County and South Sutter County from State Route 99 in Sutter County to Foothills Boulevard in the City of Roseville is paramount to creating sustainable economic development in the South Placer and South Sutter region; and

WHEREAS, future planned and approved development within the South Placer and South Sutter region will result in cumulative traffic impacts in excess of capacity on the regional transportation network; and

WHEREAS, failure to expand the capacity of the regional transportation network in the South Placer and South Sutter region will cause unacceptable levels of traffic congestion; and

WHEREAS, traffic impacts of a development project approved in one jurisdiction may overlap or cross the boundary of another jurisdiction; and

WHEREAS, Placer County and the City of Roseville currently collect traffic impact fees to address the regional traffic impacts of planned development through development agreements on a project-by-project basis, including the SPRTA Tier 2 fee program and the City/County Baseline fee program; and

WHEREAS, Sutter County does not currently collect traffic impact fees to address the regional traffic impacts of planned development within the South Sutter region; and

WHEREAS, existing and future sources of revenue are inadequate to fund substantial portions of the regional transportation network improvements needed to avoid unacceptable levels of traffic congestion and related adverse environmental impacts; and

WHEREAS, the Participating Agencies mutually desire to create a regional transportation funding and financing plan that will maximize the potential to attract state and federal funding by leveraging existing and expanded impact fee programs for improvements on Riego Road/Baseline Road and

other roadways that will improve both east/west and north/south traffic circulation in the South Placer and South Sutter region.

Work Cooperatively Together

WHEREAS, Placer County and Sutter County have entered into a mutual settlement agreement in June 2009 relating to the Placer Vineyards and Sutter Pointe Specific Plans whereby, among other things, the counties agreed to work diligently and cooperatively to establish a program of fair share mitigation for traffic impacts within and outside their jurisdictional boundaries associated with certain projects; and

WHEREAS, the Participating Agencies recognize that it is in their best interest to work cooperatively together to develop a fair and equitable method to obtain State and federal transportation funding, and to fund and finance costs of certain regional transportation network improvements, possibly including Riego Road/Baseline Road, State Route 99/70, Watt Avenue and Placer/Sutter Parkway, necessary to address cumulative traffic impacts within the South Placer and South Sutter region.

Riego Road and Baseline Road

WHEREAS, the Participating Agencies have determined through an approved Project Study Report (October 2020) that Riego Road/Baseline Road needs to be widened and improved to support future planned and approved development, and to provide for a reliable and safe east-west connection to meet anticipated traffic demands in the South Placer and South Sutter region; and

WHEREAS, the Participating Agencies recognize that it is in their best interest to work cooperatively with each other to plan for, design, fund, and finance, and determine the timing of construction of Riego Road/Baseline Road transportation improvements located in the Participating Agencies respective jurisdictions.

Facilitating Agency and Cost to Study

WHEREAS, the Participating Agencies agree that PCTPA shall facilitate the cooperative efforts of the Participating Agencies and make every reasonable and timely effort to obtain funding from alternative sources to prepare a scope of work, schedule, and cost to evaluate regional transportation funding and financing options for the South Placer and South Sutter region and to develop an implementation plan for Riego Road/Baseline Road project development phases.

AGREEMENT

SECTION 1. DEVELOPMENT OF STUDIES

1.1 The purpose of this Agreement is to facilitate a proactive multi-jurisdictional approach between the Participating Agencies and PCTPA to address cumulative transportation impacts from pending and approved land development within the South Placer and South Sutter region.

1.2 The Participating Agencies agree the following three tasks are needed to advance a regional transportation funding and financing plan and to construct improvements on Riego Road/Baseline Road:

Task 1: To meet and confer to develop options and a mutually agreed upon scope and structure of a regional transportation funding and financing plan.

Task 2: To mutually develop the analysis and any related reports necessary to adopt a regional transportation funding and financing plan.

Task 3: To develop an implementation plan for the Riego Road/Baseline Road project, including the Project Approval and Environmental Document (PA&ED) project development phase.

1.3 The Participating Agencies agree to continue to work diligently and cooperatively to establish a program of shared mitigation for traffic impacts within and outside their jurisdictional boundaries associated with certain projects including the Placer Vineyards and Sutter Pointe Specific Plans, among others. At this time, specific emphasis would be placed on the Riego Road/Baseline Road project; however other transportation improvements would be considered as agreed upon by the Participating Agencies.

1.4 The Participating Agencies agree to form a Project Development Team (PDT) consisting of one representative (and alternates) designated by each Agency. The PDT will meet as necessary to administer and implement this Agreement and take such action(s) as it deems appropriate to advance a regional transportation funding and financing plan and to construct improvements on Riego Road/Baseline Road. A majority of the members of the PDT will constitute a quorum, and consensus of all Participating Agency representatives will be required for decisions of the PDT. If a decision cannot be made by consensus as described, then a meeting will be held among the representatives to resolve the disagreement.

1.5 The Participating Agencies authorize PCTPA to perform the following work in support of Task 1:

1) Coordinate the efforts amongst the Participating Agencies to evaluate options and develop a regional transportation funding and financing plan for the South Placer and South Sutter region. PCTPA will schedule and facilitate PDT meetings and synthesize data to identify a mutually agreeable plan. Upon consensus on the plan by the PDT, PCTPA will develop an RFP for any needed consultant services, schedule, and cost estimate to prepare an analysis and reports in support of the plan, to permit consideration of the plan by the Participating Agencies' elected bodies.
2) PCTPA's cost for this initial work is estimated not to exceed $60,000, which shall be shared equally by the Participating Agencies subject to the unanimous approval of PCTPA's proposed budget by the PDT.

1.6 The Participating Agencies further agree that the participants will make periodic payments to PCTPA within thirty days of submittal of an invoice by PCTPA. The contribution by each Participating Agency pursuant to this MOU shall not exceed $20,000. At the conclusion of Task 1, PCTPA will return any surplus funds to the Participating Agencies on a pro-rata basis

reflecting the amount of the payments made by each of the Participating Agencies.

1.7 A subsequent Memorandum of Understanding is required prior to initiation of Tasks 2 and 3 identified above. This Agreement does not bind the Participating Agencies to take any future action beyond Task 1 to evaluate, establish, or implement the regional transportation funding and financing plan for the South Placer and South Sutter region or to conduct the Riego Road/Baseline Road PA&ED project development phase.

1.8 The Participating Agencies shall have the right to request and review any and all documents and records that are created pursuant to this Agreement.

SECTION 2. MISCELLANEOUS

2.1 Effective Date. This Agreement is effective after execution by all the Participating Agencies and PCTPA and shall continue in effect until terminated by all the parties through mutual agreement.

2.2 Amendments. Any amendments to this Agreement shall be made by all Participating Agencies and PCTPA in writing.

2.3 Execution. The Board of Supervisors of the County of Placer, the City Council of the City of Roseville, and the Board of Supervisors of the County of Sutter, and the Board of Directors of the PCTPA have each authorized execution of this Agreement as evidence by the authorized signatures below.

2.4 Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which, together, shall constitute one and the same instrument. Documents executed, scanned, and transmitted electronically, and electronic signatures shall be deemed original signatures for purposes of this Agreement and all matters related thereto, with such scanned and electronic signatures having the same legal effect as original signatures.

2.5 Integrated Agreement. This is an integrated agreement and contains all of the terms, considerations, understanding and promises of the parties. It shall be read as a whole.

IN WITNESS WHEREOF, the parties have entered into this Agreement as of the last date set out below:

PLACER COUNTY TRANSPORTATION PLANNING AGENCY:

By: _____
Michael W. Luken
Executive Director

Approved as to Form:

By: _____
DeeAnne Gillick
Legal Counsel

COUNTY OF PLACER:

By: _____
Ken Grehm
Director, Department of Public Works

Approved as to Form:

By: _____
County Counsel

CITY OF ROSEVILLE:

By: _____
Dominick Casey
City Manager

Approved as to Form:

By: _____
Michelle Sheidenberger
City Attorney

COUNTY OF SUTTER:

By: _____
Dan Flores, Chair
Sutter County Board of Supervisors

Approved as to Form:

By: _____
County Counsel

ORDINANCE NO. 6405

ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE

THE CITY OF ROSEVILLE ORDAINS:

SECTION 1. The City of Roseville Annual Budget, Fiscal Year 2021-22, is hereby amended as listed on the attached budget adjustment to reimburse Placer County Transportation Planning Agency to cover the cost associated with improvements to Riego/Baseline Road.

SECTION 2. This ordinance is hereby declared to be an appropriation measure, immediately effective pursuant to the provisions of Section 5.03 of the Charter.

SECTION 3. The City Clerk is hereby authorized and directed to post a true copy of the foregoing ordinance in each of three (3) conspicuous locations in the City and she shall immediately after such posting enter in the ordinance book, under the record of the ordinance, a certificate under her hand stating the time and place of such publication by posting.

PASSED AND ADOPTED by the Council of the City of Roseville, this _____ day of _____, 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

REQUEST FOR BUDGET ADJUSTMENT

REQUESTER NAME & TITLE:	Jason Shykowski, Public Works Director	FISCAL YEAR:	2021-22
PREPARER NAME & TITLE:	Lainie Anderson, Administrative Assistant	COUNCIL DATE (if applicable):	10/20/21
DEPARTMENT/DIVISION:	Publlic Works Admininstation	ORDINANCE:	

EXPENDITURES/EXPENSES/TRANSFERS OUT

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
3395	6505	62001		20,000	Reimbursement to PCTPA from the City County Mitigation Fund for improvements to Baseline Road
			TOTAL	20,000	

REVENUES/TRANSFERS IN

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
			TOTAL	-	

NET ADJUSTMENT	20,000	

FUND BALANCE

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
3395				(20,000)	Reduce City County Mitigation Fund Balance
			TOTAL	(20,000)	

Justification for Budget Adjustment:

This budget adjustment is requested to reimburse PCPTA pursuant to the multi-agency Memorandum of Understanding (MOU) to cover the cost associated with improvements of Reigo/Baseline Road. There is no impact to the General Fund.

REQUIRED APPROVALS:

Jason Shykowski Digitally signed by Jason Shykowski Date: 2021.09.30 10:17:18 -07'00'

REQUESTING DEPARTMENT HEAD / DESIGNEE	DATE	BUDGET MANAGER / DESIGNEE	DATE
CHIEF FINANCIAL OFFICER / DESIGNEE	DATE	CITY MANAGER / DESIGNEE	DATE

BUDGET DEPARTMENT USE ONLY:

POSTED BY	DATE

Revised: June 24, 2019

COUNCIL COMMUNICATION

CC #: 1748
File #: 0709-01 & 0201-01

Title:	Junction Crossing Affordable Housing Project - Budget Adjustment
Contact:	Suzanne Acrell 916-774-5469 sacrell@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.15.

RECOMMENDATION TO COUNCIL

Staff recommends that the City Council, acting as the Housing Successor Agency, adopt an ordinance to allow transfer and expenditure of the following funds during FY2021-22:
1) Transferring $200,000 of unspent Housing Taxable Bonds from the Successor Agency to the Former RDA Fund to the Housing Successor Low and Moderate Income Fund (Low Mod Fund); and
2) Expending $600,000 from the Low Mod Fund; and
3) Transferring $3,760,000 from the Housing Trust Fund to the Affordable Housing In Lieu of Program Equity Fund.

BACKGROUND

On April 20, 2016, the City Council, acting on behalf of the City and in its role as the Housing Successor Agency, approved funds totaling $4.36 million to assist in developing the Junction Crossing project. This 100 percent affordable housing community will consist of a four-story building with 80 apartment units. Sixty (60) units are designed to be one-bedrooms. The remaining 20 units will be studios designed to accommodate very-low and low-income households, focusing on members of the local workforce. The project includes 86 on-grade parking spaces distributed about the site for residents, guests, and public parking access. Specifically, three parking spaces are designated to the business located at 127 Church Street, 36 parking spaces are reserved for public parking use, and the remaining 47 parking spaces are set aside for residents, consistent with Government Code 65915 (p)(3)(B). On site amenities will include a community kitchen, technology center, gym space, management offices, and laundry facilities.

A Disposition and Development Agreement, executed in January 2019, allowed St. Anton, the developer, to pursue state and federal financing for the Junction Crossing affordable housing project. In April 2021, the California Tax Credit Allocation Committee recommended funds for Federal 4% and State Low Income Housing Tax Credits for this project. This funding award will allow St. Anton to proceed with the proposed Junction Crossing development and provide a $23 million investment into the Historic Old Town area and the provision of much-needed affordable workforce housing.

Attachment 1 is a budget adjustment authorizing the transfer of $200,000 of unspent Housing Taxable Bonds, currently held by the Successor Agency to the former RDA Fund, to the Low Mod Fund and approving the expenditure of those bonds, including $400,000 from the Low Mod Fund balance and authorizing the transfer of $3.76 million from the Housing Trust Fund back to the Affordable Housing in Lieu of Program Equity Fund to be consistent with the Disposition and Development Agreement recorded in January 2019.

St. Anton will be granted two loans, one from the Low Mod Fund for $600,000 and one from the Affordable Housing Trust Fund for $3.76 million, totaling $4.36 million. These funds will be provided as a 55-year loan at 3 percent per annum and will be repaid through residual receipts, based on the cash flow of the project.

FISCAL IMPACT

The City's Affordable Housing Fund receives funding from developer in-lieu fees, payoffs from resales, and payoffs from developer subsidy loans. There are adequate available resources in the Affordable Housing Trust Fund (2821) as well as in the Successor Agency to the former RDA Fund (7201) and Housing Successor Low Mod Fund (2841) to fund the recommended budget adjustment. No General Fund resources will be used for the Junction Crossing loan.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. Approval of a budget adjustment is not subject to CEQA. No additional environmental review is required.

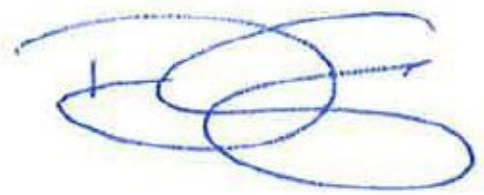
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal A - Remain fiscally responsible in a changing world

Respectfully Submitted,

Suzanne Acrell, Housing Analyst

Ryan DeVore, Assistant City Manager



Dominick Casey, City Manager

ATTACHMENTS:

Description

Ordinance 6402

ED Housing Junction Crossing Budget Adjustment

ORDINANCE NO. 6402

ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE

THE CITY OF ROSEVILLE ORDAINS:

SECTION 1. The City of Roseville Annual Budget, Fiscal Year 2021-22, is hereby amended as listed on the attached budget adjustment for the Junction Crossing Affordable Housing project.

SECTION 2. This ordinance is hereby declared to be an appropriation measure, immediately effective pursuant to the provisions of Section 5.03 of the Charter.

SECTION 3. The City Clerk is hereby authorized and directed to post a true copy of the foregoing ordinance in each of three (3) conspicuous locations in the City and she shall immediately after such posting enter in the ordinance book, under the record of the ordinance, a certificate under her hand stating the time and place of such publication by posting.

PASSED AND ADOPTED by the Council of the City of Roseville, this _____ day of _____, 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

REQUEST FOR BUDGET ADJUSTMENT

REQUESTER NAME & TITLE:	Claudia Carreno Management Analyst	FISCAL YEAR:	FY2021-22
PREPARER NAME & TITLE:	Claudia Carreno Management Analyst	COUNCIL DATE (if applicable):	
DEPARTMENT/DIVISION:	Economic Development - Housing	ORDINANCE:	

EXPENDITURES/EXPENSES/TRANSFERS OUT

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
2821	6801	10001		3,760,000	Transfer from Housing Trust Fund to Affordable Housing Fund
2824	5573	54011		3,760,000	Increase Deferred loan for Junction Crossing Project
7201	6801	10001		200,000	Transfer from Successor Agency fund to Low Mod fund.
2841	5573	54011		600,000	Increase Deferred loan for Junction Crossing Project
			TOTAL	8,320,000	

REVENUES/TRANSFERS IN

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
2824	4801	10001		3,760,000	Transfer to Affordable Housing fund from Housing Trust fund.
2841	4801	10001		200,000	Transfer to Low Mod fund from Successor Agency fund.
			TOTAL	3,960,000	

NET ADJUSTMENT	4,360,000	

FUND BALANCE

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
2821				(3,760,000)	Reduce available resources in the Housing Trust fund.
7201				(200,000)	Reduce available resources in the Successor Agency fund
2841				(400,000)	Reduce available resources in the Housing Successor Low Mod fund.
			TOTAL	(4,360,000)	

Justification for Budget Adjustment:

Staff recommends this budget adjustment to authorize a transfer of $3.76M from the Housing Trust fund to the Affordable Housing Fund and approve the expenditure of these funds as per the Disposition and Development agreement recorded in January 2019 for the development of the Junction Crossing Project. In addition, this budget adjustment increases the deferred loans budget in the Housing Successor Low Mod Fund by $600K for the Junction Crossing Project by authorizing the transfer of $200K from the Successor Agency fund to the Low Mod Fund and approving the expenditure of those bonds, as well as $400K from the Low Mod Fund available resources.

REQUIRED APPROVALS:

	9/29/21		
REQUESTING DEPARTMENT HEAD / DESIGNEE	DATE	BUDGET MANAGER / DESIGNEE	DATE
CHIEF FINANCIAL OFFICER / DESIGNEE	DATE	CITY MANAGER / DESIGNEE	DATE

BUDGET DEPARTMENT USE ONLY:

POSTED BY	DATE

Revised: June 24, 2019

COUNCIL COMMUNICATION

CC #: 1756
File #: 0900-04 & 0201-01

Title:	Corporation Yard Vehicle Wash Systems Replacement Project – Budget Adjustment
Contact:	Rebecca McCoy 916-241-6471 ramccoy@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.16.

RECOMMENDATION TO COUNCIL

Staff recommends the City Council adopt an ordinance approving a budget adjustment for $85,000 for additional costs associated with replacing the City vehicle wash systems.

BACKGROUND

In April 2020, the City of Roseville released RFP 01-031 and solicited proposals to replace two existing vehicle wash systems consisting of one large vehicle and bus wash system and one small vehicle wash system. The proposals were evaluated on the overall proposal, cost, qualifications, and experience. The City received three proposals, one being non-responsive. After reviewing and ranking the proposals, staff recommended awarding to Air & Lube Systems, Inc.

The new vehicle wash systems needed to be installed within the existing vehicle wash building consisting of one 90 foot drive through bay for larger vehicles and one 60 foot drive through bay for smaller vehicles. There is a 60 foot bay between the two bays to house the vehicle wash equipment and the existing water storage pits.

The wash system being replaced was 12 years old and had exceeded its useful life. The new wash system will help reduce downtime due to maintenance and repairs, reduce water waste, and achieve a higher quality wash for our fleet of almost 900 vehicles.

The City originally budgeted $660,000 for this project (500083 - Automotive Services - Bus and Car Wash Replacement). After the replacement and commissioning of these systems, the balance remaining in the project budget is insufficient to cover the cost of chemicals, customized wash modifications, and the project management required to achieve the desired high-performance wash. To cover these additional costs, staff recommends that Council approve a budget adjustment of $85,000, consisting of $8,500 from the Facility Rehabilitation Fund (4065) by way of the General Fund, $59,500 from the Waste Services Rehabilitation Fund (6330), $16,575 from the Transit Fund (6511) and $425 from the Electric Fund (6001). This adjustment will bring the total project budget to $745,000.

FISCAL IMPACT

There are adequate available resources in the Facility Rehabilitation Fund (4065), Waste Services Rehabilitation Fund (6330), Transit Fund (6511), and Electric Fund (6001) to fund the recommended budget adjustment totaling $85,000.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. Approval of a budget adjustment meets the above criteria and is not subject to CEQA. No additional environmental review is required.

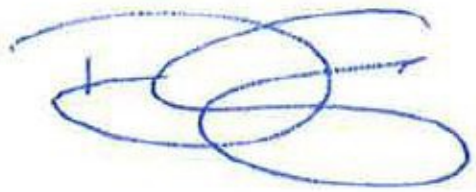
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal E - Deliver exceptional city services

Respectfully Submitted,

Rebecca McCoy, Project Coordinator

Jason Shykowski, Public Works Director



_____
Dominick Casey, City Manager

ATTACHMENTS:

Description

Ordinance 6404

budget adjustment

ORDINANCE NO. 6404

ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE

THE CITY OF ROSEVILLE ORDAINS:

SECTION 1. The City of Roseville Annual Budget, Fiscal Year 2021-22, is hereby amended as listed on the attached budget adjustment for the replacement of the City vehicle wash systems.

SECTION 2. This ordinance is hereby declared to be an appropriation measure, immediately effective pursuant to the provisions of Section 5.03 of the Charter.

SECTION 3. The City Clerk is hereby authorized and directed to post a true copy of the foregoing ordinance in each of three (3) conspicuous locations in the City and she shall immediately after such posting enter in the ordinance book, under the record of the ordinance, a certificate under her hand stating the time and place of such publication by posting.

PASSED AND ADOPTED by the Council of the City of Roseville, this _____ day of _____, 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

REQUEST FOR BUDGET ADJUSTMENT

REQUESTER NAME & TITLE:	Dan Allen, Facility Manager	FISCAL YEAR:	2021-22
PREPARER NAME & TITLE:	Rodney Funke, Management Analyst II	COUNCIL DATE (if applicable):	10/20/2021
DEPARTMENT/DIVISION:	Public Works / Building Maintenance	ORDINANCE:	

EXPENDITURES/EXPENSES/TRANSFERS OUT

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
4065	5080	84001	500083	1,700	Establish Internal Project budget for project #500083
4065	6587	84001	500083	6,800	Establish Capital Outlay budget for project #500083
6001	5080	84001	500083	85	Establish Internal Project budget for project #500083
6001	6587	84001	500083	340	Establish Capital Outlay budget for project #500083
6330	5080	84001	500083	11,900	Establish Internal Project budget for project #500083
6330	6587	84001	500083	47,600	Establish Capital Outlay budget for project #500083
6511	5080	84001	500083	3,315	Establish Internal Project budget for project #500083
6511	6587	84001	500083	13,260	Establish Capital Outlay budget for project #500083
			TOTAL	**85,000**	

REVENUES/TRANSFERS IN

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
			TOTAL	**-**	

NET ADJUSTMENT	**85,000**	

FUND BALANCE

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
4065	3601	00000		(8,500)	Reduce Facility Rehabilitation Fund Balance
6001	3601	00000		(425)	Reduce Electric Fund Balance
6330	3601	00000		(59,500)	Reduce Waste Services Rehabilitation Fund Balance
6511	3601	00000		(16,575)	Reduce Transit Fund Balance
			TOTAL	**(85,000)**	

Justification for Budget Adjustment:

Project #500083 - Automotive Services - Bus and Car Wash Replacement is funded by 4065 - Facilities Rehabilitation, 6001 – Electric, 6330 – Waste Services Rehabilitation and 6511 – Transit.
This project was originally estimated to cost $660,000, however the final cost is estimated to be $745,000. This $85,000 budget is requested to align the budget with anticipated costs.
All funds have adequate fund balance to cover the additional costs

REQUIRED APPROVALS:

REQUESTING DEPARTMENT HEAD / DESIGNEE	**DATE**	**BUDGET MANAGER / DESIGNEE**	**DATE**
CHIEF FINANCIAL OFFICER / DESIGNEE	**DATE**	**CITY MANAGER / DESIGNEE**	**DATE**

BUDGET DEPARTMENT USE ONLY:

POSTED BY	**DATE**

Revised: June 24, 2019

COUNCIL COMMUNICATION

CC #: 1763
File #: 0502

Title:	Second Reading - Proposed Amendments to Campaign Finance Ordinance
Contact:	Joseph Speaker 916-774-5325 jspeaker@roseville.ca.us Sonia Orozco 916-774-5269 sorozco@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.17.

RECOMMENDATION TO COUNCIL

ORDINANCE NO. 6409 OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTIONS 2.60.065, 2.60.070, AND 2.60.090 OF CHAPTER 2.60 OF TITLE 2 OF THE ROSEVILLE MUNICIPAL CODE REGARDING CAMPAIGN FINANCE DISCLOSURE, for second reading and adoption.

BACKGROUND

Not applicable.

FISCAL IMPACT

Not applicable.

ENVIRONMENTAL REVIEW

Not applicable.

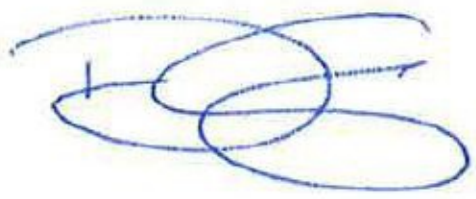
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal B – Support community engagement and advocacy.

Respectfully Submitted,

Joseph Speaker, Assistant City Attorney

Sonia Orozco, City Clerk



_____

Dominick Casey, City Manager

ATTACHMENTS:

Description

Ordinance 6409

ORDINANCE NO. 6409

ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTIONS 2.60.065, 2.60.070, AND 2.60.090 OF CHAPTER 2.60 OF TITLE 2 OF THE ROSEVILLE MUNICIPAL CODE REGARDING CAMPAIGN FINANCE DISCLOSURE

THE CITY OF ROSEVILLE ORDAINS:

SECTION 1. Section 2.60.065 of Chapter 2.60 of Title 2 of the Roseville Municipal Code is hereby amended to read as follows:

2.60.065 Mandatory contribution limits.

A. A person shall not make to a candidate for elective city office, and a candidate for elective city office shall not accept from a person, a contribution totaling more than $500.00 per election, as that amount is adjusted by the city clerk pursuant to subsection E of this section.

B. Each candidate and controlled committee shall, before accepting any contributions, file with the city clerk, on a form provided by the clerk, a statement acknowledging the contribution limits established by this section.

C. Candidates or controlled committees may retain no more than $500.00, as adjusted, in cumulative contributions per campaign period from any single contributor. Any amount in excess of $500.00, as adjusted, received from any single contributor shall be returned to the contributor within 15 business days of the candidate's or controlled committee's receipt of the excess contribution.

D. Contributions to a candidate and contributions to a candidate's controlled committee shall be cumulated for the purposes of the mandatory contribution limits of this chapter.

E. The city clerk shall adjust the contribution limits in January of every odd-numbered year to reflect any increase or decrease in the Consumer Price Index. Those adjustments shall be rounded to the nearest ten dollars ($10).

F. For purposes of this chapter, contributions by a dependent child shall be treated as contributions by their legal parent(s) and/or legal guardian(s). "Dependent child" shall mean any person under the age of eighteen (18) years old for whom a legal parent(s) or legal guardian(s) is/are responsible for their day to day care and support. If there is joint custody of the dependent child, one-half of the contribution shall be attributed to each legal parent and/or legal guardian, and if there is a single custodial parent and/or legal guardian, the entire contribution shall be attributed to that parent and/or legal guardian.

SECTION 2. Section 2.60.070 of Chapter 2.60 of Title 2 of the Roseville Municipal Code is hereby amended to read as follows:

2.60.070 Reporting campaign contributions and expenditures.

A. The Political Reform Act of 1974, and the California Government Code, provide for various campaign reports to be filed on dates determined by the Fair Political Practices Commission (FPPC). In addition to the reports required by the FPPC, Roseville candidates will

be required to file reports no later than April 5 for the period of February 1 to March 31 and June 5 for the period of April 1 to May 31 during the election period.

All candidates appearing on the ballot, their controlled committees, and committees primarily formed to support or oppose an elected official, candidate, or a measure shall file the applicable pre-election and post-election reports specified in Section 84200 et seq., of the California Government Code and file reports required by the City of Roseville as prescribed in subsection (B)(1) of this section. Reports shall be filed with the city clerk as follows:

1. A report of all contributors who have made a contribution or contributions to the candidate or controlled committee in the cumulative amount of $100.00 or more since the last report. The list shall include the name, address, occupation, and employer of each contributor, and the dollar amount of each contribution or contributions.

2. A report of all expenditures made by the candidate or controlled committee to each person who received the cumulative amount of $100.00 or more since the last report. The report shall include the name, and street address of each recipient, as well as the amount of each expenditure and a brief description of the consideration for which each expenditure was made.

B. Reporting Deadlines.

1. For general elections, pre-election and post-election reports shall be filed as follows:

a. April 5 for the period of February 1 to March 31.

b. June 5 for the period of April 1 to May 31.

c. July 31 for the period of January 1 to June 30 (semi-annual).

d. For the period ending 45 days before the election and filed no later than 40 days before the election covering period July 1 to deadline (first pre-election).

e. For the period ending 17 days before the election and filed no later than 12 days before the election from the last deadline (second pre-election). This report must be filed by personal delivery, guaranteed overnight service or on-line.

f. January 31 for the period from second pre-election deadline to December 31 (semi-annual).

g. Reports shall be filed with the city clerk by 5:00 p.m. on the deadline dates.

2. For special or recall elections, pre-election and post-election reports shall be filed as follows:

a. April 5 for the period of February 1 to March 31.

b. June 5 for the period of April 1 to May 31.

c. July 31 for the period of January 1 to June 30 (semi-annual).

d. For the period ending 45 days before the election and filed no later than 40 days before the election (first pre-election).

e. For the period ending 17 days before the election and filed no later than 12 days before the election from the last deadline (second pre-election). This report must be filed by personal delivery, guaranteed overnight service or on-line.

f. 60th day after the special election.

g. January 31 for the period from second pre-election deadline to December 31 (semi-annual).

h. Reports shall be filed with the city clerk by 5:00 p.m. on the deadline dates.

C. The period covered by any report begins on the day after the closing date of the last report filed. Dates for the first pre-election and second pre-election reports will vary depending on the yearly election date.

D. In addition to the campaign reports required by Sections 84200 and 84200.5 of the California Government Code, all candidates and committees shall file the following special reports (if applicable):

1. Late contribution reports (within 24 hours of receipt).

2. Late independent expenditure reports, when required by Section 84204 of the California Government Code.

E. All reports required by this section shall be filed electronically on forms supplied by the FPPC, the city clerk or via the City of Roseville electronic campaign filing portal. The contributions and expenditures listed on required reports shall be cumulative for each election.

F. It shall be the duty of the candidate, their treasurer, and principal officer of any committee, to maintain such detailed accounts, records, bills, copies of checks, and receipts that are necessary to prepare the campaign statements required by this chapter and the Political Reform Act. Such records shall also be maintained and retained by committees primarily formed to support or oppose an elected officer, candidate, or a measure pursuant to the provisions of the Political Reform Act and regulations promulgated by the FPPC.

SECTION 3. Section 2.60.090 of Chapter 2.60 of Title 2 of the Roseville Municipal Code is hereby amended to read as follows:

2.60.090 Violation unlawful.

Any person who knowingly or willfully violates any provision of this chapter, after receiving notice of such violation and an opportunity to correct, is guilty of a misdemeanor.

SECTION 4. This ordinance shall be effective at the expiration of thirty (30) days from the date of adoption.

SECTION 5. The City Clerk is hereby directed to cause this ordinance to be published in full at least once within fourteen (14) days after it is adopted in a newspaper of general circulation in the City, or shall within fourteen (14) days after its adoption cause this ordinance to be posted in full in at least three (3) public places in the City and enter in the Ordinance Book a certificate stating the time and place of said publication by posting.

PASSED AND ADOPTED by the Council of the City of Roseville this ___ day of _____, 20__, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____

MAYOR

ATTEST:

_____
City Clerk

COUNCIL COMMUNICATION

CC #: 1761
File #: 0400-04-12-1 & 0400-03 & 0400-04

Title:	Second Reading - Sierra Vista Specific Plan Parcels FD-2, FD-5, FD-9, FD-40, FD-63, FD-64 – Development Agreement Amendment
Contact:	Sean Morales 916-774-5282 smorales@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.18.

RECOMMENDATION TO COUNCIL

ORDINANCE NO. 6407 OF THE COUNCIL OF THE CITY OF ROSEVILLE ADOPTING A FIFTH AMENDMENT OF THE DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF ROSEVILLE, SOLAIRE COMMUNITY BUILDERS AS ASSIGNEE OF WESTPARK SIERRA VISTA, LLC, AS ASSIGNEE OF WESTPARK FEDERICO, LLC, MOURIER INVESTMENTS, LLC, AND FEDERICO-TYLER FAMILY LIMITED PARTNERSHIP RELATIVE TO THE SIERRA VISTA SPECIFIC PLAN AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE, for second reading and adoption.

BACKGROUND

Not applicable.

FISCAL IMPACT

Not applicable.

ENVIRONMENTAL REVIEW

Not applicable.

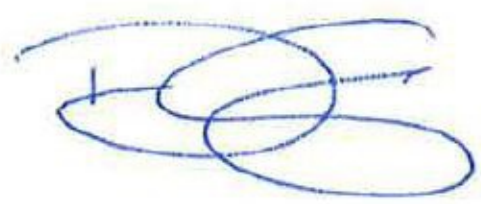
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal F - Invest in well-planned infrastructure and growth

Respectfully Submitted,

Sean Morales, Assistant Planner

Mike Isom, Development Services Director



_____

Dominick Casey, City Manager

ATTACHMENTS:

Description

Ordinance 6407

ORDINANCE NO. 6407

ADOPTING A FIFTH AMENDMENT OF THE DEVELOPMENT AGREEMENT BY AND BETWEEN THE CITY OF ROSEVILLE AND SOLAIRE COMMUNITY BUILDERS, LLC AS ASSIGNEE OF WESTPARK SIERRA VISTA, LLC, RELATIVE TO THE SIERRA VISTA SPECIFIC PLAN AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE

THE CITY OF ROSEVILLE ORDAINS:

SECTION 1. In accordance with Chapter 19.84 of Title 19 of the Roseville Municipal Code (the Zoning Ordinance) of the City of Roseville, the City Council has received the recommendation of the Planning Commission that the City of Roseville enter into a Fifth Amendment of the Development Agreement by and between the City of Roseville and Solaire Community Builders, LLC, as assignee of Westpark Sierra Vista, LLC pertaining to property located within the Sierra Vista Specific Plan area.

SECTION 2. Prior to considering the proposed Fifth Amendment to Development Agreement, the City Council considered the 5th Addendum to the Sierra Vista Specific Plan Environmental Impact Report (EIR) (SCH #2008032115, certified May 5, 2010), pursuant to the California Environmental Quality Act, California Public Resources Code Section 21000 *et seq.*

SECTION 3. The Council of the City of Roseville has reviewed the findings of the Planning Commission recommending approval of the Fifth Amendment to Development Agreement, and makes the following findings:

1. The Fifth Amendment to the Development Agreement is consistent with the objectives, policies, programs and land use designations of the City of Roseville General Plan and the Sierra Vista Specific Plan;

2. The Fifth Amendment to the Development Agreement is consistent with the City of Roseville Zoning Ordinance;

3. The Fifth Amendment to the Development Agreement is in conformance with the public health, safety and welfare;

4. The Fifth Amendment to the Development Agreement will not adversely affect the orderly development of the property or the preservation of property values; and

5. The provisions of the Fifth Amendment to the Development Agreement will provide sufficient benefit to the City to justify entering into said Amendment.

SECTION 4. The Fifth Amendment to Development Agreement, by and between the City of Roseville and Solaire Community Builders, LLC as assignee of Westpark Sierra Vista, LLC., a copy of which is on file in the City Clerk's Department and incorporated herein by reference, is hereby approved and the City Manager is authorized to execute it on behalf of the City of Roseville.

SECTION 5. The City Clerk is directed to record the executed Development Agreement Amendment within ten (10) days of the execution of the agreement by the City Manager with the County Recorder's Office of the County of Placer.

SECTION 6. This ordinance shall be effective at the expiration of thirty (30) days from the date of its adoption.

SECTION 7. The City Clerk is hereby directed to cause this ordinance to be published in full at least once within fourteen (14) days after it is adopted in a newspaper of general circulation in the City, or shall within fourteen (14) days after its adoption cause this ordinance to be posted in full in at least three (3) public places in the City and enter in the Ordinance Book a certificate stating the time and place of said publication by posting.

PASSED AND ADOPTED by the Council of the City of Roseville this _____ day of _____ 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

COUNCIL COMMUNICATION

CC #: 1762
File #: 0321

Title:	Second Reading - Roseville Municipal Code Amendment to Sign Ordinance
Contact:	Robert Cline 916-746-1172 racline@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.19.

RECOMMENDATION TO COUNCIL

ORDINANCE NO. 6408 OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTION 17.17.035 OF CHAPTER 17.17 OF TITLE 17 OF THE ROSEVILLE MUNICIPAL CODE REGARDING SIGNS ON PUBLIC PROPERTY, for second reading and adoption.

BACKGROUND

Not applicable.

FISCAL IMPACT

Not applicable.

ENVIRONMENTAL REVIEW

Not applicable.

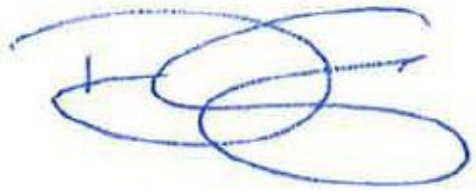
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal A - Remain fiscally responsible in a changing world.
Goal B - Support community engagement and advocacy.
Goal D - Enhance economic vitality.

Respectfully Submitted,

Robert Cline, Economic Development Project Manager

Dominick Casey, City Manager



_____

Dominick Casey, City Manager

ATTACHMENTS:

Description

Ordinance 6408

ORDINANCE NO. 6408

ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTION 17.17.035 OF CHAPTER 17.17 OF TITLE 17 OF THE ROSEVILLE MUNICIPAL CODE REGARDING SIGNS ON PUBLIC PROPERTY

THE CITY OF ROSEVILLE ORDAINS:

SECTION 1. Section 17.17.035 of Chapter 17.17 of Title 17 of the Roseville Municipal Code is hereby amended to read as follows:

17.17.035 Signs permissible within city-owned property.

A. Notwithstanding any provision of this title to the contrary, the City may construct and maintain, or cause the construction and/or maintenance of, freestanding billboard signs within City-owned property and visible from Interstate Highway 80 and/or State Highway 65 pursuant to (i) a relocation agreement; or (ii) an agreement negotiated following one of the City's standard procurement processes. Such signs may be electronic, digital, programmable, and/or illuminated. City-owned property may additionally include easement or leasehold interests.

B. Notwithstanding any provision of this code to the contrary, an existing sign that is removed and/or relocated in the implementation or exercise of above subsection A(i) may be either a legal conforming sign or a legal nonconforming sign. The off-site sign(s) approved for relocation must be removed from the original site(s) prior to construction or installation of the off-site sign(s).

C. In addition to complying with the other requirements of this section, a relocated sign must also comply with the requirements of the Outdoor Advertising Act, Chapter 2 in Division 3 of the California Business and Professions Code ("Act"), including, but not limited to, the restrictions on size, height, intermittent flashing lights, proximity to interstate and primary highways and landscaped freeways, and other regulations set forth in Articles 7 and 8 of the Act. To the extent a conflict arises between this section and the Act, the Act will prevail. Furthermore, a relocated sign must comply with Section 17.12.010(A) and (D).

D. Findings for Approval of a Relocation Agreement. A relocation agreement may be approved if the City Council makes the following findings concerning the signage proposed for the relocation pursuant to the relocation agreement:

1. The relocated signage complies with the purpose and requirements of this section;

2. The relocated signage is compatible with the uses and structures, if any, on the site and in the surrounding area, including parks, trails, and other public facilities and amenities; and

3. The relocated signage will not interfere with onsite access or circulation or significantly interfere with visibility.

SECTION 2. This ordinance shall be effective at the expiration of thirty (30) days from the date of adoption.

SECTION 3. The City Clerk is hereby directed to cause this ordinance to be published in full at least once within fourteen (14) days after it is adopted in a newspaper of general

circulation in the City, or shall within fourteen (14) days after its adoption cause this ordinance to be posted in full in at least three (3) public places in the City and enter in the Ordinance Book a certificate stating the time and place of said publication by posting.

PASSED AND ADOPTED by the Council of the City of Roseville this ___ day of _____, 20__, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

COUNCIL COMMUNICATION

CC #: 1746
File #: 0102-06

Title:	Proclamation - Extra Mile Day November 1, 2021
Contact:	Blair Hutchison 916-774-5266 bmhutchison@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 7.20.

RECOMMENDATION TO COUNCIL

Proclaim November 1, 2021, to be Extra Mile Day and urge individuals in the community to “go the extra mile” and celebrate individuals who make the world a better place.

BACKGROUND

Not applicable.

FISCAL IMPACT

Not applicable.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. Ceremonial documents meet the above criteria and are not subject to CEQA. No additional environmental review is required.

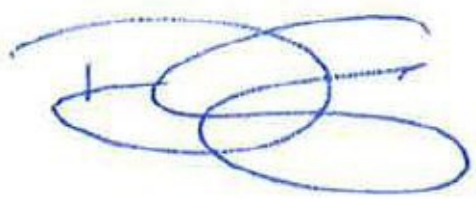
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal B - Support community engagement and advocacy

Respectfully Submitted,

Blair Hutchison, Deputy Clerk

Sonia Orozco, City Clerk



Dominick Casey, City Manager

ATTACHMENTS:

Description

Proclamation - Extra Mile Day November 1, 2021

Proclamation

EXTRA MILE DAY

November 1, 2021

WHEREAS, Roseville acknowledges that a special vibrancy exists within the community when citizens "go the extra mile" in personal effort, volunteerism, and service; and

WHEREAS, Roseville encourages citizens to maximize their personal contribution to the community by giving of themselves wholeheartedly and with total effort, commitment, and conviction to their individual ambitions, family, friends, and community; and

WHEREAS, Roseville chooses to recognize individuals and organizations within its community who "go the extra mile" in order to make a difference and lift up fellow members of their community; and

WHEREAS, Roseville acknowledges the mission of Extra Mile America to create 550 Extra Mile cities in America, and is proud to support "Extra Mile Day" on November 1, 2021.

NOW, THEREFORE, I, KRISTA BERNASCONI, MAYOR OF THE CITY OF ROSEVILLE, CALIFORNIA, do hereby proclaim **NOVEMBER 1, 2021**, to be **EXTRA MILE DAY** and urge individuals in the community to "go the extra mile" and celebrate individuals who make the world a better place.

SIGNED AND APPROVED this 20th day of October, 2021.

KRISTA BERNASCONI, MAYOR

CITY OF ROSEVILLE
INCORPORATED APRIL 10, 1909

COUNCIL COMMUNICATION

CC #: 1757
File #: 0800-03 & 0215

Title:	Roseville Electric Utility Rate Proposal
Contact:	Shawn Matchim 916-746-1620 smatchim@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 8.1.

RECOMMENDATION TO COUNCIL

Staff recommends City Council adopt an ordinance approving amendments to Section 14.24 of the Municipal Code to reflect Roseville Electric Utility's recommended electric rate adjustments as explained below and shown in Attachment A, effective January 2022 and January 2023.

BACKGROUND

Roseville Electric Utility's mission is to deliver safe, reliable electricity at competitive rates with exceptional service. This mission shapes how the electric utility conducts its day-to-day business operations and impacts the electric service provided to over 65,000 business and residential customers in the City of Roseville. This mission is balanced with the electric utility's ability to align operating costs with expected revenues so that the utility remains in a position of financial strength to serve the community in the future. Reviewing and recommending adjustments to electric rates is essential in delivering on the utility's mission.

As a result, Roseville Electric Utility periodically prepares an electric rate cost of service analysis which informs the need for adjustments. The analysis helps forecast our future costs to operate the utility and expected revenues while considering several items impacting our business environment, including regulatory requirements, labor costs, customer service, maintenance activities, and capital planning. Roseville Electric Utility initiated its 2021 electric rate cost of service analysis earlier this year.

RATE PROPOSAL

It has been over seven years since Roseville Electric Utility raised electric rates, and since that time, the utility has worked hard to mitigate cost increases and operate the utility as efficiently as possible. Actions taken include implementing a robust, forward-looking energy procurement program, refinancing and paying down debt, carefully managing of position vacancies, and most importantly, establishing a culture of cost discipline. These actions have all helped the electric utility avoid electric rate increases since 2014 and helped to minimize the level of electric rate increases in the future.

Roseville Electric Utility's 2021 electric rate cost of service analysis concluded that expected revenues are not sufficient to cover expected costs for fiscal years 2023 through 2025. As a result, Roseville Electric Utility recommends an electric rate increase for all of its customer classes, as summarized below.

	Bill Component			
	Usage Rate Increase		Monthly Basic Service Charge Increase	
Customer Group	**1/1/2022**	**1/1/2023**	**1/1/2022**	**1/1/2023**
Residential	2%	2%	$2	$2
Small Commercial	2%	2%	$3	$3
Medium Commercial	1.5%	1.5%	-	-
Large Commercial	2%	2%	$20	$20
Industrial	2%	2%	$25	$25

The cost of delivering safe, reliable electric utility services continues to rise. Increasing costs associated with regulatory requirements, operations and maintenance, staffing costs associated with attracting and retaining a highly skilled workforce, and developing new, more sophisticated customer programs all place upward cost pressure on our current rate levels.

If approved, the proposed rate changes detailed above will be effective January 1, 2022, and January 1, 2023.

PUBLIC OUTREACH AND CUSTOMER FEEDBACK

The Roseville Electric Utility rate proposal included a significant amount of public outreach. As a community owned utility, rate proposal outreach is an intentionally collaborative process that offers customers numerous opportunities to engage with the electric utility. Customer feedback and participation in this process are critically important to the successful adoption and broader understanding of the proposed rate changes. Some of the noteworthy outreach events for this rate proposal for community engagement included:

- (3) Virtual Public Workshops
- Roseville Area Chamber of Commerce Meeting
- Sun City Government Affairs Meeting
- Roseville Coalition of Neighborhood Associations (RCONA) Board Meeting
- Largest Electric Customers / Key Account Meetings
- Roseville Electric webpage
- Social media (Facebook and Nextdoor)

Throughout our public outreach, customer feedback was very positive and complimentary of Roseville Electric Utility's reliability and service levels. There were no substantive concerns expressed by residents or the business community.

On September 28, 2021, the Roseville Public Utilities Commission voted unanimously to recommend approval of the rate proposal to the City Council.

FISCAL IMPACT

The proposed rate changes will result in $8.1 million of additional revenue annually after the two year implementation. The proposed changes align the revenues collected from customers with the costs of operating the utility to maintaining financial strength and stability consistent with City Council priorities.

ENVIRONMENTAL REVIEW

Approval of the new utility rates is considered statutorily exempt from CEQA (State CEQA Guidelines section 15273). The project involves the modification of rates, tolls, fares, and other charges by a public agency for the purpose of (1) Meeting operating expenses, including employee wage rates and fringe benefits, (2) Purchasing or leasing supplies, equipment, or materials, (3) Meeting financial reserve needs and requirements, (4) Obtaining funds for capital projects, necessary to maintain service within existing service areas, and (5) Obtaining funds necessary to maintain such intra-city transfers as are authorized by city charter. No further CEQA action is required.

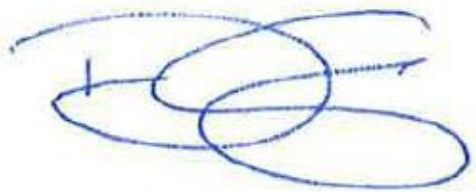
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal A - Remain fiscally responsible in a changing world
Goal E - Deliver exceptional city services

Respectfully Submitted,

Shawn Matchim, Assistant Electric Utility Director

Michelle Bertolino, Electric Utility Director



_____
Dominick Casey, City Manager

ATTACHMENTS:

Description

RMC redline

ORDINANCE NO. ____

ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AMENDING SECTIONS 14.24.040, 14.24.050, 14.24.051 AND 14.24.055 OF CHAPTER 14.24 OF TITLE 14 OF THE ROSEVILLE MUNICIPAL CODE REGARDING ELECTRICAL ENERGY

THE CITY OF ROSEVILLE ORDAINS:

SECTION 1. Section 14.24.040 of Chapter 14.24 of Title 14 of the Roseville Municipal Code is hereby amended to read as follows:

14.24.040 Residential rates.

A. Effective January 1, 2022~~16~~, the residential rate applied to service within a monthly billing period and charged to residential customers shall be as follows:

1. For each residential customer meter:

a. Basic service charge: a basic service charge of $2~~2~~8.00 per meter, per billing month.

b. Energy charge applied to electricity consumption in kWh in accordance with the following tiers:

i. Tier 1—Up to 500 kWh: $0.~~0982~~ 0959 per kWh;

ii. Tier 2—Greater than 500 kWh: $0.~~1497~~ 1452 per kWh.

c. California renewable energy requirement surcharge: $0.0056 per kWh.

d. California greenhouse gas emission reduction requirement surcharge: $0.0002 per kWh.

e. Hydroelectric adjustment: the annually adjusted charge or credit on residential billings that will be applied from July 1st to June 30th each fiscal year, as provided in Section 14.24.052.

B. Effective January 1, 20231~~7~~, the residential rate applied to service within a monthly billing period and charged to residential customers shall be as follows:

1. For each residential customer meter:

a. Basic service charge: a basic service charge of $3026~~26~~.00 per meter, per billing month.

b. Energy charge applied to electricity consumption in kWh:

i. Tier 1—Up to 500 kWh: $0.0989~~31~~ per kWh;

ii. Tier 2—Greater than 500 kWh: $0.1468~~35~~ per kWh.

c. California renewable energy requirement surcharge: $0.0056 per kWh.

d. California greenhouse gas emission reduction requirement surcharge: $0.0002 per kWh.

e. Hydroelectric adjustment: the annually adjusted charge or credit on residential billings that will be applied from July 1st to June 30th each fiscal year, as provided in Section 14.24.052.

SECTION 2. Section 14.24.050 of Chapter 14.24 of Title 14 of the Roseville Municipal Code is hereby amended to read as follows:

14.24.050 General service rates.

A. Effective January 1, 2022~~16~~, the general service rates applied to service within a monthly billing period and charged to general service customers shall be as follows:

1. Small General Service (GS-1) Rate. The GS-1 monthly rates on monthly billings will be as follows:

Basic Service Charge	$41~~33~~.00 per meter, per month
Energy Charge	
Winter	$0.0995~~1014~~ per kWh
Summer	$0.1156~~78~~ per kWh
California Renewable Energy Requirement Surcharge	$0.0056 per kWh
California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh
Hydroelectric Adjustment	Annually adjusted charge or credit on billings that will be applied from July 1st to June 30th each fiscal year, as prescribed in Section 14.24.052

2. Medium General Service (GS-2) Rate. The GS-2 monthly rates on monthly billings will be as follows:

Basic Service Charge	$65~~70~~.00 per meter, per month
Demand Charge	$6.16~~5.39~~ per kW
Energy Charge	
Winter	$0.1047~~8~~ per kWh
Summer	$0.1258~~7~~ per kWh
California Renewable Energy Requirement Surcharge	$0.0056 per kWh
California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh
Hydroelectric Adjustment	Annually adjusted charge or credit on billings that will be applied from July 1st to June 30th each fiscal year, as prescribed in Section 14.24.052

3. Large General Service (GS-3) Rate. TOU rates are mandatory for all customers receiving service in the GS-3 rate classification. Customers not having the necessary equipment to meter consumption on a TOU basis will be charged at the GS-2 rate until the necessary equipment is installed. Customers with facilities where the necessary TOU equipment is infeasible or impractical to employ, as determined by Roseville Electric, will be billed at the GS-2 rate. Discounts for primary services are provided pursuant to Section 14.24.050(D).

The GS-3 monthly rates on monthly billings will be as follows:

Basic Service Charge	$5414.00 per meter, per month
Demand Charge	
Winter	$6.604.99 per kW
Summer	$11.5762 per kW
Energy Charge	
Winter	
Off Peak	$0.06998 per kWh
On Peak	$0.09132 per kWh
Super Peak	$0.09132 per kWh
Summer	
Off Peak	$0.09123 per kWh
On Peak	$0.1125 per kWh
Super Peak	$0.14443 per kWh
California Renewable Energy Requirement Surcharge	$0.0056 per kWh
California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh
Hydroelectric Adjustment	Annually adjusted charge or credit on billings that will be applied from July 1st to June 30th each fiscal year, as prescribed in Section 14.24.052

4. Very Large General Service (GS-4) Rate. TOU rates are mandatory for all customers receiving service in the GS-4 rate classification. Discounts for primary services are defined in Section 14.24.050(D).

The GS-4 TOU monthly rates on monthly billings will be as follows:

Basic Service Charge	$6163~~38~~.00 per meter, per month
Demand Charge	
Winter	$6.71~~4.99~~ per kW
Summer	$11.51~~40~~ per kW
Energy Charge	
Winter	
Off Peak	$0.06918~~9~~ per kWh
On Peak	$0.08841~~1~~ per kWh
Super Peak	$0.08841~~1~~ per kWh
Summer	
Off Peak	$0.0901~~899~~ per kWh
On Peak	$0.10941~~1~~ per kWh
Super Peak	$0.143228~~28~~ per kWh
California Renewable Energy Requirement Surcharge	$0.0056 per kWh

California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh
Hydroelectric Adjustment	Annually adjusted charge or credit on billings that will be applied from July 1st to June 30th each fiscal year, as prescribed in Section 14.24.052

B. Effective January 1, 201237, the general service rates applied to service within a monthly billing period and charged to general service customers shall be as follows:

1. Small General Services (GS-1) Rate. The GS-1 monthly rates on monthly billings will be as follows:

Basic Service Charge	$4438.00 per meter, per month
Energy Charge	
Winter	$0.10170974 per kWh
Summer	$0.11831 per kWh
California Renewable Energy Requirement Surcharge	$0.0056 per kWh
California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh
Hydroelectric Adjustment	Annually adjusted charge or credit on billings that will be applied from July 1st to June 30th

	each fiscal year, as prescribed in Section 14.24.052

2. Medium General Service (GS-2) Rate. The GS-2 monthly rates on monthly billings will be as follows:

Basic Service Charge	$65.00 per meter, per month
Demand Charge	$6.16 per kW
Energy Charge	
Winter	$0.10<u>66</u>~~28~~ per kWh
Summer	$0.12<u>82</u>~~35~~ per kWh
California Renewable Energy Requirement Surcharge	$0.0056 per kWh
California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh
Hydroelectric Adjustment	Annually adjusted charge or credit on billings that will be applied from July 1st to June 30th each fiscal year, as prescribed in Section 14.24.052

3. Large General Service (GS-3) Rate. TOU rates are mandatory for all customers receiving service in the GS-3 rate classification. Customers not having the necessary equipment

to meter consumption on a TOU basis will be charged at the GS-2 rate until the necessary equipment is installed. Customers with facilities where the necessary TOU equipment is infeasible or impractical to employ, as determined by Roseville Electric, will be billed at the GS-2 rate. Discounts for primary services are provided pursuant to Section 14.24.050(D).

The GS-3 monthly rates on monthly billings will be as follows:

Basic Service Charge	$561~~21~~.00 per meter, per month
Demand Charge	
Winter	$6.60 per kW
Summer	$11.57 per kW
Energy Charge	
Winter	
Off Peak	$0.0717~~682~~ per kWh
On Peak	$0.0936~~890~~ per kWh
Super Peak	$0.0936~~890~~ per kWh
Summer	
Off Peak	$0.0936~~890~~ per kWh
On Peak	$0.1153~~098~~ per kWh
Super Peak	$0.1480~~08~~ per kWh
California Renewable Energy Requirement Surcharge	$0.0056 per kWh

California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh
Hydroelectric Adjustment	Annually adjusted charge or credit on billings that will be applied from July 1st to June 30th each fiscal year, as prescribed in Section 14.24.052

4. Very Large General Service (GS-4) Rate. TOU rates are mandatory for all customers receiving service in the GS-4 rate classification. Discounts for primary services are defined in Section 14.24.050(D).

The GS-4 TOU monthly rates on monthly billings will be as follows:

Basic Service Charge	$~~591~~641.00 per meter, per month
Demand Charge	
Winter	$6.71 per kW
Summer	$11.51 per kW
Energy Charge	
Winter	
Off Peak	$0.0709~~674~~ per kWh
On Peak	$0.0907~~862~~ per kWh
Super Peak	$0.0907~~862~~ per kWh
Summer	

Off Peak	$0.0924~~879~~ per kWh
On Peak	$0.1122~~067~~ per kWh
Super Peak	$0.1469~~397~~ per kWh
California Renewable Energy Requirement Surcharge	$0.0056 per kWh
California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh
Hydroelectric Adjustment	Annually adjusted charge or credit on billings that will be applied from July 1st to June 30th each fiscal year, as prescribed in Section 14.24.052

C. Aggregation of Demand. Accounts with multiple GS-3 service, or a combination of GS-3 and GS-4 service, that combine to exceed 1,000 kW of billed demand in any six months of the prior calendar year, will receive a discount of $0.003 per kWh on the GS-3 service total monthly billed energy.

D. Primary Service. Service provided at 12,000 volts or higher under delivery arrangements approved by Roseville Electric shall receive a discount of two percent of the energy and demand charges.

E. Contract Rates. The city reserves the right to negotiate and provide, by contract, service at rates other than those specified in the municipal code.

F. Standby Service Rate.

1. Applicability. This service is applicable to any general service customer who utilizes, in whole or in part, generating facilities, as defined in Roseville Electric Rule 21 standards for interconnection, other than solar, wind or solar/wind hybrid customer-owned generating facilities, to supply all or part of such customer's power requirements, and where:

a. Based upon the manufacturer's nameplate rating the generating facilities do not exceed 100 percent of their projected demand as determined by Roseville Electric.

b. Pursuant to Rule 21 standards for interconnection, generating facilities are connected to the city's electrical distribution system. The customer shall not operate such customer-owned generating facilities in parallel with the city's electrical system unless otherwise approved in advance by Roseville Electric.

An interconnection agreement between the city and customer is required for service under this rate, when the customer-owned generating facilities are interconnected with the city's electrical system.

~~2. Effective January 1, 2016 the standby service charge ($/kW of "rated capacity" per month) shall be as follows:~~

~~Secondary voltage~~	~~$4.99~~
~~Primary voltage~~	~~$4.89~~

2~~3~~. Effective January 1, 2017 the standby service charge ($/kW of "rated capacity" per month) shall be as follows:

Secondary voltage	$6.71
Primary voltage	$6.58

"Rated capacity" is a fixed kilowatts value determined by the manufacturer's rating of the generator unit. In addition to the auxiliary or standby service rate, the city will continue to bill for all applicable charges under the appropriate rate schedule, including, but not limited to, basic service, energy and demand charges.

G. Demand/kWh Criteria. Service provided under general service rates shall be periodically evaluated for compliance with rate classification monthly demand and/or kWh criteria. If the monthly demand and/or kWh criteria are not satisfied, the service may be transferred to the appropriate general service rate effective with the next available billing cycle. Exceptions are at the discretion of Roseville Electric or by a customized customer contract (if applicable). Compliance with monthly demand/kWh criteria shall be determined in accordance with Section 14.24.020 rate classification.

H. Advanced Metering Service Charge. The advanced metering service charge is required for all GS-2 customers who have access to the city's online energy profiler system. GS-2 service whose maximum demand is equal to or greater than 250 kW in two or more summer months (as defined in Section 14.24.021) in the prior calendar year will receive a special load profile meter, and the ability to remotely access usage data. Customers with facilities where the necessary metering equipment is infeasible or impractical to employ, as determined by Roseville Electric, will be exempted from this charge. The city will charge a monthly service fee of $42.00 to cover maintenance, software support and related expenses.

SECTION 3. Section 14.24.051 of Chapter 14.24 of Title 14 of the Roseville Municipal Code is hereby amended to read as follows:

14.24.051 Customer-owned solar and wind electric generation rates.

A. Net Metering Rate. For solar, wind, and/or solar/wind hybrid electric generation located on the premises of the end user customer-generator, where the customer-generator's own electricity demand is located, interconnected behind the electric meter of record:

1. Net metering is available for solar, wind, and/or solar/wind hybrid electric generation systems, where the generating system meets no more than 100 percent of the customer-generator's annual energy (kWh) usage but is less than or equal to 1,000 kW, as defined in Roseville Electric Rule 21 standards for interconnection.

2. The solar and/or wind electric generating system must operate in parallel with the city's electric utility system, and designed to offset part of but no more than 100 percent of the customer-generator's meter of record total annual kilowatt-hour electric load.

3. All eligible customer-generators receiving service under net metering rates shall pay all applicable electric monthly basic service charges and other charges identified by state law and/or city ordinance as a mandatory charge according to the terms and conditions of the rate which the customer-generator would be assigned to, or be eligible for, if the customer-generator was not an eligible customer-generator over a normal billing cycle.

4. The net metering solar, wind, and/or solar/wind hybrid electric generation rate on billings shall be as follows:

a. For all net metering customer-generators, any net surplus kilowatt-hours generated during the previous billing cycle shall be carried over to the following billing period as a monetary value, calculated according to the customer-generator's applicable rate based energy charge. Net credit values will be offset by future energy charges or will appear as a net dollar based surplus energy value at the end of the customer-generator's annual period.

b. For eligible NM-1 customer-generators who are net generators at the end of their annual period, the net energy surplus compensation rate shall be applied to any net surplus kWh remaining.

c. Eligible customer-generators will receive compensation for the annual surplus as a credit applied toward the next annual period, unless the customer elects to receive surplus compensation by check.

5. For all other net metering customer-generators, any monetary credits associated with net annual energy surplus generation at the end of the customer-generator's annual period shall have no value.

6. All net metering customer generators will receive annualized billing, with any monthly credits valued at the applicable tariff energy value.

7. For energy payments due within any monthly billing period where an amount, or net amount, is due for energy consumption:

a. NM-1 Net Metering Rate with Surplus. The customer-generator has the option to pay any amount due for net energy consumption, or defer payment for net energy consumption until the end of the annual period, or cessation of city provided electric service.

b. All Other Net Metering Customers. The customer-generator must pay any amount due for net energy consumption upon receipt of the monthly bill.

8. Net Metering Rate with Surplus (NM-1). The NM-1 rate applies to residential customer-generators and small non-residential customer-generators with a maximum yearly demand (kW) of 10 kW or less. Annual net surplus kWh for these eligible customer-generators shall be valued using the net surplus energy compensation rate. Effective on electric service utility billings generated on or after:

~~a. January 1, 2016, the net surplus energy compensation rate shall be $0.0982 per kWh energy charge.~~

a~~b~~. January 1, 2017, the net surplus energy compensation rate shall be $0.0931 per kWh energy charge.

B. Roseville Solar 2.0 Rate. For eligible renewable generation such as solar, wind, and/or solar/wind hybrid electric located on the premises of the end user customer-generator, where the customer-generator's own electricity demand is located, interconnected behind the electric meter of record:

1. Roseville solar 2.0 is available where the generating system meets no more than 100 percent of the customer-generator's annual energy (kWh) usage but is less than or equal to 1,000 kW, as defined in Roseville Electric Rule 21 standards for interconnection.

2. The generating system must operate in parallel with the city's electric utility system, and be designed to offset part of, but no more than 100 percent, of the customer-generator's meter of record total annual kilowatt-hour electric load.

3. All eligible customer-generators receiving service under the Roseville solar 2.0 rate shall pay all applicable electric monthly basic service charges and other charges identified by state law and/or city ordinance as a mandatory charge according to the terms and conditions

of the rate which the customer-generator would be assigned to, or be eligible for, if the customer-generator was not an eligible customer-generator over a normal billing cycle.

4 The Roseville solar 2.0 rate on billings shall be as follows:

a. All energy (kWh) delivered and received after the customer-generator serves its own instantaneous load shall be measured by a multi-register meter.

b. The customer-generator will be billed consumption charges for the energy delivered to the customer by Roseville Electric Utility, based on the customer's applicable rate.

c. In the event the energy generated by the customer exceeds the energy consumed, Roseville Electric Utility will receive that energy and the customer will receive a credit which shall be compensated at the surplus energy compensation rate.

d. The customer-generator must pay any amount due for energy consumption upon receipt of the monthly bill.

5. Roseville Solar 2.0 Rate. The Roseville solar 2.0 rate applies to eligible customer-generators. Monthly customer generated kWh received by the utility shall be compensated at the surplus energy compensation rate:

a. The surplus energy compensation rate shall be $0.0598 per kWh. This rate is subject to revision by the city council as energy prices and system requirements change.

C. For customer-generators where the generating system is over 1,000 kW, the surplus energy compensation rate will be determined on a case-by-case basis.

D. The customer must comply with conditions and terms set forth by the city and Roseville Electric Rule 21 requirements for safe and efficient interconnection with the city's electrical system.

SECTION 4. Section 14.24.055 of Chapter 14.24 of Title 14 of the Roseville Municipal Code is hereby amended to read as follows:

14.24.055 Outdoor, street lighting, traffic signal, and electric vehicle charging rates.

A. Outdoor Lighting Rate. All unmetered service including outdoor lighting service, will be charged in accordance with engineering determinations made by Roseville Electric. Service furnished under this rate may be discontinued at any location where the city's overhead facilities are relocated, converted to underground, or the space on the pole utilized by the light is needed by the city for other facilities.

B. Street Lighting Rate. Consumption on city-owned streetlights is not metered. The base charge is set using estimated consumption. For the city-owned street lighting account, the monthly billing will be as follows:

1. Base Charge.

a. Effective ~~July~~ January 1, 2022~~13~~, a charge of $1~~6,858.02~~ 7,539.08per month.

b. Effective ~~July~~ January 1, 2023~~14~~, a charge of $17,889.87~~,195.18~~ per month.

C. Traffic Signal Rate. For all city-owned traffic signal electric service, the monthly billing will be as follows:

1. Effective January 1, 2022~~16~~.

Customer Charge	$34.41~~3.74~~ per meter, per month
Energy Charge	$0.03392~~2~~ per kWh

California Renewable Energy Requirement Surcharge	$0.0056 per kWh
California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh
Hydroelectric Adjustment	Annually adjusted charge or credit on billings that will be applied from July 1st to June 30th each fiscal year, as prescribed in Section 14.24.052

2. Effective January 1, 2023.

Customer Charge	$35.10 per meter, per month
Energy Charge	$0.0345 per kWh
California Renewable Energy Requirement Surcharge	$0.0056 per kWh
California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh
Hydroelectric Adjustment	Annually adjusted charge or credit on billings that will be applied from July 1st to June 30th each fiscal year, as prescribed in Section 14.24.052

D. City-Owned Electric Vehicle Charging Rate. For city-owned electric vehicle charging stations, the rate will be $0.30 per kWh.

E. Pole Attachment Rate. This rate applies to general service accounts attached to unmetered Roseville assets where the consumption of electricity is small or can be predetermined with reasonable accuracy by reference to the capacity of equipment served and the hours of operation. Roseville Electric will calculate electricity consumption in lieu of providing metering equipment.

1. Effective January 1, 2022

Basic Service Charge	$10.4928 per attachment, per month
Energy Charge	$0.116038 per kWh
California Renewable Energy Requirement Surcharge	$0.0056 per kWh
California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh

2. Effective January 1, 2023

Basic Service Charge	$10.70 per attachment, per month
Energy Charge	$0.1184 per kWh
California Renewable Energy Requirement Surcharge	$0.0056 per kWh

California Greenhouse Gas Emission Reduction Requirement Surcharge	$0.0002 per kWh

F. All rates in subsection A will increase or decrease at the same percentage as the percentage change applied to the rates for the GS-1 rate classification.

SECTION 5. This ordinance shall be effective at the expiration of thirty (30) days from the date of adoption.

SECTION 6. The City Clerk is hereby directed to cause this ordinance to be published in full at least once within fourteen (14) days after it is adopted in a newspaper of general circulation in the City, or shall within fourteen (14) days after its adoption cause this ordinance to be posted in full in at least three (3) public places in the City and enter in the Ordinance Book a certificate stating the time and place of said publication by posting.

PASSED AND ADOPTED by the Council of the City of Roseville this ___ day of _____, 20__, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____

MAYOR

ATTEST:

_____

City Clerk

COUNCIL COMMUNICATION

CC #: 1760
File #: 0900-02 & 0201-01

Title:	Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Construction Project - Award of Design-Assist and Construction Agreement and Budget Adjustment
Contact:	Janice Gainey 916-774-5535 jrgainey@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 8.2.

RECOMMENDATION TO COUNCIL

Staff recommends that City Council:

1. Approve the Design-Assist Construction Agreement for the Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) project with Auburn Constructors in the amount of $14,525,300 and adopt a resolution authorizing the City Manager to execute the attached Design-Assist Construction agreement for the project.
2. Authorize the Environmental Utilities Director or designee to approve and pay for contract change orders for this project that could increase the contract amount by no more than 10 percent ($1,452,530) or a not-to-exceed total contract amount of $15,977,840.
3. Approve the project's construction plans and specifications.
4. Adopt an ordinance to approve a budget adjustment of $7,750,000 from available resources in the Water Construction Fund to fully fund the project.

BACKGROUND

In 2019, the City initiated a project to expand the existing Aquifer Storage and Recovery (ASR) Well Program. The preliminary design was completed for an initial set of well sites. Due to critical drought conditions, two other sites (separate from the initial set of well sites) are being prioritized for expedited implementation.

At these newly selected sites, the downhole wells have been previously drilled by developers on the west side of Roseville. Finishing the above-ground construction and equipping with mechanical, electrical, and instrumentation is needed to complete these well facilities. Selecting these two sites where the "below ground" installation is already completed provides the most viable option to achieve Environmental Utilities (EU) Water Utility's goal of bringing two new wells online as soon as possible.

EU is expediting the installation of these facilities as part of a select group of capital projects that are focused on providing water sources, alternate to our surface water supplies from Folsom

Reservoir, to help mitigate against the impacts of another potential dry year, which would create critical drought conditions.

Given that the Governor's Emergency Proclamation regarding the drought from May 10, 2021, allows for the suspension of certain competitive bid and procurement requirements in order to expedite drought-related projects, and given that the RMC's Section 9.28.060(6) provides the City Manager (as the Director of Emergency Services) authorization to suspend/modify any city ordinance, as reasonably necessary…to obtain vital supplies, equipment, etc. a sole source request to hire Auburn Constructors and sole source the Design Assist Construction Services, was submitted to the City Manager and City Attorney's Office for consideration and approval. Given the immediacy of this need due to the current drought situation, the City Manager supports this sole source agreement. The City Attorney has reviewed and decided that this agreement meets the criteria for sole sourcing.

FISCAL IMPACT

The Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) project (formerly known as the Aquifer Storage and Recovery Wells 1 and 2 project) has a current remaining budget of $9,616,240 and will require an additional $7,750,000 from available resources in the Water Construction Fund to fully fund the project including the recommended Design-Assist Construction Agreement ($15,977,830), City staff time ($150,000), City Wastewater Regional Connection Fees (initial estimate of $1,000,000), Roseville Electric Backbone Fee ($120,000), and additional hardware ($38,000). These additional funds will bring the project's currently available budget to $17,366,240 and the total project budget to $17,750,000.

ENVIRONMENTAL REVIEW

Implementation of the proposed project was previously evaluated in the 2012 ASR Program Final EIR (State Clearinghouse No. 2009072018) certified by City Council on March 29, 2012. The proposed project is consistent with the scope of the project covered by the 2012 ASR Final EIR. All applicable mitigation measures from the ASR Program Final EIR will be implemented during the design and construction of the project and consequently no additional CEQA review is required for design and construction approval.

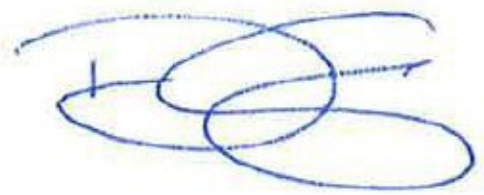
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal F - Invest in well-planned infrastructure and growth

Respectfully Submitted,

Janice Gainey, Senior Engineer

Richard Plecker, Environmental Utilities Director



Dominick Casey, City Manager

ATTACHMENTS:

Description

Resolution 21-437

Auburn Constructors Design-Assist Agreement Vol 1 of 3

Solaire Volume 2 of 3

Westbrook Volume 2 of 3

Technical Specifications Volume 3 of 3

Ordinance 6406

budget adjustment

RESOLUTION NO. 21-437

APPROVING A DESIGN-ASSIST CONSTRUCTION AGREEMENT, BY AND BETWEEN AUBURN CONSTRUCTORS, LLC AND THE CITY OF ROSEVILLE, AND AUTHORIZING THE CITY MANAGER TO EXECUTE IT ON BEHALF OF THE CITY OF ROSEVILLE

WHEREAS, a Design-Assist Construction Agreement for the Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) project, by and between Auburn Constructors, LLC and the City of Roseville, has been reviewed by the City Council; and

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Roseville that said agreement is hereby approved.

BE IT FURTHER RESOLVED that the Environmental Utilities Director or his designee is authorized to approve change orders for the project, consistent with the contract terms, provided that the net cost of all change orders shall not exceed ten percent (10%) of the contract price.

PASSED AND ADOPTED by the Council of the City of Roseville this____day of _____, 20_, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

CONTRACT DOCUMENTS FOR

DESIGN-ASSIST AND CONSTRUCTION OF AQUIFER STORAGE AND RECOVERY WELLS 9 (Westbrook) and 18 (Solaire) PROJECT

VOLUME 1 of 3: AGREEMENT

INCLUDING:

Agreement and Agreement Exhibits

September 29, 2021

Note: Final Executed Agreement will be conformed to all Addenda and incorporate final negotiations with Contractor prior to award of Agreement

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DESIGN-ASSIST CONSTRUCTION AGREEMENT
AQUIFER STORAGE AND RECOVERY WELLS
9 (Westbrook) and 18 (Solaire)

This Design-Assist Construction Agreement ("Agreement") is made and entered into on this _____day of _____ , 20____, by and between the CITY of Roseville, a municipal corporation ("CITY"), and Auburn Constructors, LLC (CSLB License #1043407 A, B, C10), a California limited liability company (hereinafter referred to as "CONTRACTOR").

RECITALS

WHEREAS, the CITY issued a Request for Letter Proposal for the design-assist construction of two (2) aquifer storage and recovery wells, known as the "Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project" (hereinafter "Project"); and

WHEREAS, CONTRACTOR has submitted a Proposal to CITY, dated October 5, 2021 attached hereto and made a part hereof as Exhibit B – Contractor's Proposal, and CITY desires for CONTRACTOR to provide the design assist and construction services as set forth in this Agreement; and

WHEREAS, CONTRACTOR is ready, willing and able to perform the aforementioned services required in accordance with the terms and conditions of this Agreement; and

NOW, THEREFORE, CITY and CONTRACTOR agree as follows:

ARTICLE 1 - DEFINITIONS OF LANGUAGE USED, WORDS AND TERMS

Where used in the Contract Documents, the following words and terms shall have the meanings indicated. The meanings shall be applicable to the singular, plural, masculine and feminine of the words and terms.

The Contract Documents include the terms "as allowed," "as approved," "as ordered", "as directed" or terms of like effect to authorize an exercise of professional judgment by the CITY, Construction Manager or Engineer. The adjectives/terms "reasonable," "suitable," "acceptable," "proper," "satisfactory," and "of like effect" are used to describe an action or determination of the CITY, Construction Manager or Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term is not intended to and shall not be effective to assign to CITY, Construction Manager or Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority contrary to the other provisions of the Contract Documents.

Specification Section Paragraphs entitled "Section Includes" summarize briefly what is generally included in the section. Requirements of Specifications are not limited by "Section Includes" paragraphs.

Specifications and Drawings have been partially streamlined by intentionally omitting words and phrases, such as "the Contractor shall," "in conformity therewith," "shall be" following "as indicated," "a," "an," "the" and "all." The phrases "by CITY's Representative", "by Engineer", and "by Construction

Manager" modify words such as "accepted," "directed," "selected," "inspected," "permitted," "submit", "report", and "satisfactory" when they are unmodified. Words "Contractor shall" are implied when direction is stated.

Colons (:) are used to introduce a list of particulars, an amplification, or an illustrative quotation. When used after designation of product, colons are used in place of words "shall be."

Whether the term or phrase is capitalized or in all capitals (for example, Contractor or CONTRACTOR) in the Contract Documents shall be deemed to be the same for purposes of the Definitions of Language Used, Words and Terms.

1.1. **"Agreement" or "Contract"** means this Design-Assist Construction Agreement, its exhibits, and all amendments and/or modifications hereto executed by the parties. The defined terms "Contract" and "Agreement" may be used throughout interchangeably and should be considered as one in the same defined term.

1.2. **"Allowance" or "Construction Allowance"** is an amount of money set aside under the Contract for a special purpose identified and defined in the Contract Documents. Voluntary Allowance items are described by Contractor in Exhibit C – Guaranteed Maximum Price, Fee, and Cost of Work and are included in the total GMP.

1.3. **"Applicable Laws"** means all laws, codes, ordinances, rules and regulations of **governmental** authorities having jurisdiction over the Site and/or the Work.

1.4. **"Application for Payment"** means the document prepared by CONTRACTOR and **submitted** to CITY showing CONTRACTOR's entitlement to progress payments, the requirements of which are more fully described in Article 8 hereof.

1.5. **"Architect/Engineer"** means a licensed professional(s) (and/or entity(ies)) retained by CITY, who provides architectural, design and/or engineering services as may be required by the Work. The Architect/Engineer shall be registered in the State of California and the architect and/or engineer of record for the Work pursuant to their design responsibilities. The Architect/Engineer may be substituted or replaced at the discretion of CITY.

1.6. **"Asbestos"** is any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

1.7. **"Authorized Representatives"** means the Design-Assist Team and those individuals appointed by CITY and CONTRACTOR from time to time in accordance with the provisions of Article 4.2.1.

1.8. **"Beneficial Occupancy" or "Beneficial Occupation**" is a term that can be used to describe a distinct portion of the Work, that in the CITY's Representative's opinion, is capable of being used for its intended purpose, even though it may have some minor deficiencies, including outstanding punch list items to complete.

1.9. **"Business Day"** means any day when the office of the CITY Clerk of the CITY of Roseville is open for business.

1.10. **"Certificate of Substantial Completion"** means a certificate prepared by CONTRACTOR in accordance with Article 8.13 and forwarded to CITY.

1.11. **"Certificate of Final Completion"** means a certificate prepared by CONTRACTOR and forwarded to CITY stating that the Project is finally complete and that CONTRACTOR is entitled to Final Payment in accordance with Article 8.14 hereof.

1.12. **"Change Directive", "Change Order"**, **or "Construction Change Directive (CCD)"** is a

written order prepared by the Construction Manager and signed by the CITY, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract GMP amount or Contract Time.

1.13. **"Change Proposal"** means a proposal for a Change Order submitted by CONTRACTOR to CITY, either at the request of CITY, or at CONTRACTOR's own initiative.

1.14. **"CITY"** refers to the CITY of Roseville, the governing body of which is termed the "CITY Council".

1.15. **"CITY's Representative"** is the person(s) designated by the Director of the CITY's Environmental Utilities Department who has been duly authorized to exercise control and supervision of the Work. A CITY's Representative generally will be either a professional engineer or architect, depending on the nature of the Work, but is not required to be a professional engineer or architect. The CITY may change the individual(s) acting as the CITY's Representative(s), or delegate one or more specific functions to one or more specific CITY's Representative at any time without notice and without liability to Contractor. Each CITY's Representative is the beneficiary of all Contractor obligations to CITY, including without limitation, all releases and indemnities

1.16. **"Claim".** A demand or assertion by the Contractor seeking an adjustment of the GMP or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

1.17. **"Construction Documents"** means the plans and specifications prepared by the Design Assist Team for the Project, approved by CITY, and incorporated into this Agreement by reference after such approval, to be used to construct the Project. The Construction Documents shall set forth in detail all items necessary to complete the construction of the Project in accordance with the Contract Documents (subject to their completion following commencement of the Construction Phase). All amendments and modifications to the Plans and Specifications must be approved by CITY prior to incorporation into this Agreement. CONTRACTOR's attention is hereby directed to the confidentiality requirements of Article 2.12.

1.18. **"Construction Consultant".** The CITY may retain a Construction Consultant(s) as it deems necessary to assist/advise the CITY staff and/or other CITY consultants during the progress of the Work. Any Construction Consultant retained by CITY for this Project will not have any formal contract administration responsibilities. The Construction Consultant(s) is the beneficiary of all Contractor obligations to CITY, including without limitation, all releases and indemnities.

1.19. **"Construction Manager"** is the person designated, in writing, by the CITY to act as its representative at the Site and to perform administrative functions relating to this Agreement. The Construction Manager shall also furnish inspection services as provided by the contract between the Construction Manager and the CITY. All contact between the Contractor and the CITY shall be through the Construction Manager; unless otherwise specified or directed. Only the CITY may modify the Agreement. The CITY may assign all or part of the CITY's Representative's duties, rights and responsibilities to the Construction Manager. The Construction Manager is the beneficiary of all Contractor obligations to CITY, including without limitation, all releases and indemnities.

1.20. **"Construction Phase"** means the period beginning with the issuance of the Construction Notice to Proceed (NTP) and ending on the date of Final Completion of the Project.

1.21. **"Construction Work"** means that portion of the Work consisting of the provision of labor, materials, equipment and services in connection with the construction of the Project as set forth in the Contract Documents.

1.22. **"Contingency Costs"** means those items of Cost of the Work attributable to a contingency for which CITY is responsible and which are payable by CITY to CONTRACTOR pursuant to a Change Order as provided in Article 9.7-CHANGE ORDERS ON ACCOUNT OF CONTINGENCIES.

1.23. **"Contract"** means this Design-Assist Construction Agreement, its exhibits, and all amendments and/or modifications hereto executed by the parties. The defined terms "Contract" and "Agreement" may be used throughout interchangeably and should be considered as one in the same defined term.

1.24. **"Contract Documents"** means 1) this document (Agreement) and its Exhibits,2) the Technical Specifications, and 3) Project Drawings, all of which form the entire integrated agreement between CITY and CONTRACTOR. In the event of a conflict between any of these documents, this Agreement controls, followed by its Exhibits.

1.25. **"Contract Time"** The number of days or the dates stated in the Agreement to: (i) achieve Milestones, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Construction Manager's written recommendation of final payment. See Exhibit H - COMPLETION TIMES AND LIQUIDATED DAMAGES.

1.26. **"CONTRACTOR"** means the individual or entity identified in the preamble to this Agreement.

1.27. **"CONTRACTOR'S Plant and Equipment"** means the equipment, material, supplies and all other items, except labor, brought onto the Site by the Contractor to carry out the Work, but not to be incorporated in the Work.

1.28. **"CONTRACTOR Event of Default"** shall have the meaning set forth in Article 14.1 hereof.

1.29. **"Cost of the Work"** consists of those items of Work, which are paid for by CITY to CONTRACTOR, and consist of those categories of costs set forth as allowable on Exhibit C.

1.30. "**County**" refers to Placer County where the Site is located.

1.31. **"CPM"** means a critical path method schedule in the form of precedents, networks and time sequences.

1.32. **"Day" or "Days"** means calendar days, including legal holidays, Saturdays and Sundays, unless specifically noted otherwise. The day shall be 24 hours measured from midnight to the next midnight.

1.33. "**Defective Work**" refers to Work that does not meet the requirements of the Contract Documents and has been identified to the Contractor by the Construction Manager in writing because the Work:

a. Does not meet the requirements of or conform to the Contract Documents; or

b. Does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. Has been damaged prior to Construction Manager's or Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by CITY as of the Substantial Completion date in accordance with the Contract Documents).

Punch list or other minor corrective items of work that are not in compliance with the Contract Documents do not meet to the definition of "Defective Work" as used in these Contract Documents. For work to be deemed "Defective Work," the Construction Manager must have notified the Contractor in writing of a defective item of the Work.

1.34. **"Design-Assist Team"** includes the following: Architect/Engineer; CONTRACTOR; and/or others as coordinated by CONTRACTOR and CITY.

1.35. **"Design Development Documents"** means the drawings, specifications and other documents prepared by the Design-Assist Team for CITY's review and approval prior to the preparation of the Construction Documents. The Design Development Documents shall illustrate the scale and relationship of Project components, outline the nature and structural exterior and three dimensional scale of the Project and shall fix and describe in detail the configuration and character of the Project concerning all items of the Project necessary for the complete and final preparation of the Construction Documents in accordance with the requirements of the Contract Documents, including architectural and electrical systems, materials and such other elements as may be appropriate. CONTRACTOR's attention is hereby directed to the confidentiality requirements of Article 2.12.

1.36. **"Design Materials"** means any and all documents, shop drawings, electronic information, data, plans, drawings, sketches, illustrations, specifications, descriptions, models and other information developed, prepared, furnished, delivered or required to be delivered by CONTRACTOR to CITY under the Contract Documents or developed or prepared by CONTRACTOR specifically to discharge its duties under the Contract Documents. CONTRACTOR's attention is hereby directed to the confidentiality requirements of Article 2.12.

1.37. **"Design-Assist Work"** means that portion of the Work consisting of the design-assist services required to be provided in connection with the Architect/Engineer's design of the Project as set forth in the Contract Documents, which shall be performed consistent with the standards of care set forth herein.

1.38. "**Direct**" is an action of the CITY or Construction Manager by which the Contractor is ordered to perform or refrain from performing work under the Agreement.

1.39. "**Drawings**", also referred to as "**Plans**" are that part of the Contract Documents consisting of the graphical and technical requirements of the Agreement as included on the plan, profile, section and detail sheets, included in a response to Request for Information or any revisions issued by Engineer. Drawings, or reproductions thereof, show the location, character, dimensions and details of the Work to be done. Shop drawings and other Contractor submittals are not Drawings as so defined.

1.40. "**Engineer**". The engineer, architect or specialty design consultant designated by the CITY to have design control over the Work or a specified portion of the Work, acting either directly or through duly authorized representatives. Such representatives shall act within the scope of the particular duties delegated to them. The Engineer may also furnish inspection services as provided by the Agreement. The Engineer may also be referred to as the "CITY's Representative" if the definition is used in an Engineer role and capacity. The CITY may assign all or part of the CITY's Representative's duties, rights and responsibilities to the Engineer. The Engineer is the beneficiary of all Contractor obligations to CITY, including without limitation, all releases and indemnities.

1.41. **"Equipment"** (Construction) is all machinery and equipment, together with the necessary supplies for upkeep and maintenance, including tools and apparatus necessary for the proper construction and acceptable completion of the Work contemplated. Equipment (Installation) is all material or articles used in equipping a facility or apparatus required to fulfill a functional design.

1.42. **"Execution"** means field or site performance, workmanship, installation, erection, application, field fabrication, quality control, and protection of installed products on the Site.

1.43. **"Excusable Delay"** shall have the meaning set forth in Article 7.3.3.

1.44. **"Extra Work"** is new or unforeseen work, or added work of a different character or function; or that involves revisions of the details of the Work on which Contractor based its GMP. If the extra work increases the Contractor's Cost of the Work and/or time to perform the Work, and is approved by the CITY via a written Change Order, the GMP and/or Contract Times shall be adjusted as provided in the Contract Documents. Extra Work shall not include Work which is shown, detailed or specified in the Contract Documents or which constitutes "Incidental Work" as defined within the Contract Documents definition below.

1.45. **"Fee"**, if applicable, means the fee payable to CONTRACTOR pursuant to this Agreement and as part of the GMP, if shown on Exhibit C – GUARANTEED MAXIMUM PRICE, COST OF WORK AND FEE attached hereto.

1.46. **"Field Directive**" is a change in the scope of the Agreement that does not cause an increase in the Cost of the Work, nor an adjustment to the GMP or the Contract Time(s), unless the Construction Manager determines the Field Directive warrants a Change Order.

1.47. **"Field Order"** is a written instruction given to the Contractor by Construction Manager authorizing work that is a change to the scope of Work to be performed on a time and material basis or a lump sum cost agreed to between CITY and the Contractor and documented in a Change Order.

1.48. **"Final Acceptance"** is the formal approval by CITY in accepting a portion of the Contractor's work as completed.

1.49. **"Final Completion"** means the date when the work is 100% complete in accordance with the terms and conditions of the Contract Documents, including completion of all Punch list items as certified by the Construction Manager.

1.50. **"Force Majeure**" includes industry wide or nationwide labor dispute (excluding labor shortage), fire, unusual delay in transportation or delivery, unavoidable casualty, flood (assuming CONTRACTOR has taken reasonable precautions), earthquake, epidemic, civil disturbance, war, freight embargo, riot, sabotage (by persons other than CONTRACTOR or Subcontractors), material shortage or any other similar act or condition, in each case only to the extent the event in question is beyond the reasonable control of and without the fault or negligence of CONTRACTOR. It is expressly agreed that the following matters shall not constitute Force Majeure:

a. Lack of or inability to use funds for any reason;

b. Any occurrence which results from the wrongful act, or wrongful omission, of the affected party, or the failure by the affected party to act in a prudent and proper manner and in accordance with good and accepted industry practices;

c. Any failure by the affected party to reach agreement with any third party necessary to enable the affected party to perform its obligations under this Agreement;

d. An event or circumstance, where the event or circumstance, or its effects on the affected party, or the resulting inability of the affected party to perform its obligations could have been prevented, overcome or remedied by the exercise by the affected party of the standard of care and diligence consistent with that of a reasonable and prudent person;

e. Breakdown of Contractor's Equipment;

f. Strike or industrial action of Contractor's employees or those of subcontractors; or

g. Adverse weather conditions including, without limitation, wet weather, unless the

weather is unusually severe for the Site.

1.51. **"Governmental Approvals"** means those CITY approvals necessary for the completion of the Project, including, but not limited to, modification of existing zoning, vacation of certain streets and/or alleys, and modifications to or variances from applicable building or zoning regulations.

1.52. **"Guaranteed Maximum Price"** or **"GMP"** means the amount set forth on Exhibit C-GUARANTEED MAXIMUM PRICE, FEE, AND COST OF WORK hereto, which may be increased or decreased in accordance with the provisions of the Contract Documents.

1.53. **"Hazardous Materials"** means those items identified on Exhibit E-HAZARDOUS MATERIALS hereto.

1.54. **"Holidays"** are the legal holidays as designated by the CITY including: New Year's Day, Martin Luther King Jr. Day, President's Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Veteran's Day, Thanksgiving Day, the day after Thanksgiving and Christmas Day.

1.55. **Incidental Work.** Incidental work includes reasonably implied parts of the not shown on Drawings nor described in Specifications, but which is necessary or normally or customarily required as a part of the Work shown on the Drawings or described in the Specifications to provide a complete installation which is fully connected and tied into the existing facilities and processes and is fully functional and operational. Incidental work shall be treated as if fully described in Specifications and shown on Drawings, and expense thereof shall be included in the GMP. Incidental work shall be performed by Contractor and included in the Cost of the Work without an increase in the GMP.

1.56. **"Indemnified Parties"** includes, but is not limited to, CITY, its agents, officers, employees, and volunteers.

1.57. **"Inspector"** shall mean the person(s), firm(s), or agency(ies) employed by the CITY to perform inspection during construction of the Work, under the direction of the Construction Manager. It shall also mean any representative of the CITY who will perform inspections of the Work for code compliance and quality assurance reporting in addition to those inspections performed by the CITY's Representative and/or the Engineer. Said inspector may be the Construction Manager or may be another representative of the CITY.

1.58. **"Liquidated Damages"** means the damages payable by CONTRACTOR to CITY in the event CONTRACTOR does not achieve project Milestones Final Completion of the Project by the date required on the Schedule, as adjusted, as more fully described in Article 7.5 and Exhibit H-COMPLETION TIMES AND LIQUIDATED DAMAGES hereof.

1.59. **"Modification"** means an amendment to this Agreement executed by the parties after the date hereof.

1.60. **"Non-Excusable Delay"** shall have the meaning set forth in Article 7.3.2.

1.61. **"Notice of Completion"** is the formal action taken by the CITY in determining that the Contractor's Work has been completed, or as delegated pursuant to a CITY Council resolution, accepting the Work as fully completed. The written notice is signed by the CITY and filed with the County Recorder.

1.62. **"Notice to Proceed"** (NTP) is the written notice given by the CITY to the Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

1.63. **"Or Equal"** means any product, equipment, material, thing, service, mean/method or service which is proposed by the Contractor for use in the Work, which is equal to or better than, and is

as suitable as the product, equipment, material, thing, service, mean/method or service specified in the Contract Documents as to function, performance, reliability, quality, schedule and general configuration. Any "or equal" substitutions must be approved by the CITY.

1.64. **"Owner"** refers to the CITY, or authorized representative as approved by the CITY.

1.65. **"Party"** shall mean CITY or CONTRACTOR individually, and **"Parties"** shall mean CITY and CONTRACTOR collectively.

1.66. **"Payment and Performance Bonds"** means the payment bond and performance bond issued by an admitted Surety covering the faithful performance and completion of the Construction Work, including payment for all materials and labor furnished or supplied in connection with the Construction Work, by CONTRACTOR. Such bonds shall be in the form described in Exhibit G-BOND FORMS.

1.67. **"Plans".** See "Drawings".

1.68. **"Project"** means the design and construction of the project described in the Recitals, together with all on-site infrastructure, site improvements and appurtenances to be designed, constructed and installed in connection therewith, as more fully set forth and described in the Contract Documents and as required thereby or reasonably inferred therefrom.

1.69. **"Project Manager"** means the person assigned by the Director of the CITY's administering department to monitor the Project and Work.

1.70. **"Proposal"** is the offer of a Proposer to perform the Work pursuant to completed prescribed Bid Proposal requirements and forms, properly executed and guaranteed, and timely submitted.

1.71. **"Punch List"** means those minor items of Work to be completed after Substantial Completion and prior to Final Completion, which do not prevent the Project from being used for the purpose for which it is intended and which will not prevent beneficial occupancy or use.

1.72. **"Reference Specifications"** are those standards, rules, method of tests or analysis, codes, and specifications of other agencies, engineering societies, or industrial associations referred to in the Contract Documents.

1.73. **"Request for Information"** also referred to as "Request for Clarification". A Request for Information (RFI) is issued by the Contractor to the Construction Manager requesting additional information necessary to clarify or amplify an item in the Contract Documents that the Contractor believes is not clearly shown or called for in the Drawings or Specifications or other portions of the Contract Documents, or to address problems which have arisen under field conditions. A RFI is not to be used for request for materials/equipment substitutions or value engineering/cost reduction incentive proposals.

1.74. **"Request for Quotation"** is a request for a proposed cost made to the Contractor by the CITY to add, delete or change the Work. A Request for Quote (RFQ) shall not be deemed to be a direction to proceed with any addition, deletion or change to the Work.

1.75. **"Retention"** means the amount withheld from progress payments from CITY to CONTRACTOR from time to time, as more fully described in Article 8.6-RETENTION, ESCROW AGREEMENT, FINAL PAYMENTS hereof.

1.76. **"Samples"** refers to physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

1.77. **"Schedule"** means the schedule pursuant to the Proposal and/or other Contract Documents to which CONTRACTOR has agreed to complete the Work. The Schedule shall be adjusted

pursuant to the provisions of the Contract Documents. In the event the Schedule is not contained within the Proposal, then CONTRACTOR shall provide to CITY, within fifteen (15) days of issuance of a Notice To Proceed by CITY, with a complete milestone schedule identifying, among other things, critical paths (if any) and total calendar days until Substantial and Final Completion. In the event the Schedule is contained in the Proposal, the start of the Schedule shall be adjusted by the CONTRACTOR to reflect the date of the Notice To Proceed.

1.78. **"Scheduled Date of Substantial Completion"** means the date CONTRACTOR has agreed to achieve Substantial Completion of the Project in accordance with the Schedule, as adjusted.

1.79. **"Scope Change Costs"** means those items of Cost of the Work attributable to changes in scope of the Work and payable by CITY to CONTRACTOR pursuant to a Change Order, as provided in Article 9-CHANGES IN THE WORK.

1.80. **"Separate Contractors"** means those individuals or entities (including, but not limited to, concessionaires) who have entered into arrangements with CITY for the provision of labor, materials or other services in connection with the Project.

1.81. **"Shop Drawings (Submittals)"** are drawings, diagrams, illustrations, schedules, performance charts, instructions, brochures, and other data which are prepared by the Contractor or any subcontractor, manufacturer, supplier, or distributor and which illustrate some portion of the Work.

1.82. **"Site"** is the real property on which the Project will be located.

1.83. **"Specifications"** are that part of the Contract Documents consisting of written descriptions of the technical features of materials, equipment, construction systems, standards, and workmanship.

1.84. **"Specify"** refers to information described, shown, noted or presented in any manner in any part of the Agreement.

1.85. **"State"** is the State of California.

1.86. **"State of California Specifications"** are the State of California Department of Transportation Standard Specifications in effect as documented in the Specifications and/or Drawings. Also referred to as State Standard Specifications and Caltrans Standard Specifications.

1.87. **"Subcontract"** means an agreement between CONTRACTOR and another person or entity engaged to perform a portion of the Work.

1.88. **"Subcontractor"** means an individual or entity who has entered into an agreement with CONTRACTOR or another Subcontractor for the provision of labor, materials or other services required to be performed by CONTRACTOR under the Contract Documents.

1.89. **"Subcontractor-KEY".** Key subcontractors are defined as a subcontractor who will perform greater than or equal to twenty-five percent (25%) of the GMP.

1.90. **"Subcontractor-MAJOR".** Major subcontractors are defined as a subcontractor who will perform greater than five percent (5%) of the GMP.

1.91. **"Subcontractor-LISTED**". Listed subcontractors are defined as a subcontractor who will perform greater than one half percent (>0.5%) of the GMP.

1.92. **"Submittals"** are the information which is specified for submission to the Construction Manager in accordance with the Contract Documents.

1.93. **"Substantial Completion"** means the stage in the progress of the Work when the Work or a designated portion thereof is sufficiently complete in accordance with the Contract Documents

so that CITY may use the Project for its intended purpose. Determination of Substantial Completion is solely at the discretion of the CITY. Substantial Completion does not mean complete in accordance with the Agreement nor shall Substantial Completion of all or any part of the Project entitle the Contractor to Final Completion under the Agreement.

1.94. **"Surety"** means one or more issuers of the Payment and Performance Bonds, each of which shall be admitted and licensed to do business in the State of California.

1.95. **"Surveyor"** means a land surveyor licensed in the State of California.

1.96. **"Trade Names".** Where a certain product is called by its Trade Name, it is intended as a guide for type and quality.

1.97. **"Typical Details"** are details of standard structures, devices or instructions referred to on the Plans and Specifications by title or number and developed by the Engineer.

1.98. **"Underground Facilities"** means all underground pipelines, including but not limited to, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electrical, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

1.99. **"Unit Price Work"** is work to be paid for on the basis of unit prices.

1.100. **"Utility"** is a public or private fixed works for, including but not limited to, the transportation of fluids, gasses, power, signals, or communications.

1.101. **"Work"** or **"Scope of Work"** means the Project, inclusive of all labor, materials and services required to be performed or provided by CONTRACTOR officers, employees, agents, Subcontractors or Suppliers pursuant to the provisions of this Agreement and its Exhibits.

1.102. **"Work Day".** A working day is defined as any day, except Saturdays, Sundays and CITY's Legal Holidays. Any work scheduled by the Contractor on non-working days (Saturdays, Sundays, and CITY Legal Holidays) shall be verified with the CITY at least 72 hours in advance. Depending on the circumstances, the CITY may request Contractor compensation for inspection work, at an hourly rate, for any work performed on non-working days and for overtime.

ARTICLE 2 - SCOPE OF WORK / PROJECT REQUIREMENTS

2.1 Scope of Work Summary

The CITY, in conjunction with its Engineer and other consultants, developed the Design-Assist and Construction Contract Documents for the Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project. The work includes but is not limited to, Construction of two (2) Aquifer Storage and Recovery well facilities including; new concrete masonry unit (CMU) block Well building, filtration/water treatment system, well pump, piping, valving, and equipment, chemical feed systems, mechanical systems including down-hole flow control valve, electrical switchgear, instrumentation and controls, Contractor Design Assist Responsibilities, and all other structural, mechanical, civil, and ancillary systems in support of the Project, including asset management, startup and testing to provide a complete integrated and operational system in all respects.

Based on the 30% Design Level Drawings and Partial Draft Technical Specifications provided to the contractor, and in accordance with the Contract Documents, the Contractor is a Design-Assist Team

member with responsibility to complete the following design assist activities. Coordination with other members of the Design-Assist Team will be required; the City, Engineer, Construction Manager and possibly other personnel that have regulatory or funding authority.

A. Conduct a constructability review of the 50% Design Level Drawings and Partial Draft Technical Specifications, and submit comments and identified mitigation solutions to the City.

B. Identify cost savings and added value alternative design/construction solutions, and submit to the City for evaluation.

C. Develop detailed cost estimates for identified alternatives when requested by City for the City's evaluation.

D. Identify construction sequencing and the impacts of the identified alternatives on the sequencing.

E. Develop a detailed schedule and the impacts of the identified alternatives on the schedule.

F. Participate in a cooperative partnership relationship with City, Engineer, and Construction Manager to develop a comprehensive construction plan to address project risk and minimize existing facility disruptions.

G. Participate in up to sixteen (16) Final Design Coordination Meetings lasting up to four (4) hours each to present and work collaboratively to allow for issuance of the Project Drawings and Specifications for construction.

Note that the Engineer is the entity professionally responsible for the design of the Project. City acknowledges that Contractor is a general contractor and not an architect or engineer. Except with respect to any subcontractors of Contractor providing architectural or engineering services for the Project as design-build work, the Contractor's review of or input for any design documents, or Contractor's recommendation for any design concepts, is made solely in Contractor's capacity as a licensed contractor and not as a licensed design professional. Contractor is not responsible for any errors in the Engineer's design or failure of the design to comply with applicable laws, codes, rules and regulations, or lawful orders of public authorities. However, if Contractor observes any such nonconformity or errors it shall promptly notify City's Representative and the Engineer.

2.2 Performance of Work

CONTRACTOR shall perform the Work in accordance with this Agreement. CONTRACTOR covenants and agrees that it shall be responsible for performing and completing, and for causing all Subcontractors to perform and complete, the Work in accordance with the Contract Documents, standard professional and trade practices, Local Ordinances, and Applicable Laws. CONTRACTOR covenants that the Work and the materials provided thereunder shall be appropriate for the purposes stated in the Request for Proposal and Proposal. Although it is the responsibility of CONTRACTOR to conform the Work to Applicable Laws at all times, to the extent there is a change in one or more Applicable Laws after the date of execution of this Contract, and such change has the effect of increasing the cost or time of performance of the Work, such change may be the subject of a Change Order under the provisions of Article 9- CHANGES IN THE WORK hereof.

2.3 Standards of Performance

The Work shall be performed by CONTRACTOR in accordance with the professional standards applicable to projects, buildings or work of complexity, quality and scope comparable to the Work and the Project. CONTRACTOR may make such additions or substitutions to personnel and responsibilities

as it deems necessary or appropriate in order to carry out its responsibilities hereunder, provided such personnel shall be suitably qualified. Nothing in this Agreement shall be construed to create any contractual liability with CITY toward any Subcontractor.

2.4 Execution, Correlation and Intent

2.4.1 Execution of Agreement.

Execution of this Agreement by CONTRACTOR is a representation that CONTRACTOR has visited the Site, become familiar with the local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

2.4.2 Intent of Contract Documents.

The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by CONTRACTOR. The Contract Documents are complementary and what is required by one shall be as binding as if required by all; performance by CONTRACTOR shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results. Any work, materials or equipment that may reasonably be inferred from the requirements of the Contract will be furnished and performed whether or not specifically called for. When words or phrases that have a well-known technical or construction industry or trade meaning are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning

2.4.3 Organization of Material.

Organization of the Design Materials into divisions, sections and articles, and arrangement of drawings does not necessarily control CONTRACTOR in dividing the Construction Work among Subcontractors or in establishing the extent of Construction Work performed by any trade.

2.4.4 Resolving Conflicts

In resolving conflicts resulting from errors or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:

A. Permits from other agencies specifically required for the performance of the Work as may be required by law,

B. Supplemental Agreements and Change Orders, the one dated later having the precedence over another dated earlier,

C. Agreement,

D. General Requirements (Division 1),

E. Technical Specifications (Division 2 and all other Divisions following),

F. Contract Drawings,

G. CITY of Roseville's most current version of Construction Standards and Design Standards and Amendments to the Current Version,

H. Other Referenced Standard Specifications, and

I. Other Referenced Standard Plans.

With reference to the Drawings, the order of precedence is as follows:

A. Addenda/Change Order drawings govern over any other drawings,

B. Enumerated dimensions govern over scaled dimensions,

C. Detail drawings govern over general drawings, and

D. Contract Drawings govern over standard drawings/plans.

The provisions of the Contract Documents shall take precedence over any Laws or Regulations applicable to the performance of the work unless such an interpretation of the provisions of the Contract Documents would result in a violation of such Law or Regulation.

2.4.5 Meaning of Words

Unless otherwise stated in this Agreement, words which have well-known technical or construction industry meanings are used in accordance with such recognized meanings.

2.5 Contractor Services and Facilities

2.5.1 General.

CONTRACTOR shall provide everything required for the orderly progress and proper execution and completion of the Work and the Project in accordance with the requirements of the Contract Documents, whether temporary or permanent and whether or not incorporated or to be incorporated into the Work, including, but not limited to, services, labor, materials, equipment, furnishings, tools, construction equipment and machinery, utilities, transportation and other facilities and services.

2.5.2 Supervision

CONTRACTOR shall supervise and direct the Work in accordance with its best skill and attention. CONTRACTOR shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures. CONTRACTOR shall be responsible to CITY for the acts and omissions of, and whenever this Contract refers to the negligence, fault or omission of CONTRACTOR, such term shall include the negligence, fault or omission of, CONTRACTOR's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work under an agreement with CONTRACTOR. CONTRACTOR shall not be relieved of obligations to perform the Work in accordance with the Contract Documents by tests, inspections or approvals required or performed by persons other than CONTRACTOR.

2.5.3 Coordination

CONTRACTOR shall coordinate construction requirements with Governmental agencies, utilities, and all other parties either involved in infrastructure improvements or otherwise affected by the design and construction requirements.

2.5.4 Design-Assist Development Coordination

CONTRACTOR understands and agrees that all Design Development Documents and time schedules prepared by Architect/Engineer must be coordinated with CONTRACTOR and CITY. CONTRACTOR shall participate and provide recommendations in the development of the drawings and other documents to fix and describe the size and character of the Project in its entirety as to structural, and electrical systems, materials and other essentials in CONTRACTOR’s capacity as a general contractor and not as a design professional, focusing on constructability and cost implications of the evolving design.

2.5.5 Construction Documents Coordination. [reserved]

2.5.6 Cooperation

CONTRACTOR shall cooperate with the Architect/Engineer, and CITY's financial, design and construction consultants and all other designated representatives during the design and construction of the Project.

2.5.7 Management

CONTRACTOR shall implement suitable management systems and work plans for the Project relative to Project safety, quality assurance and managing and controlling the Work.

2.5.8 Reports

CONTRACTOR shall prepare and submit to CITY monthly progress reports on the Work accomplished during the previous monthly period, which reports shall be prepared in a manner and in a format reasonably acceptable to CITY. Such reports shall be furnished at the time of submission of each monthly Application for Payment. As part of such report, CONTRACTOR shall provide an updated Schedule, including CPM, if any, illustrating the progress that has been made, by reference to the initial CPM, and specifying whether the Work is on schedule or behind schedule and actions being taken to correct Schedule slippage. The monthly report shall also set forth CONTRACTOR's projected progress for the forthcoming month.

2.6 Labor and Materials; Liens (Stop Payment Notice Claims); Indemnity

Unless otherwise provided in the Contract Documents, CONTRACTOR shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. CONTRACTOR shall enforce strict discipline and good order among CONTRACTOR's employees, subcontractors, and other persons carrying out the Work. CONTRACTOR shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

CONTRACTOR shall not permit any Subcontractor, materialman, or laborer to place liens on the Project covering any portion of the Work for which CITY has made payment to CONTRACTOR. If any liens (e.g., stop payment notice claims) are imposed, CITY may withhold payment in the amount of 125% of the claim until such time an unconditional release is provided in a form satisfactory to CITY. CONTRACTOR shall indemnify, defend, and hold harmless CITY regarding any claim or lien that proceeds to, or is the subject of litigation. CITY may withhold payment(s) pending compliance with this provision.

2.7 Local Conditions; Environmental Site Conditions

2.7.1 Local Conditions

CONTRACTOR represents that it has taken steps reasonably necessary to ascertain the nature and location of the Work, and that it has investigated and satisfied itself as to the general and local conditions which are applicable to the Work such as (a) conditions bearing on transportation, disposal, handling and storage of materials; (b) the availability of labor, water, power and roads; (c) normal weather conditions; (d) observable physical conditions at the Site; (e) the surface conditions of the ground; and (f) the character of equipment and facilities needed prior to and during the performance of the Work. To the

extent CONTRACTOR encounters subsurface or concealed conditions which differ materially from that actually known by CONTRACTOR on the date of this Agreement or from those ordinarily found to exist and generally recognized as inherent in the activities of the character provided in the Contract Documents; then CONTRACTOR shall give notice to CITY promptly before conditions are disturbed and in no event later than two (2) Days after the first observance of the conditions if a Change Order is contemplated by CONTRACTOR due to such condition. Such materially different conditions may entitle CONTRACTOR to an equitable adjustment in the GMP and/or Schedule pursuant to the Change Order provisions of this Agreement.

2.7.2 Hazardous Materials

The Parties' agreement as to the handling of Hazardous Materials discovered at the Site (and not brought there by CONTRACTOR or any Subcontractor) is set forth in Exhibit E-HAZARDOUS MATERIALS hereto, and the only duties and responsibilities of CONTRACTOR in connection therewith are as therein specified, notwithstanding any other provision of this Agreement.

2.8 Legal Requirements

CONTRACTOR shall comply with all Applicable Laws, and shall give applicable **notices** pertaining thereto.

2.8.1 Governmental Approvals

CONTRACTOR shall comply with Applicable Laws, and shall give applicable notices pertaining thereto. Except with respect to Governmental Approvals, CONTRACTOR shall prepare and file all documents required to obtain the necessary approvals of governmental authorities having jurisdiction over the Work and/or the Project and shall secure and pay for permits and governmental fees, licenses and inspections necessary for the proper execution of the Work and completion of the Project. Notwithstanding the foregoing, CITY has informed CONTRACTOR that fees in connection with building permits, street use permits, and similar permits relating to construction will be waived and are not to be included in the GMP. If and to the extent charges for such permits are imposed in the future, such charges shall be paid by CITY, or shall be the subject of a Change Order to the Contract in accordance with the Change Order provisions of this Agreement.

2.8.2 Permits, Fees and Notices

Unless otherwise provided in the Contract Documents, and subject to the provisions of Article 2.8-Legal Requirements hereof, CONTRACTOR shall secure all permits, governmental fees, licenses and inspections necessary for the proper execution and completion of the Work. To the extent there is a change in the type or cost of any of such permits, fees, licenses or inspection occurring after execution of this Agreement, there shall be an equitable adjustment in the GMP and Schedule on account of such change in accordance with the Change Order provisions. CONTRACTOR shall comply with and give notices required by Applicable Laws.

2.8.3 Patents, Trademarks, Copyrights

CONTRACTOR shall pay, as a Cost of the Work, all-applicable royalties and license fees on any matters arising in connection with the Work. CONTRACTOR shall defend all suits or claims for infringement of patent, trademark, and copyrights against the Indemnified Parties, and shall save the Indemnified Parties harmless from loss on account thereof for any and all matters arising in connection with the Work or the Project (such costs to be paid as Cost of the Work), except with respect to any particular design process or the product of a particular manufacturer or manufacturers specified and required by CITY, other than

pursuant to the recommendation or suggestion of CONTRACTOR or a subcontractor; provided however, if CONTRACTOR has reason to believe that the design, process or product so specified is an infringement of a patent, CONTRACTOR shall be responsible for any loss resulting unless CONTRACTOR has provided CITY with prompt written notice of CONTRACTOR's belief, and CITY has nevertheless elected to go forward with such design, process or product so specified.

2.9 Warranty

CONTRACTOR warrants to CITY that any and all materials, equipment and furnishings incorporated in the Work will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Construction Work will be free from defects not inherent in the quality required or permitted, and that the Construction Work will conform with the requirements of the Contract Documents. Construction Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective by CITY at its sole discretion**.**

CONTRACTOR shall warranty the Construction Work for a period of one-year commencing upon recording of the notice of completion. If within this one-year warranty period any of the Work is found to be defective or not in accordance with the requirements of the Contract Documents, CONTRACTOR shall correct it promptly after receipt of written notice from CITY to do so. CITY shall give such notice promptly after discovery of the condition. CONTRACTOR shall bear the cost of correction. CONTRACTOR's attention is directed to Article 11.13-Payment, Performance, and Warranty Bonds and Exhibit G-BOND FORMS regarding Warranty Bond requirements.

2.10 Use of Site.

2.10.1 Beneficial Use

CITY shall be permitted beneficial use of the Work.

2.10.2 Access by CITY

CONTRACTOR shall afford CITY and its authorized designees access to the Project Site at all times, subject to reasonable prior notice for access outside of normal business hours.

2.10.3 Rubbish; Debris; Cleanup

During the performance of all on-site Work, CONTRACTOR shall at all times, as a Cost of the Work, keep the Site and adjacent streets, properties and sidewalks free from waste materials, debris and/or rubbish, and shall employ adequate dust control measures. If accumulation of such materials, debris, rubbish or dust constitutes a nuisance or safety hazard or is otherwise objectionable in the reasonable opinion of CITY, CONTRACTOR shall promptly remove them. Upon Substantial Completion of the Work, or any portion or component thereof, CONTRACTOR shall remove from the Site, or applicable portion thereof, all tools, construction equipment, machinery, surplus materials, waste materials and rubbish and shall leave the Site in a "broom clean" condition. If CONTRACTOR fails to clean up as provided in the Contract Documents, CITY may do so and the cost thereof shall be charged to CONTRACTOR as a Cost of the Work.

2.10.4 Noise and Night Work

CONTRACTOR shall comply with CITY's noise ordinance.

2.11 Taxes

CONTRACTOR shall pay, as Cost of the Work, all existing and future applicable federal, state and local sales, consumer, use and similar taxes, whether direct or indirect, relating to, or incurred in connection with, the performance of the Work (excluding taxes based on CONTRACTOR's income). In the event CONTRACTOR is obligated to pay any new or increased taxes or duties adopted after the date hereof, the amount of such new or increased taxes shall increase the GMP pursuant to the Change Order provisions of this Contract. In the event CONTRACTOR receives the benefit of a tax exemption or tax reduction taking effect after the date hereof, the amount of such exemption or reduction shall decrease the GMP pursuant to the Change Order provisions of this Contract

2.12 Ownership of Documents and Materials, and Confidentiality

CITY shall have unlimited rights to copy and use in connection with the Project all Design Materials, including the right to use same on the Project at no additional cost to CITY, regardless of degree of completion, provided that said services performed have been fully paid for as required by the terms of this Agreement. CONTRACTOR and its Subcontractors shall keep all design documents confidential, and shall not disclose such documents except as may be required in performance of the Work or pursuant to legal process.

2.13 Value Engineering

CONTRACTOR shall suggest to CITY value engineering to reduce the cost of the Project, which CITY may accept at its sole discretion.

2.13.1 Acceptance of Value Suggestions

To the extent that CONTRACTOR provides value engineering suggestions or comments with respect to the Project's design, CITY acknowledges that such services are advisory only and not professional design services. CITY shall refer all such suggestions and comments to the Architect/Engineer for review and evaluation prior to CITY's acceptance thereof. CITY shall cause the Architect/Engineer to revise the Project's design documents to reflect all value engineering suggestions and comments accepted by CITY without delay or disruption to the timely and orderly progress of the Work, including revisions needed to address the impact of an agreed value engineering solution on other portions of the Work. The GMP and Contract Time shall be adjusted by Change Order promptly after CONTRACTOR's review and pricing of the change to the Work reflected in the revised design documents.

2.13.2 Subcontractors Bids

CONTRACTOR shall make recommendations to the Architect/Engineer regarding the appropriate quality of materials, equipment, component systems and types of construction for the most reasonable prices for inclusion in the Construction Documents, and CONTRACTOR shall also recommend to the Architect/Engineer and CITY reasonable adjustments in the scope of the Project so that the total cost bid by the bidding Subcontractors will not exceed the estimate.

2.14 Design Development Documents and Construction Documents.

2.14.1 General

The Design-Assist Team understands that all construction documents, working drawings and specifications must be coordinated with, submitted to, and approved by, CITY prior to construction. CONTRACTOR shall allow CITY a minimum of fourteen (14) days for review of Submittals and corrections made thereto. CONTRACTOR shall work with the Design-Assist Team to prepare, for the approval of CITY, working drawings and specifications setting forth in detail the requirements for the

construction of the Project in its entirety CITY's review of the Design Development Documents and the Construction Documents shall not relieve CONTRACTOR from its responsibilities under this Agreement, or be deemed to be an approval or waiver by CITY of any deviation from, or of CONTRACTOR's failure to comply with, any provision or requirement of the Contract Documents, unless such deviation or failure has been identified as such in writing in the document submitted for approval by CONTRACTOR and approved by CITY. CONTRACTOR shall comply with all CITY construction standards as deemed applicable by the CITY. CONTRACTOR shall provide CITY with a complete, accurate, full size, and current set of as built drawings in a hard copy acceptable to City prior to Final Completion.

The Architect/Engineer is the entity professionally responsible for the design of the Project. CITY acknowledges that CONTRACTOR is a general contractor and not an architect or engineer. Except with respect to any subcontractors of CONTRACTOR providing architectural or engineering services for the Project as design-build work, CONTRACTOR's review of or input for any design documents, or CONTRACTOR's recommendation for any design concepts, is made solely in CONTRACTOR's capacity as a licensed contractor and not as a licensed design professional. CONTRACTOR is not responsible for any errors in the design or failure of the design to comply with applicable laws, codes, rules and regulations, or lawful orders of public authorities. However, if CONTRACTOR observes any such nonconformity or errors it shall promptly notify CITY and the Architect/Engineer.

2.14.2 Reliance on Approvals

CONTRACTOR shall be entitled to rely on the approvals of CITY with respect to the Design Materials. If CITY revokes, modifies or otherwise changes in a material way its approval of a given system after such system has been designed and approved, or modifies the original Scope of Work in a material manner requiring modification to one or more systems which have been designed and approved, CONTRACTOR shall be entitled to a Change Order in accordance with the provisions of Article 9-CHANGES IN THE WORK hereof. No Change Order shall be issued to the extent such modification is due to the fault or neglect of CONTRACTOR.

2.14.3 Review of Contract Documents and Field Conditions

CONTRACTOR shall take field measurements and verify field conditions and shall carefully compare such field conditions and other information known to CONTRACTOR with the Contract Documents before commencing activities. CONTRACTOR shall perform the Work in accordance with the Contract Documents and submittals approved in accordance with the procedures set forth in this Agreement.

2.15 Shop Drawings, Product Data, Samples and Other Submittals.

2.15.1 Documents and Samples at the Site

From and after commencement of the Construction Work, CONTRACTOR shall maintain at the site one (1) record copy of the Construction Documents, and any and all amendments thereto, in good order and marked to record changes and selections made during the Construction Phase. In addition, CONTRACTOR shall maintain at the site approved shop drawings, product data, samples and similar required submittals. These shall be provided to CITY upon completion of the Work.

2.15.2 Shop Drawings

Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by CONTRACTOR, a Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

2.15.3 Product Data

Product Data includes illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by CONTRACTOR to illustrate materials or equipment for some portion of the Work.

2.15.4 Samples

Samples are physical examples, which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

2.15.5 Submittals are not Contract Documents.

Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way CONTRACTOR proposes to conform the construction to the Construction Documents.

2.15.6 Submission of items listed in Article 2.15.5

Requirements and procedures for submittal of shop drawings, product and equipment data are covered in technical specification section 01322 and 01330.

2.15.7 Responsibility

CONTRACTOR shall not be relieved of responsibility for the deviations from requirements of the Contract Documents by CITY's approval of Shop Drawings, Product Data, Samples or similar submittals unless CONTRACTOR has specifically informed CITY of such deviation at the time of the submittal and CITY has given written approval to the specific deviation. CONTRACTOR shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by CITY's approval thereof.

2.16 Tests and Inspections

2.16.1 Initial Tests and Inspections

Tests, inspections and approvals of portions of the Construction Work shall be made as required by the Contract Documents, Applicable Laws or normal construction practices and/or as directed by CITY. Unless otherwise provided, CONTRACTOR shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to CITY, or with the appropriate public authority. The costs of such tests, inspections and approvals shall be a cost paid by CONTRACTOR. CONTRACTOR shall give CITY timely notice of when and where tests and inspections are to be made so that CITY may observe such procedures. All costs of tests, inspections or approvals imposed upon CONTRACTOR by changes in Applicable Laws occurring after execution of this Agreement shall be an increase to the GMP in accordance with the Change Order provisions herein.

2.16.2 Additional Tests and Inspections

If CITY, or any other public authority having jurisdiction, determines that portions of the Construction Work require additional testing, inspection or approval beyond that required by Article subsection 2.16.1 above, CITY will instruct CONTRACTOR to make arrangements for such additional testing, inspection or approval by an entity acceptable to CITY, and CONTRACTOR shall give timely notice to CITY of when and where tests and inspections are to be made so CITY may observe such procedures. If such additional tests and/or inspections reveal failure of the portions of the Work to comply with the

requirements of the Contract Documents, the costs of such tests and required correction shall be paid as a Cost of the Work, subject to the limitations set forth in Article 2.19-CORRECTION OF WORK hereof. If the additional tests and/or inspections show that the portions of the Work comply with the requirements of the Contract Documents, the costs thereof shall be an increase to the GMP in accordance with the Change Order provisions of this Agreement.

2.16.3 Required Certificates

Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by CONTRACTOR and promptly delivered to CITY.

2.16.4 Timing of Testing

Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

2.17 Cutting and Patching

2.17.1 Cutting and Patching of the Work

CONTRACTOR shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

2.17.2 Damage to Work of CITY or Separate Contractors

CONTRACTOR shall not damage or endanger a portion of the completed Work, fully or partially completed construction of CITY, or work or construction by Separate Contractor(s) by cutting, patching or otherwise altering such construction or work, or by excavation. CONTRACTOR shall not cut or otherwise alter such construction by CITY or a Separate Contractor except with written consent of CITY and of such Separate Contractor, such consent not to be unreasonably withheld.

2.18 Uncovering of Construction Work.

2.18.1 Uncovering

If a portion of the Construction Work is covered contrary to CITY's written request to observe such work prior to it being covered or contrary to requirements of the Contract Documents, it must, if directed in writing by CITY, be uncovered for CITY's observation and be replaced without change in the Schedule or GMP. The costs of such uncovering and replacement shall be Cost of the Work, subject to the limitation set forth in Article 2.19-CORRECTION OF WORK hereof.

2.18.2 Covering of Work Requested to be Observed

If a portion of the Construction Work has been covered, which CITY has not specifically requested to observe prior to being covered, CITY may request to see such Construction Work and it shall be uncovered by CONTRACTOR. If such Construction Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be charged to CITY and shall increase the GMP. An appropriate time extension shall also be given. If such Construction Work is not in accordance with the Contract Documents, CONTRACTOR shall pay such costs as Cost of the Work, unless such condition was caused by CITY or a Separate Contractor in which event CITY shall be responsible for payment of such costs by appropriate Change Order, and an appropriate time extension shall also be given.

2.19 Correction of Work

2.19.1 Work Rejected by CITY

CONTRACTOR shall promptly correct Construction Work rejected by CITY or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. CONTRACTOR shall bear the costs of correcting such rejected Construction Work, as a Cost of the Work, including additional testing and inspection and compensation for services and expenses of CITY made necessary thereby.

2.19.2 Removal of Work

CONTRACTOR shall remove from the Site portions of the Construction Work, which are not in accordance with the requirements of the Contract Documents and are neither corrected by CONTRACTOR nor accepted by CITY. The costs incurred in removing such Work shall be a Cost of the Work, subject to the limitation set forth in Article 2.19-CORRECTION OF WORK hereof.

2.19.3 Failure to Correct Nonconforming Work

If CONTRACTOR fails to correct nonconforming Construction Work within a reasonable time, CITY may correct it in accordance with the terms of this Agreement. If CONTRACTOR does not proceed with correction of such nonconforming Construction Work within a reasonable time fixed by written notice from CITY, CITY may remove it and store the salvageable materials or equipment at CONTRACTOR's expense. If CONTRACTOR does not pay costs of such removal and storage within ten (10) Days after written notice, CITY may, upon ten (10) additional Days written notice, sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by CONTRACTOR, including compensation for services and expenses made necessary thereby. If such proceeds of sale do not cover costs which CONTRACTOR should have borne, CONTRACTOR shall pay such excess to CITY. If such proceeds are in excess of the costs which CONTRACTOR should have borne, such excess shall be paid by CITY to CONTRACTOR. If such costs arise during the performance of the Work, such costs shall be charged against the Cost of the Work. If such costs arise after Substantial Completion, such costs shall be payable as provided in Article 8.1-GUARANTEED MAXIUMU PRICE.

2.19.4 Damaged or Destroyed Work

CONTRACTOR shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of CITY or Separate Contractors caused by CONTRACTOR's correction or removal of Construction Work which is not in accordance with the requirements of the Contract Documents. If such costs arise during the performance of the Work, such costs shall be charged against the Cost of the Work. If such costs arise after Substantial Completion, such costs shall be payable as provided in Article 8.1-GUARANTEED MAXIMUM PRICE.

2.19.5 No Limitation

Nothing contained in this Article 2.19-CORRECTION OF WORK shall be construed to establish a period of limitation with respect to other obligations which CONTRACTOR might have under the Contract Documents.

2.19.6 Acceptance of Nonconforming Work

If CITY prefers to accept Work, which is not in accordance with the requirements of the Contract Documents, CITY may do so instead of requiring its removal and correction, in which case the GMP will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

2.20 Contractor Registration

No contractor or subcontractor may work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5. During the performance of this Contract, CONTRACTOR and its subcontractors shall have a continuing legal obligation to maintain current registration with the Department of Industrial Relations. CONTRACTOR is hereby notified that this Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

ARTICLE 3 - CONTRACT ADMINISTRATION

3.1 Administration of the Contract

The CITY's Representative and the Construction Manager will provide administration of the Agreement as hereinafter described. If the status of any of the above parties should change, the CITY will provide written notice to the Contractor of such change.

3.2 CITY's Representative

3.2.1 General

The CITY's Representative has the authority to act on behalf of the CITY on change orders, field orders, progress payments, Contract Decisions, acceptability of the Contractor's work, and early possession.

3.2.2 Change Orders

The CITY's Representative has the authority to accept or reject change orders and cost proposals submitted by the Contractor or as recommended by the Construction Manager.

3.2.3 Progress Payments

CITY's Representative has the authority to accept or reject requests for progress payments which have been submitted by the Contractor and recommended by the Construction Manager.

3.2.4 Contract Decisions

Should CONTRACTOR disagree with the Construction Manager's decision with respect to the Agreement, the CONTRACTOR may appeal to the CITY's Representative in accordance with the provisions of the Agreement.

3.2.5 Acceptability of Work

The CITY's Representative has the authority to make the final determination of the acceptability of the Work.

3.3 Construction Manager

3.3.1 General

The Construction Manager is a representative of the CITY employed to act as advisor and consultant to the CITY in construction matters related to the Agreement. The term Construction Manager may include more than one individual to perform contract administration and construction observation. Hereinafter, the term Construction Manager includes any and all representatives working under the direction of the Construction Manager.

All instructions to the Contractor and all communications from the Contractor to the CITY or the CITY's Representative shall be forwarded through the Construction Manager. The Construction Manager will have authority to act on behalf of the CITY only to the extent provided in the Contract Documents. The CITY has delegated its authority to the Construction Manager to make initial decisions regarding questions which may arise as to the quality or acceptability of materials furnished and work performed, and as to the manner of performance and rate of progress of the Work. The Construction Manager shall make initial decisions with respect to the Contractor's fulfillment of the Agreement and the Contractor's entitlement to compensation. The Contractor shall look initially to the Construction Manager in matters relating to the Agreement.

The Construction Manager's authority to act under Article 3-CONTRACT ADMINISTRATION, herein, and any decision made by it in good faith either to exercise or not to exercise such authority, shall not be interpreted or construed as control of or responsibility for any of the Work performed under this Agreement.

3.3.2 On-Site Representative

The Construction Manager will observe the progress, quality, and quantity of the Work to determine, in general, if the Work is proceeding in accordance with the provisions of the Contract Documents. The Construction Manager shall not be responsible for the superintendence of the construction site conditions; construction means, methods, appliances techniques, sequences, or procedures; operation of equipment; Contractor's personnel; or for safety practices or unsafe practices, precautions, and programs in connection with the Work.

In accordance with the provisions of these Contract Documents, the Construction Manager will make decisions relative to all matters of interpretation or execution of the Contract Documents.

3.3.3 Observation and Inspections of Construction

The Construction Manager shall observe the construction and shall have the authority to reject work and materials which do not conform to the Contract Documents, and to require special inspection or testing. Observation and inspection by the Construction Manager or an inspector is not an authorization to revoke, alter, or waive any requirements of the Specifications. Observation and inspection is the authorization to call the attention of the Contractor to any failure of the Work, materials or workmanship to conform to the Contract Documents. The Construction Manager shall have this authority including the ability to reject materials or, in any emergency, suspend the Work. The Contractor may appeal any such issue which it disagrees with to the Construction Manager for decision. If the decision of the Construction Manager is not satisfactory to the Contractor, the Contractor may appeal such decision to the CITY's Representative.

3.3.4 Acceptability of the Work

The Construction Manager has the authority to make a recommendation as to the acceptability of the Work.

3.3.5 Change Orders

The Construction Manager has the authority to initiate change orders; to reject change orders proposed by the Contractor; to negotiate and recommend acceptance of change orders to the CITY; or to order minor changes in the Work that result in no cost to the CITY.

3.3.6 Construction Schedule

The Construction Manager has the authority to review and recommend acceptance of the progress schedule submitted by the Contractor at the start of the Work and subsequent significant revisions for conformance to the specified sequence of Work and logic.

3.3.7 Progress Payments

The Construction Manager has the authority to recommend acceptance or rejection of requests for progress payments which have been submitted by the Contractor.

3.3.8 Final Payment

The Construction Manager, with the assistance of the CITY's Representative and the Engineer, will conduct inspections to determine the date of Final Completion of the Work, and the Construction Manager will receive and forward to the CITY, for the CITY's review, written warranties and related documents required by the Agreement and assembled by the Contractor.

3.3.9 Contract Interpretation by the Construction Manager

Notwithstanding any omission from the Specifications or the Drawings it shall be the duty of the Contractor to call the Construction Manager's attention to apparent errors or omissions upon discovery by the Contractor and request instructions in writing before proceeding with the Work. The Contractor shall not unreasonably take advantage of any errors or omissions found by Contractor. If the Contractor discovers any errors or omissions that it believes affect the time or cost of performing the Work, it shall be entitled to request a Change Order. Contractor shall promptly notify the Construction Manager in writing of any design, materials, or specified method that the Contractor identifies as defective or insufficient, provided, however, that in doing so Contractor will be acting in its capacity as a contractor and not an architect or engineer, and that this section does not affect CITY's responsibility with regard to the Contract Documents. The Construction Manager may, by appropriate written instructions, correct errors and supply omitted information, which instructions shall be as binding upon the Contractor as though contained in the original Specifications or Drawings when incorporated into Change Orders. Such instructions shall be incorporated into the Agreement in accordance with the Change Order provisions of the Agreement.

Any discrepancies discovered by the Contractor between the Contract Documents and Site conditions or any inconsistencies or ambiguities in the Contract Documents shall be promptly reported, in writing, to the Construction Manager. Questions regarding the meaning and intent of the Contract Documents shall be referred in writing by the Contractor to the Construction Manager with a Request for Information (RFI).

Work done by the Contractor after its discovery of such errors, omissions, discrepancies, inconsistencies or ambiguities without such notice and prior to response from the Construction Manager shall be done at the Contractor's risk and shall not be reimbursed as a Cost of the Work, nor be a basis for an increase in the GMP.

3.4 Engineer

3.4.1 General

The Engineer will have the authority to act on behalf of the CITY only to the extent provided in the Contract Documents. The Engineer shall not be responsible or have authority for the superintendence of construction site conditions; construction means, methods, appliances techniques, sequences, or procedures; operation of equipment; Contractor's personnel; or for safety practices or unsafe practices; precautions and programs in connection with the Work; or for any failure of the Contractor to comply with laws, regulations, rules, ordinances, codes, or orders applicable to the Contractor furnishing and performing the Work.

3.4.2 Interpretations

The Engineer has the authority to be the initial interpreter of the technical requirements of the Contract Documents. Either party to the Agreement may make written request to the Construction Manager for interpretations necessary for the proper execution or progress of the Work. The Construction Manager shall refer such written requests to the Engineer, who will render such interpretations. Where the Contractor has requested an interpretation from the Construction Manager, or been notified by the Construction Manager that such interpretation has been requested by the CITY, any work done before receipt of such interpretations, if not in accordance with same, shall be removed and replaced or adjusted as directed by the Construction Manager without additional expense to CITY and shall not be reimbursed as a Cost of the Work, or be a basis for an increase in the GMP.

3.4.3 Acceptability of the Work

The Engineer has the authority to make a recommendation as to the acceptability of the Work. The Engineer has the authority to recommend acceptance regarding the remediation or retention of Defective Work.

3.4.4 Submittal

The Engineer shall receive, through the Construction Manager, shop drawings, product data and samples for review.

The Engineer has the authority to review and take other appropriate action upon the Contractor's submittal such as shop drawings, product data and samples, but only for conformance with the design concept of the Work and the information given in the Contract Documents.

ARTICLE 4 - CITY'S RIGHTS AND RESPONSIBILITIES

4.1 General

CITY, acting through the CITY's Representative or the Construction Manager, shall have the authority to act as the sole judge of the Work and materials with respect to both quantity, quality function, performance and reliability as set forth in the Agreement except as delegated to the Construction Manager in these Contract Documents.

4.2 Information and Services Required of CITY

4.2.1 CITY Designation of Authorized Representative

Both Parties shall designate, from time to time, one or more representatives authorized to act on their behalf with respect to the Project, together with the scope of his/her respective authority.

CONTRACTOR shall not be entitled to rely on directions from anyone outside the scope of that person's authority as set forth in written delegations pursuant to this Agreement. Directions and decisions made by Authorized Representative(s) of CITY shall be subject to any further approval(s) required by any provisions of CITY's Charter or the Roseville Municipal Code.

4.2.2 Communication

During the term of this Contract, CITY shall communicate with Subcontractors, suppliers and others performing any part of the Work only through CONTRACTOR's Authorized Representative.

4.2.3 CITY'S instruction to CONTRACTOR

Wherever CITY is identified in the contract documents in reference to providing the CONTRACTOR with instruction, the "CITY" reference could mean, Construction Manager, Engineer, or Representative acting on behalf of the CITY as delegated in that instance.

4.3 Activities on Site by CITY or Separate Contractors

4.3.1 Observation and Inspection

In addition to the Construction Manager's designated representative, the CITY may provide one or more inspectors to the Construction Manager to observe the Work and with the same authority as provided for in Article 3.3.3, Observation and Inspections of Construction.

Separate and independent from the observations and inspections above, the Work may be inspected by Building Officials, Fire Officials, Roseville Electric and/or Pacific Gas and Electric for code compliance. Such inspectors shall have the authority provided to them by their jurisdiction. Any design deficiencies or additional work required by these code inspections not required by the Contract Documents may be incorporated into the Work in accordance with the Change Order provisions of the Agreement

4.3.2 CITY'S Right to Award Separate Contracts

CITY reserves the right to perform work or operations related to the Project with the CITY'S own forces, and to award separate contracts to Separate Contractors in connection with the Project or other work on the Site. If the Contractor claims that delay, damage, or additional cost is involved because of such action by the CITY, the Contractor shall make such claim as provided elsewhere in the Contract Documents. When separate agreements are awarded for different portions of the Project or other work on the Site, the term "Contractor" in the Contract Documents in each case shall mean the contractor who executes each separate Agreement.

4.3.3 Integration of the Work with Separate Contractors

Following the request of CITY, CONTRACTOR shall prepare a plan in order to integrate the work performed by Separate Contractors with the performance of the Work, and shall submit such plan to CITY for approval. The plan shall be fair and reasonable for CONTRACTOR and the Separate Contractors, and CONTRACTOR shall work with the Separate Contractors to reach agreement on such plan. CONTRACTOR shall arrange the performance of the Work so that the Work and the work of the Separate Contractors are, to the extent applicable, properly integrated, jointed in an acceptable manner, and performed in the proper sequence so that any disruption or damage to the Work or to any work of Separate Contractors is avoided.

4.3.4 Coordination

CONTRACTOR shall provide for the coordination of the activities of CONTRACTOR and its Subcontractors with the activities of the Separate Contractors. CONTRACTOR shall participate with all Separate Contractors and CITY in reviewing and coordinating the schedules of the Separate Contractors with the Schedule. CONTRACTOR shall make any revisions to the Schedule deemed necessary to properly incorporate the work of the Separate Contractors with the Work. To the extent (a) the date of Substantial Completion is extended by such Schedule revision; (b) CONTRACTOR is required to perform its Work materially out of sequence, and in a manner which is not as efficient or cost effective as originally planned; or (c) the Scope of Work is increased, an equitable adjustment in the GMP and the Schedule shall be made in accordance with the Change Order provisions of this Agreement.

4.3.5 Use of Site

CONTRACTOR shall afford CITY and all Separate Contractors reasonable opportunity for storage of materials and equipment and performance of their work. CONTRACTOR shall also connect and coordinate its Work and operations with CITY and all Separate Contractors' operations as required by the Contract Documents. CITY shall direct the Separate Contractors to cooperate with CONTRACTOR and to avoid actions or omissions, which could interfere with or delay the activities of CONTRACTOR.

4.3.6 Deficiency in Work of Contractors

If part of CONTRACTOR's Work depends upon proper execution or results upon construction or operations by CITY or a Separate Contractor, CONTRACTOR shall, prior to proceeding with that portion of the Work, promptly report to the Separate Contractor and CITY apparent discrepancies or defects in such other construction that would render it unsuitable for proper execution and results by CONTRACTOR. CONTRACTOR and the Separate Contractor shall use good faith efforts to resolve any such discrepancies or defects or any disagreements relating thereto. Failure of CONTRACTOR to report such discrepancies or defects shall constitute acceptance by CONTRACTOR of the work of Separate Contractors as fit and proper to receive CONTRACTOR's Work (except as to those defects or discrepancies that are not apparent).

4.4 Claims Involving Separate Contractors

In the event that CONTRACTOR unnecessarily and unreasonably delays the work of Separate Contractors by not cooperating with them as required hereby, or by not affording them reasonable opportunity to perform their work as stated herein, CONTRACTOR shall, in such event, pay, as Cost of the Work, all reasonable direct incremental costs and expenses incurred by such Separate Contractors due to any such delays. If any Separate Contractor shall assert a claim or bring an action against CITY alleging damage due to the fault or neglect of CONTRACTOR, CITY shall immediately notify CONTRACTOR, who shall defend such claim. If it is determined that CONTRACTOR was at fault, CONTRACTOR shall pay all costs of defense, including attorney's fees, as well as any resulting judgment or settlement, as a Cost of the Work.

4.5 Assignment of Separate Contracts

If CITY determines that it wishes to assign to CONTRACTOR one or more contracts between CITY and a Separate Contractor, it shall give CONTRACTOR written notice of such desire, including in such notice a copy of such contract for CONTRACTOR's review and approval. The Separate Contractor shall be fully qualified to perform the work under the to-be-assigned contract, shall possess the financial capability to perform its obligations under such to-be-assigned contract, and shall provide one hundred percent (100%) payment and performance bonds covering such work from sureties meeting the standards

set forth in Article 11-Insurance and Bonds; Indemnification hereof. Such contract shall contain provisions similar to those contained in CONTRACTOR's agreements with its Subcontractors with respect to liability, indemnification, retention, payment, labor, warranty, and other material items. Upon CONTRACTOR's approval of the assignment of such contract, which approval shall not be unreasonably withheld, delayed or conditioned, such Separate Contractor shall cease to be a Separate Contractor and shall thereafter be deemed to be a Subcontractor of CONTRACTOR, and the GMP shall be increased by Change Order in the amount of (a) such assigned contract, and (b) the additional Fee pursuant to the provisions of Article 9.6-Change Orders on Account of Scope Change.

4.6 CITY's Right to Stop the Work

If CONTRACTOR persistently fails to correct Work which is not in accordance with the requirements of the Contract Documents and this Agreement or persistently fails to carry out the Work in accordance with the Contract Documents, CITY, by written order signed by CITY, may deliver a notice to CONTRACTOR setting forth that such a persistent and material failure is occurring and has occurred, and demanding that CONTRACTOR commence a cure of such persistent and material failure within twenty (20) Days and diligently pursue such cure thereafter. In the event that the cure is not commenced and pursued diligently, CITY may, by written notice to CONTRACTOR, order CONTRACTOR to stop the Work, or any portion thereof, until the use for such order has been eliminated; provided, however, that the right of CITY to stop the Work shall not give rise to a duty on the part of CITY to exercise this right for the benefit of CONTRACTOR or any other person or entity and shall not give rise to any liability of CITY to CONTRACTOR resulting from any delay (except to the extent that such order is found to be improper).

If CONTRACTOR fails to correct an unsafe condition as specified in Article 12-SAFETY: PROTECTION OF PERSONS AND PROPERTY, the CITY shall have the right to notify the Contractor through the Construction Manager that an unsafe condition may exist and must be corrected or the Work in question can be stopped immediately. CITY's has a right to stop the work, until the condition is corrected to the satisfaction of the CITY.

4.7 CITY's Right to Carry Out the Work

If CONTRACTOR defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven (7) Day period after receipt of written notice from CITY to commence and diligently continue correction of such default or neglect with diligence and promptness, CITY may, after such seven (7) Day period, give CONTRACTOR a second written notice to correct such deficiencies within such second seven (7) Day period. If CONTRACTOR within such second seven (7) Day period after receipt of such second notice fails to commence and diligently continue to correct any deficiencies, CITY, without prejudice to other remedies CITY may have, may correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due to CONTRACTOR the cost of correcting such deficiencies, including Compensation for additional services and expenses made necessary by such default, neglect or failure. If payments then or thereafter due to CONTRACTOR are insufficient to cover such amounts, CONTRACTOR shall pay the difference to CITY.

The CITY also reserves the right to perform and suspend any portion of the Work due to an emergency threatening the safety of the Work, public, CITY, and any property or equipment. No deductive Change Order shall be issued for an emergency not caused by Contractor.

4.8 Non-Responsibility of the CITY

CITY shall not be held responsible for the care or protection of any material or parts of the Work prior to the Final Acceptance, except as expressly provided in the Contract Documents.

ARTICLE 5 - CONTRACTOR RIGHTS AND RESPONSIBILITIES

5.1 Status of Contractor and Subcontractors

5.1.1 Contractor

It is stipulated and agreed that the Contractor shall be an independent contractor in the performance of this Agreement and shall have complete charge of persons engaged in performance of the Work. The Contractor shall perform the Work in accordance with its own means, methods, and appliances subject to compliance with the requirements of the Agreement.

5.1.2 Subcontractors

If any part of the Work to be done under this Agreement is subcontracted, the subcontract shall be in writing and shall provide that all Work to be performed thereunder shall be performed in accordance with the terms of the Contract Documents. The subcontracting of any or all of the Work to be done will in no way relieve the Contractor of any part of its responsibility under the Agreement. Subcontractors will not be recognized as having a direct relationship with the CITY. The persons engaged in the Work, including employees of subcontractors and suppliers, will be considered employees of the Contractor and their work shall be subject to the provisions of the Agreement. References in the Contract Documents to actions required of subcontractors, manufacturers, suppliers, or any person other than the Contractor, the CITY or the Construction Manager shall be interpreted as requiring that the Contractor shall require such subcontractor, manufacturer, supplier or person to perform the specified action.

The Contractor shall only employ subcontractors that are properly licensed in accordance with State law and are registered with the California Department of Industrial Relations (DIR).

Prior to commencement of any work by a subcontractor, the Contractor shall submit to the Construction Manager:

A. Verification that the subcontractor is properly licensed for the work it will perform.

B. Upon CITY'S request, copies of subcontract agreements.

C. Copies of subcontractor's insurance certificates and endorsements.

5.2 Contractor's Representative

The Contractor shall provide in writing, a request to the CITY to delegate authority to an individual to serve in the capacity of authorized representative and shall wait to receive written confirmation from the CITY, before the authorized representative can start work. The authorized representative shall be qualified for the duties required and have complete authority to represent and to act for the Contractor. Said authorized representative has the authority to act in matters relating to the Agreement, and shall be personally present at the Site at all times while work is actually in progress on the Agreement. During periods when the Work is suspended, arrangements acceptable to the Construction Manager shall be made for any emergency work that may be required. The Contractor's authorized representative shall be fluent and proficient in the English language in order to understand, receive, and carry out oral and written communications or instructions relating to all job functions and responsibilities. All

communications to and from the Contractor's authorized representative shall be binding as if given to or by the Contractor.

Contractor shall provide its authorized representative's contact information which shall include the representative's name, office street address, office telephone number, mobile phone number, home phone number, email address and the office mailing address if different from the street address.

The Contractor's authorized representative shall give its personal attention to and shall supervise the Work to the end that it shall at all reasonable times be prosecuted faithfully; and when the authorized representative is not personally present on the Work, the representative shall at all reasonable times be represented by a competent designated alternate, superintendent or foreman (approved in writing by the CITY, to act in this capacity) who shall receive and obey all instructions or orders given under this Agreement, and who shall have full authority to supply materials, tools, and labor without delay, and who shall be the legally appointed representative of the Contractor. The Contractor shall be liable for the faithful observation of any instructions delivered to the Contractor or to its authorized representative.

5.3 Supervision and Superintendence

CONTRACTOR shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

At all times during the progress of the Work, Contractor shall assign a competent resident Superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

5.4 Documents and Samples at the Site.

CONTRACTOR shall maintain at the site for CITY one record copy of the drawings, specifications, addenda, Change Order and other Modifications, in good order and marked currently to record changes and selections made during construction, and in addition approved Shop Drawings, Product Data, Samples and similar required submittals. CONTRACTOR shall also prepare one reproducible set of as-built drawings. These shall be provided to CITY upon completion of the Work.

5.5 Use and Protection of CITY'S Site and Adjacent Property

5.5.1 Designated Areas

With the approval of the Construction Manager, the Contractor may use designated portions of the CITY'S Site for storage of construction equipment, materials and field offices provided the Contractor does not interfere with CITY'S operations. The Contractor will not be allowed to unreasonably encumber the Site or adjacent areas with its materials and/or equipment. The CITY will not accept any responsibility for damage to or loss of the Contractor's equipment or materials stored on any Project related site caused by vandalism, nature, or otherwise, suffered by the Contractor. Protection of all construction equipment, stores, and supplies shall be the sole responsibility of the Contractor. Where additional work space is desired by the Contractor or where the CITY cannot provide the space to the Contractor, it shall be the Contractor's sole responsibility and expense to obtain such a space for its use.

5.5.2 Contractor's Site Access

All workers or representatives of the Contractor, subcontractors or suppliers are admitted to the Site only for the proper execution of the Work and have no tenancy without the express written permission of the CITY. Furthermore, no persons may occupy property owned by the CITY outside the limit of the Work, as indicated on the Drawings, without the express written permission of the CITY.

5.5.3 Provisions for Handling Emergencies

It is possible that emergencies may arise during the progress of the Work, which may require special treatment or make advisable extra shifts of labor forces to continue the Work for twenty-four (24) hours per day. These emergencies may be caused by damage or possible damage to nearby existing structures or property by reason of the work under construction, or by storm, accidents, or leakage. The Contractor shall be prepared in case of such emergencies to make all necessary repairs and shall promptly execute such work when required; such emergency work will be reimbursed as a Cost of the Work and the GMP increased accordingly.

Upon start of the Work, Contractor shall provide means for immediate emergency notification of Contractor's designated representative and designated emergency alternates.

5.5.1 Debris, Trash, and Construction Wastes

The Contractor shall keep the Site reasonably free from debris, trash and construction wastes to permit Contractor to perform construction services efficiently, safely and without interfering with the use of adjacent land areas, and as further stipulated in the Contract Documents. When the Work is Substantially Complete, or a portion of the Work has been completed, Contractor shall remove all debris, trash, construction wastes, materials, equipment, machinery and tools arising from the Work or applicable portions thereof to permit CITY to occupy the Project or a portion of the Project for its intended use. Contractor shall provide a finished cleaning of all areas acceptable to the CITY before releasing any area to the CITY for occupancy.

5.6 Compliance with Laws

The CITY is a municipal corporation in the State of California and is subject to the applicable provisions of law relating to public contracts as a Charter CITY. It is agreed that all provisions of law applicable to public contracts are a part of these Contract Documents to the same extent as though set forth herein and will be complied with by Contractor.

The Contractor shall at all times observe and comply with all existing laws, ordinances, regulations, orders and decrees; and shall protect, indemnify, and defend the CITY, the Construction Manager, the Engineer, the Funding Agencies and all of their officers, officials, employees, agents, volunteers, and servants against any claim or liability arising from or based upon the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor itself, employees, or its subcontractors.

The Contractor, shall at its own cost and expense, observe and keep itself and its subcontractors fully informed of all existing and future legislated State and Federal Laws and CITY and County ordinances and regulations which in any manner affect those engaged or employed in the Work, or the materials and equipment used in the Work, or which in any way affect the conduct of the Work, and all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same.

If any discrepancy or inconsistency is discovered in the Drawings, Specifications, or in any other part of this Agreement, in relation to any law, ordinance, regulation, order or decree, the Contractor shall immediately report the same to the Construction Manager in writing.

Attention is directed to the following specific regulations and requirements that are hereby included in the Contract Documents. This list of regulations is not warranted to be complete and the burden of ascertaining legal requirements that must be satisfied shall rest solely with the Contractor.

5.6.1 Prevailing Wages

For purposes of this Agreement, CONTRACTOR and its Subcontractors shall comply with all applicable prevailing wage laws, e.g., but not limited to, California Labor Code Sections 1770 et seq. In accordance with said Section 1775, CONTRACTOR shall forfeit as a penalty to the CITY Two Hundred Dollars ($200) for each calendar Day or portion thereof for each worker paid less than the prevailing rates for such work or craft in which such worker is employed for any work done on-Site under the Agreement by CONTRACTOR or by any Subcontractor in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. In addition to said penalty and pursuant to said Section 1775, the difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar Day or portion thereof for which each worker was paid less than the stipulated prevailing wage shall be paid to each worker by CONTRACTOR or the applicable Subcontractor.

Pursuant to the provisions of California Labor Code Sections 1773, the Department has identified the source, stated below, of the General Prevailing Rate of Wages applicable to the work to be done, for straight time, overtime, and holiday work. The holiday wage rate listed shall be applicable to all holidays recognized in the collective bargaining agreement of the particular craft, classification or type of worker concerned. These wage rates may be obtained from the State Department of Industrial Relations and/or the following website address: http://www.dir.ca.gov/dlsr/DPreWageDetermination.htm, which is a part of this Agreement.

Pursuant to Labor Code Section 1773.2, General Prevailing Wage Rates set forth above, which forms a part of this Agreement, shall be posted by CONTRACTOR at a prominent place at the Site. Prevailing wage rates to be posted at the Site will be furnished by the Department. The possibility of wage increases is one of the elements to be considered by CONTRACTOR in determining its Proposal, and will not under any circumstances be considered as the basis of a claim against CITY or the Agreement.

5.6.2 DIR Registration

California Labor Code section 1725.5 requires the Contractor and all lower-tier subcontractors performing public works services to be currently registered with the California DIR, as specified in California Labor Code section 1725.5. California Labor Code section 1771.1 provides that a contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal (subject to the requirements of Section 4104 of the California Public Contract Code), or engage in the performance of any contract for public work, unless currently registered and qualified to perform public work pursuant to California Labor Code section 1725.5. The Contractor shall list the Contractor's current DIR registration number, and the current DIR registration number of all subcontractors, as part of its Bid Proposal.

Further information can be found on DIR's website at http://www.dir.ca.gov/Public-Works/Contractors.html. The above summary is provided solely for informational purposes, and does not in any way affect the Contractor's and subcontractors' obligation to comply in all respects with all other applicable laws and regulations. The Contractor shall disseminate these provisions to every lower-tier subcontractor.

5.6.3 Apprentices on Public Work Projects

The Contractor and any subcontractor or subconsultant shall comply with California Labor Code section 1777.5 et seq., and implementing regulations set forth in Title 8 of the California Code of Regulations, governing the employment of apprentices. Contractor and any subcontractor or subconsultant performing Public Work will be subject to penalties for apprenticeship violations in accordance with Labor Code section 1777.7. Please refer to the link below for guidance in meeting your obligation to satisfy the apprentice requirements for this Project:
https://www.dir.ca.gov/das/DASApprenticesOnPublicWorksSummaryOfRequirements.htm.

5.6.1 Receipt of Workers' Wages, Fee for Registering or Placing Persons in Public Works

The Contractor and any subcontractor or subconsultant shall comply with California Labor Code sections 1778 and 1779 of the California Labor Code, which read as follows:

Section 1778. "Every person, who individually or as a representative of an awarding or public body or officer, or as a contractor or subcontractor doing public work, or agent or officer thereof, who takes, receives or conspires with another to take or receive, for his own use or the use of any other person any portion of the wages of any workman or working subcontractor, in connection with services rendered upon any public work is guilty of a felony."

Section 1779. "Any person or agent or officer thereof who charges, collects, or attempts to charge or collect, directly or indirectly, a fee or valuable consideration for registering any person for public work, or for giving information as to where such employment may be procured, or for placing, assisting in placing, or attempting to place, any person in public work, whether the person is to work directly for the State, or any political subdivision or for a contractor or subcontractor doing public work is guilty of a misdemeanor."

5.6.2 Travel and Subsistence Payments

Each worker needed to execute the Work must be paid travel and subsistence payments as defined in the applicable collective bargaining agreements filed in accordance with Section 1773.1 of the California Labor Code.

5.6.3 Workday

In accordance with the provisions of Division 2, Part 7, Chapter 1, Article 3 of the Labor Code, State of California, and in particular Sections 1810 to 1815 inclusive, thereof, eight (8) hours labor shall constitute a days' work and no laborer, worker, or mechanic in the employ of said Contractor, or any subcontractor doing or contracting to do any part of the Work contemplated by this Agreement, shall be required or permitted to work more than eight (8) hours in any one calendar day, and forty (40) hours in any one calendar week unless compensated at not less than time and a half as set forth in California Labor Code Section 1815. However, if the prevailing wage determination requires a higher rate of pay for overtime than is required under said Section 1815, then the overtime rate must be paid, as specified in California Code of Regulation Title 8, Group 3, Section 16200(a)(3)(F). The Contractor and each subcontractor shall also keep an accurate record showing the names and actual hours worked of all workers employed by them in connection with the work contemplated by this Agreement, which record shall be open at all reasonable hours for the inspection of the CITY or its officers or agents and by the Division of Labor Standards Enforcement of the Department of Industrial Relations, their deputies or agents; and it is hereby further agreed that said Contractor shall forfeit as a penalty to the CITY, the sum of the greater of (i) Twenty-Five and No/100 Dollars ($25.00) or (ii) the maximum penalty allowable by statute for each laborer, worker or mechanic employed in the execution of this Agreement by the Contractor or by any

subcontractor for each calendar day during which such laborer, worker or mechanic is required or permitted to labor more than eight (8) hours in any one calendar day and forty (40) hours in one calendar week in violation of these provisions.

5.6.4 Labor Discrimination

The Contractor and any subcontractor or subconsultant shall comply with California Labor Code Section 1735, which reads as follows:

Section 1735. "No discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, or sex of such persons, except as provided in Section 12940 of the Government Code, and every contractor for public works violating this Section is subject to all the penalties imposed for violation of this chapter."

Contractor agrees that it shall not discriminate against any person on account of their sex, race, color, religious creed, ancestry, national origin, disability, medical condition, marital status, age, gender, military or veteran status, genetic information, or sexual orientation in violation of the Fair Employment and Housing Act or the Unruh Civil Rights Act. Upon a final determination by a court of competent jurisdiction that the Grantee has violated either of these Acts, the CITY may, at its option, (1) withhold payments to Contractor under this Agreement until Contractor complies; or (2) suspend or terminate this Agreement. Contractor shall include the provisions of this paragraph in every subcontract, including procurement of materials and lease of equipment, unless specifically exempted by the CITY.

5.6.5 Asbestos Related Work

All work involving asbestos containing material must be performed in accordance with California Labor Code, Sections 6501.5 through 6510, inclusive, and California Administrative Code, Title 8, Section 5208 and all other pertinent laws, rules, regulations, codes, ordinances, decrees and orders.

5.6.6 Compliance with Environmental Laws

During construction, the Contractor shall comply with all pertinent requirements of Federal, State, and local environmental laws and regulations, including, but not limited to, the Federal Clean Air Act, State and local air pollution and noise ordinances, construction site erosion control regulations.

5.6.7 Public Records Act

5.6.7.1 Ownership and Disclosure

Except as otherwise provided herein, all records, documents, drawings, plans, specifications, and all other information relating to the conduct of CITY'S business, including information submitted by the Contractor ("Records"), shall become the exclusive property of CITY and shall be deemed public records. Said Records are subject to the provisions of the California Public Records Act (Government Code § 6250 et seq.). The CITY'S use and disclosure of its records are governed by this Act. The CITY will use its best efforts to inform the Contractor of any request for any financial records or documents marked "Trade Secret," "Confidential" or "Proprietary" provided by the Contractor to CITY. The CITY will not advise as to the nature or content of documents entitled to protection from disclosure under the California Public Records Act.

5.6.7.2 Litigation Related to Disclosure

In the event of litigation concerning the disclosure of any Records, CITY'S sole involvement will be as a stakeholder, retaining the Records until otherwise ordered by a court. The submitting party, at its sole

expense and risk, shall be fully responsible for any and all fees for prosecuting or defending any action concerning the Records and shall indemnify and hold CITY harmless from all costs and expenses including attorney's fees in connection with any such action.

5.7 Certified Electricians

Workers performing work for an electrical contractor installing, constructing, or maintaining any electrical system covered by the National Electrical Code shall be certified as a General Electrician per California Labor Code Section 3099.

5.8 Contractor's Safety Responsibility

The Contractor shall be solely and completely responsible for conditions of the jobsite, including safety of all persons and property during performance of the Work. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to U.S. Department of Labor (OSHA), the California Occupational Safety and Health Act (Cal OSHA), and all other applicable Federal, State, County, and local laws, ordinances, codes, including but not limited to the requirements set forth in Article 12 – SAFETY: PROTECTION OF PERSONS AND PROPERTY, and any regulations that may be detailed in other parts of these Contract Documents. In the event of conflicting requirements, the most stringent requirement as it pertains to the Contractor's safety responsibility, shall be followed by the Contractor. Refer to Article 12 - SAFETY: PROTECTION OF PERSONS AND PROPERTY

5.9 Nonstandard Working Hours

The Contractor may be required to prosecute the Work at night or outside of the normal working hours defined in Section 01130-1.3.c Hours of Work and Overtime. Such work may be required due to project or operational constraints as defined in Section 01130 or if emergencies arise as provided for in Article 5.5.3-Provisions for Handling Emergencies. When required, ordered, or permitted to work at night, the Contractor shall provide sufficient and satisfactory lighting and other facilities therefore. Except as provided in 5.5.3-Provisions for Handling Emergencies, for work outside of the normal working hours, the Contractor shall receive no extra payment, but compensation shall be considered as having been included in the GMP stipulated for the Work, except for authorized work performed outside of the Agreement.

5.10 Cooperation with Other Contractors

This paragraph shall serve as notice to the Contractor that the CITY may allow other contracts for other work at or near the Site of this Work. The Contractor shall afford other Contractors reasonable opportunity for the delivery and storage of their materials and the execution of their work, and shall properly connect and coordinate its work with theirs.

Should construction be under way by other forces or by other Contractors within or adjacent to the limits of the work or in the vicinity of the work to be done under this Agreement, the Contractor shall so conduct its operations as to interfere to the least possible extent with the work of such other forces or Contractors.

Any difference or conflicts which may arise between the Contractor and any other forces or Contractors, creating delays or hindrance to each other, shall be adjusted as determined by the Construction Manager.

ARTICLE 6 - SUBCONTRACTORS

6.1 Incorporation of Contract Documents

CONTRACTOR may enter into Subcontracts with various Subcontractors for portions of the Work. The Subcontracts shall require each Subcontractor, to the extent of the Work to be performed by such Subcontractor, to assume towards CONTRACTOR all the obligations and responsibilities which CONTRACTOR assumes towards CITY. All Subcontracts shall incorporate the terms of this Agreement and the Contract Documents to the extent applicable to the Work to be performed by the Subcontractor.

6.2 Approval of Subcontractors

Those portions of the Construction Work that the CONTRACTOR does not intend to perform with CONTRACTOR's own personnel shall be performed under Subcontracts. A proposed list of Subcontractors shall be submitted to CITY for approval. Proposed Subcontractors will be deemed accepted unless CITY objects in writing within five (5) days after submission by CONTRACTOR.

ARTICLE 7 - TIME AND PROGRESS OF THE WORK

7.1 Commencement of Work

Within five (5) calendar days after execution of the Agreement, written Notice to Proceed will be issued by the City to Contractor. Notwithstanding other provisions of the Agreement, the Contractor shall not be obligated to perform the Work, and the City shall not be obligated to accept or pay for such Work performed by the Contractor, prior to City's issuance of the Notice to Proceed. The Contractor shall provide the required Agreement bonds and evidences of insurance prior to the City's execution of this Agreement and prior to commencement of any Work.

The Contractor shall commence execution of the Work within five (5) days after the date established in the Notice to Proceed for the commencement of Contract Time.

The Contractor shall give the Construction Manager written notice not less than five (5) working days in advance of the actual date on which the Work is to begin on the Site (excluding Preconstruction Services performed under the Agreement) will be started. The Contractor shall be entirely responsible for any delay in the Work which may be caused by its failure to give such notice.

7.2 Contract Time

All time limits for Substantial Completion, and Final Completion as stated in the Contract Documents are of the essence of the Agreement. The counting of Working or Calendar Days shall begin five (5) Calendar Days from the date of the Notice to Proceed. The Contractor shall prosecute the Work so that the various portions of the Work shall be complete and ready for use within the times specified in Exhibit H-COMPLETION TIMES AND LIQUIDATED DAMAGES. It is expressly understood and agreed by and between the Contractor and the City that the Contract Time(s) for Contract Milestones, Substantial Completion of the Work and for Final Completion are reasonable times taking into consideration the average climatic and economic conditions and other factors prevailing in the locality and the nature of the Work known as of the date this Agreement is entered into.

7.3 Delays

7.3.1 Notice of Delays

When the Contractor foresees a delay in the prosecution of the Work and, in any event, promptly upon the occurrence of a delay to its Work, the Contractor shall notify the Construction Manager in writing of the occurrence of delay, providing the estimated extent of the delay and its cause. The Contractor shall take immediate steps to prevent or mitigate, if possible, the occurrence or continuance of the delay.

The Contractor agrees that no claim shall be made for any occurrence of delay that is not the subject of a written notice and that is not submitted to the attention of the Construction Manager within ten (10) calendar days of its occurrence. The City may accept a delay with more than ten (10) calendar days of notice if the City finds that the Contract was acting in good faith and the City was not prejudiced by the Contractor's failure to timely provide the required notice.

7.3.2 Non-Excusable Delays

Non-excusable delays in the prosecution of the Work are delays which were caused by the Contractor, or by its subcontractors and suppliers, at any tier level, or delays which could have been avoided by the exercise of care, prudence, and diligence on the part of the Contractor or its subcontractors or suppliers, at any tier level. The Contractor shall receive no compensation or time extension for such delay. The determination of Non-Excusable Delays shall be made solely by the Construction Manager. In the event that the Contractor is not in agreement with the Construction Manager's decision, the Contractor may appeal the decision by submitting to the City (for consideration), evidence that supports the Contractor's claim for an Excusable Delay consideration.

7.3.3 Excusable Delays

Excusable Delays in the prosecution or completion of the Work are delays which are not caused by or within the control of Contractor and which could not have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the Contractor or its subcontractors or suppliers, at any tier level. In addition, before a delay will be deemed an "Excusable Delay," the delay must prevent the Contractor from proceeding with at least seventy-five (75%) percent of the normal labor and equipment force for at least five (5) hours per day toward completion of the current critical activity item(s) on the latest approved progress schedule submitted by Contractor in accordance with the Contract Documents. The Contractor shall receive no compensation for such delay unless such delay also qualifies as a Compensable Delay, as described below. The following are examples of Excusable Delays:

A. Site Availability; Failure or inability of CITY to make available any or all of the Site in accordance with the requirements of the Schedule.

B. Regulatory and Governmental Authority; Failure or inability of CITY or CONTRACTOR to obtain necessary zoning changes, variances, code changes, permits or approvals from any governmental authority, or failure to obtain any street or alley vacations required for the performance of the Work, except to the extent due to the fault or neglect of CONTRACTOR.

C. Separate Contractor's Acts or Omissions; Delays resulting solely from the acts or omissions of Separate Contractors; provided however, only to the extent Separate Contractors perform their work improperly and not in accordance with any applicable critical path schedule.

D. Force Majeure; Delays resulting from Force Majeure.

E. Differing Site Conditions; Differing, unusual or concealed site conditions that could not reasonably have been anticipated by CONTRACTOR in preparing the Schedule.

F. Hazardous Materials; Delays resulting from the existence or discovery of Hazardous

Materials on the Site not brought to the site by CONTRACTOR or any Subcontractor.

G. Applicable Laws; Delays resulting from changes in Applicable Laws occurring after the date of execution of this Agreement.

H. CITY Acts or Omissions; Delays occurring solely due to the acts or omissions of CITY and those within the control of CITY, including, but not limited to, Separate Contractors.

I. Abnormal Delays; Delays caused by fire, unusual storms, floods, tidal waves, earthquakes, strikes, labor disputes, freight embargoes, and shortages of materials shall be considered as Excusable Delays insofar as they prevent the Contractor from proceeding with at least seventy-five (75%) percent of the normal labor and equipment force for at least five (5) hours per day toward completion of the current critical activity item(s) on the latest favorably reviewed progress schedule.

J. Weather Delays; Delays caused by inclement weather conditions or the conditions resulting from inclement weather shall be considered as "Excusable Delays" if they prevent the Contractor from proceeding with seventy-five (75%) percent of the normal labor and equipment force engaged in the current critical activity item for a period of at least five (5) hours per day toward completion of such operation or operations, and the crew is dismissed as a result thereof.

K. Material Shortages; Upon the Contractor's submission of satisfactory proof to the Construction Manager, shortages of material may be considered an "Excusable Delay" upon the satisfaction of the conditions set forth herein. The Contractor must demonstrate that the Contractor has made every effort to obtain such materials from all known sources within reasonable reach of the proposed Work. Only the physical shortage of material, caused by unusual and unforeseeable circumstances, will be considered as eligible for an "Excusable Delay," and no consideration will be given to any claim that the material could not be obtained at a reasonable, practical, or economical cost or price, unless it is shown to the satisfaction of the Construction Manager that such material could have been obtained only at exorbitant prices entirely out of line with current rates, taking into account the quantities involved and usual practices in obtaining such quantities. A time extension for shortage of material will not be considered for material ordered or delivered late or whose availability is affected by virtue of the Contractor's or its subcontractor's or supplier's mishandling of the procurement for such material. The above provisions apply equally to equipment to be installed in the Work. Nothing herein is intended to affect the Contractor also needing to demonstrate that the delay must prevent the Contractor from proceeding with at least seventy-five (75%) percent of the normal labor and equipment force for at least five (5) hours per day toward completion of the current critical activity item(s) on the latest favorably reviewed progress schedule.

7.3.4 Compensable Delays

Compensable Delays in the prosecution or completion of the Work are delays which meet each of the following three elements: (1) delays which result from causes beyond the control of the Contractor and which could not have been avoided by the reasonable exercise of care, prudence, and diligence on the part of the Contractor or its subcontractors or suppliers, at any tier level; (2) delays that prevent the Contractor from proceeding with at least seventy-five (75%) percent of the normal labor and equipment force for at least five (5) hours per day toward completion of the current critical activity item(s) on the latest approved progress schedule; and (3) delays that are caused by one of the following three causes:

A. CITY Acts or Omissions; Delays due to the actions and/or inactions of the City, Construction Manager, Engineer or any of their agents or employees.

B. Differing Site Conditions; Delays due to differing site conditions as defined in Article 7.3.3.E-DIFFERING SITE CONDITIONS.

C. Separate Contractor's Acts or Omissions; Delays due to other contractors employed by the City who interfere with the Contractor's prosecution of the Work as defined above.

7.3.5 Concurrent Delays

Concurrent delays are those delay periods when the prosecution of the Work is delayed during the same period of time due to causes from a combination of the delays defined in Article 7.3.2-NON-EXCUSABLE DELAYS, Article 7.3.3-EXCUSABLE DELAYS, or Article 7.3.4-COMPENSABLE DELAYS. During such concurrent delay periods, time extensions will be granted in accordance with Article 7.4-TIME EXTENSIONS; however, the Contractor will be granted a non-compensable time extension, and the City shall not assess its actual costs as defined in Article 7.4.1-NON-EXCUSABLE DELAYS**,** nor will the City assess Liquidated Damages.

7.4 Time Extensions

7.4.1 Non-Excusable Delays

The Contractor shall receive no compensation or time extension for Non-Excusable Delays.

7.4.2 Excusable or Compensable Delays

If the Contractor is delayed in the performance of its Work as defined in Article 7.3.3-EXCUSABLE DELAYS, or Article 7.3.4-COMPENSABLE DELAYS, then the Contract Time(s) will be extended by the City for such time that, the Contractor shows, and the City agrees (which agreement will not be unreasonably withheld), the Project's critical path completion dates will be delayed, provided that the Contractor strictly fulfills the following:

A. The Contractor shall have provided written notification, in accordance with Article 7.3.1-NOTICE OF DELAYS;

B. The Contractor shall have submitted in writing a request for an extension of time to the Construction Manager stating at a minimum the cause of the delay and the estimated number of days being requested. The Contractor's request for a time extension shall be submitted within fifteen (15) days of the Contractor furnishing its written notice pursuant to Article 7.3.1-NOTICE OF DELAYS. In the case of an Excusable Delay or Compensable Delay that allegedly is impacting the Contractor's operations for a period longer than fifteen (15) days, the Contractor shall update its request for a time extension, including updating its time impact analysis, every thirty (30) days until the delay is no longer allegedly impacting the Contractor's operations.

C. If the Contractor maintains that the delay at issue is a Compensable Delay, the Contractor shall submit an estimate of the additional compensation for Field Overhead and Indirect Home Office Overhead (per Article 7.4.4-FIELD OVERHEAD AND INDIRECT HOME OFFICE OVERHEAD FOR COMPENSABLE DELAYS that it is seeking in regard to the alleged delay. This estimate shall be included with the Contractor's request for time extension that is described in paragraph B, above. In the case of a Compensable Delay that allegedly is impacting the Contractor's operations for a period longer than fifteen (15) days, the Contractor shall update its estimate of additional compensation every thirty (30) days until the delay is no longer allegedly impacting the Contractor's operations.

D. If requested by the Construction Manager, the Contractor shall provide sufficient

information to the Construction Manager to assess the cause or effect of the alleged delay (as well as additional compensation in the case of Compensable Delay), or to determine if other concurrent delays affected the Work. Such additional information shall be furnished within fifteen (15) days of the Construction Manager's request for additional information.

E. Time extensions due to Excusable or Compensable Delays will be granted only if such delays involve controlling critical path operations which would prevent completion of the whole Work within the specified Contract Time(s), as described in the above conditions for determination of "Excusable Delay" or "Compensable Delay."

Construction Manager will, in writing, approve or reject the Contractor's request for a time extension within fifteen (15) days of the latter of (i) the Construction Manager's receipt of the Contractor's complete request for a time extension; or (ii) the Construction Manager's receipt of the additional information referenced in paragraph C, above. If Construction Manager does not provide a written response within such fifteen (15) day time period, the Contractor's request shall be deemed denied by the City.

If the Construction Manager determines that the Contractor is entitled to a time extension, during such approved extension of time, neither extra compensation for engineering, inspection and administration nor damages for delay will be charged to the Contractor.

7.4.3 Weather Delays

For Weather Delays, the Contractor will be granted a non-compensable time extension for weather caused delays, pursuant to Article 7.3.3.J-WEATHER DELAYS, over and above an allowance as provided for in Exhibit H-Completion Times and Liquidated Damages. No time extensions for weather delays will be granted until the total number of weather days exceeds this allowance.

Should the Contractor fail to complete the Work within the time specified in the Agreement, as extended in accordance with this clause if appropriate, the Contractor shall pay to the City liquidated damages in accordance with Article 7.5-Liquidated Damages.

7.4.4 Field Overhead and Indirect Home Office Overhead for Compensable Delays

The Contractor shall be compensated for field overhead and indirect home office overhead expenses due to Compensable Delays for periods of time when the Work is delayed as defined in Article 7.3.4-COMPENSABLE DELAYS. However, no payment shall be made for compensable delays which occur during a concurrent delay as defined in Article 7.3.5-CONCURRENT DELAYS. As a condition precedent to payment for field overhead and indirect home office overhead, the Contractor must fulfill all conditions as provided in Article 7.4.2-EXCUSABLE OR COMPENSABLE DELAYS. Compensation will be calculated in accordance with 7.4.4.1 and 7.4.4.2 below. No additional markup for overhead or profit shall be provided for such field overhead and indirect home office overhead expenses.

Payment to the Contractor for indirect overhead expenses will be made only if the extended Contract Time period granted for the compensable delay(s) is required to complete the Work following the depletion of the original Contract Time period and any time extensions granted other than compensable time extensions. Payment for field overhead and indirect home office overhead shall be calculated as follows:

7.4.4.1 Field Overhead

For those allowable delay periods as described in Article 7.4.4-FIELD OVERHEAD AND INDIRECT HOME OFFICE OVERHEAD FOR COMPENSABLE DELAYS, the Contractor shall be reimbursed for its field overhead based on:

A. Actual invoice costs for on-site field offices and temporary utilities as described in Section 015000, TEMPORARY FACILITIES AND UTILITIES.

B. Actual labor costs as shown in Exhibit C**,** GUARANTEED MAXIMUM PRICE, COST OF WORK AND FEE, for field office staff.

C. Fair rental values acceptable to the Construction Manager as described in Article 9.6-Cost Determination, for construction equipment idled due to the delay.

D. Actual Errors and Omissions insurance costs attributable to delay periods.

7.4.4.2 Indirect Home Office Overhead

For those delay periods as described in the introduction of Article 7.4.4-FIELD OVERHEAD AND INDIRECT HOME OFFICE OVERHEAD FOR COMPENSABLE DELAYS, the Contractor shall be reimbursed for its indirect home office overhead based on the following formula:

[Guaranteed Maximum Price ($) divided by the Contract Time Period (Calendar Days)] x 0.03 = Daily Indirect Home Office Overhead ($/Calendar Day)

As it is impractical to determine the actual home office overhead, such reimbursement shall encompass full payment for any and all indirect home office overhead expenses for such periods of time for the Contractor and all subcontractors. Distribution of the markup amount among the Contractor and all subcontractors and suppliers is the responsibility of the Contractor.

7.5 Liquidated Damages

City and the Contractor recognize that time is of the essence of this Agreement and that the City will suffer financial loss if the Work is not completed within the times specified in Exhibit H-COMPLETION TIMES AND LIQUIDATED DAMAGES**,** plus any extensions thereof allowed in accordance with Article 7.4-TIME EXTENSIONS. It is hereby understood and agreed that it is and will be difficult and/or impossible to ascertain and determine the actual damage which the City will sustain in the event of and by reason of the Contractor's failure to fully perform the Work or to fully perform all of its Agreement obligations that have accrued by the times for completion as specified in Exhibit H-COMPLETION TIMES AND LIQUIDATED DAMAGES.

It is, therefore, agreed in accordance with California Government Code Section 53069.85 that the Contractor will forfeit and pay to the City liquidated damages in the amount set forth in Exhibit F, COMPLETION TIMES AND LIQUIDATED DAMAGES, per day for each and every calendar day that expires after the times for completion specified for each construction milestone except as otherwise provided by extension of time pursuant to Article 7.4-TIME EXTENSIONS. It is further understood and agreed in accordance with California Government Code Section 53069.85 that the liquidated damages sum specified in this provision is not manifestly unreasonable under the circumstances existing at the time this Agreement was made, and that the City may deduct liquidated damages sums in accordance with this provision from any payments due or that may become due the Contractor.

Liquidated damages will continue to accrue at the stated rate until the completion of any defined completion milestone(s) and Final Completion of Work, all as set forth in Exhibit H, COMPLETION TIMES AND LIQUIDATED DAMAGES. Accrued liquidated damages may be deducted by the City from amounts due or that become due to the Contractor for performance of the Work. Liquidated damages may not be waived or reduced by the City unless expressly waived or reduced in writing by the City.

ARTICLE 8 - PAYMENT AND COMPLETION

8.1 Guaranteed Maximum Price ("GMP") and GMP Shared Savings

CITY shall pay for CONTRACTOR's performance under this Agreement the Cost of the Work and Fee (as described in Exhibit C-GUARANTEED MAXIMUM PRICE, FEE, AND COST OF WORK hereto); provided, however, that the sum of the Cost of the Work and the Fee shall not exceed the GMP, as adjusted by Change Order/Directive in accordance with the Contract Documents. CONTRACTOR bears the risk of its increased costs due to market price increases (including escalating costs for materials).

8.2 Shared Savings

CONTRACTOR shall be compensated for actual work completed based on the Cost of Work and Fee up to the amount of the GMP. If CONTRACTOR's actual total Cost of the Work and Fee is less than the GMP, upon Final Completion, the CONTRACTOR shall be entitled to receive a negotiated percentage of the GMP Savings as described in Exhibit C-GUARANTEED MAXIMUM PRICE, FEE, AND COST OF WORK hereto. "GMP" Savings shall mean the positive difference, if any, when the actual Total Cost of the Work and Fee is subtracted from the GMP; provided, however, that unused Allowance monies, if any, shall not be subject to shared savings.

8.3 Schedule of Values

Contractor will be required to submit a complete schedule of values upon selection of proposal to facilitate contract negotiation within ten (10) days of notice. Schedule of values should set forth the various portions of the Work, and the portions of the GMP allocated to each portion.

8.4 Applications for Payment

CONTRACTOR shall deliver to CITY not more than once each month an Application for Payment covering the Cost of Work and Fee applicable to the Work performed during the immediately preceding month. With each Application for Payment CONTRACTOR shall submit such evidence as may be necessary to demonstrate costs incurred on account of Cost of the Work during such month and the percentage of completion of each category of Work. CITY may reject requests for payment, or portions thereof, for Work, or portions thereof, not performed or completed.

8.5 Amount of Progress Payments

CITY shall pay CONTRACTOR the actual Cost of the Work and Fee, if any, through the period covered by the Application for Payment, less Retention as set forth in Article 8.6 below, provided that the aggregate payment amount before retention will not exceed the percentage of completion of the Work multiplied by the GMP (excluding items of the GMP not subject to retention). CITY may additionally withhold from progress payments such amounts pursuant to stop payment notice claims as required by law and CITY administrative regulation 4.01.

8.6 Retention, Escrow Agreement, Final Payment

Five percent (5%) Retention shall be withheld from each progress payment until the expiration of thirty-five (35) days following the recordation of the notice of completion; provided however, CITY shall continue to retain such amount as required by law and/or CITY administrative regulation 4.01. CONTRACTOR may elect to establish an escrow account for securities in-lieu of the five percent (5%) Retention in a form of escrow agreement compliant with law and subject to approval by the CITY

Attorney (form of escrow agreement is attached as Exhibit F–IN LIEU OF SECURITIES ESCROW AGREEMENT. Release of Retention monies shall constitute the Final Payment.

8.7 Early Release of Subcontractor Retention. [reserved]

8.8 Payment for On-Site and Off-Site Stored Materials.

8.8.1 Payment for Materials:

8.8.1.1 Payment may be made for those materials delivered to the site but not incorporated in the work to the extent that the materials are included in the Construction Schedule as cost-loaded material delivery activities.

8.8.1.2 Payment for materials delivered will not be made before the respective shop drawings, installation instructions and O&M manuals have been submitted, reviewed, and accepted in accordance with Section 01330, Submittal Procedures.

8.8.1.3 To receive payment for materials delivered to the site, but not incorporated in the work, it shall be necessary for the CONTRACTOR to submit to the ENGINEER, at least 7 days prior to the end of said month, a list of such materials.

8.8.1.4 At their sole discretion, the ENGINEER will approve items for which payment as for On-Site and Off-Site Stored Materials is to be made.

8.8.1.5 The list of materials and invoices shall be clearly identified by referencing the associated activity on the cost loaded schedule.

8.8.1.6 Payment for materials delivered to the site or a bonded warehouse will be made in an amount equal to the respective suppliers' invoices(s) for the actual net cost for the item(s) delivered plus delivery charges in accordance with payment terms of the Agreement.

8.8.1.7 The CONTRACTOR's actual net cost for the materials must be supported by invoices of suppliers.

8.8.2 Proper storage and protection of materials shall be provided by the CONTRACTOR. Final payment shall be made only for materials actually incorporated in the work and, upon acceptance of the work, all materials remaining for which advance payments had been made shall revert to the CONTRACTOR, unless otherwise agreed, and payments made for these items shall be deducted from the final payment for the work.

8.9 Title to Construction Work

CONTRACTOR warrants that title to all Construction Work covered by an Application for Payment shall pass to CITY no later than the time of payment. CONTRACTOR further warrants that upon submittal of an Application for Payment, all Construction Work for which Applications for Payment have been previously issued and payments received from CITY shall, to the best of CONTRACTOR's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of CONTRACTOR, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials or equipment relating to the Construction Work.

8.10 Withholding of Payment

CITY may withhold payment on account of an Application for Payment if required or authorized by any Applicable Law, or to the extent necessary to protect CITY from loss because of:

A. defective Work not remedied;

B. third party claims filed or reasonable evidence indicating probable filing of such claims;

C. failure of CONTRACTOR to make payments of undisputed amounts to Subcontractors for labor, materials or equipment;

D. damage to CITY or to a Separate Contractor caused by the fault or neglect of CONTRACTOR to the extent not reimbursed by insurance; or

E. reasonable evidence that the Work will not be Substantially Completed within the Contract Time due to Inexcusable Delay, and that the unpaid balance of the GMP would not be adequate to cover liquidated damages for the anticipated Inexcusable Delay.

8.11 Failure of Payment; Interest

In accordance with Public Contract Code §20104.50, CITY shall pay CONTRACTOR interest on any progress payment, which is made by CITY more than thirty (30) days after CITY receives an undisputed and properly submitted written payment request. Said interest shall be equal to the rate set forth in Code of Civil Procedure §685.010(a), and shall begin to accrue upon the expiration of said thirty (30) day period. Any written request for a progress payment which CITY determines to be disputed, improper or not suitable for payment for any reason shall be returned to CONTRACTOR within seven (7) days after receipt by CITY, along with a written statement of the reason or reasons why such request is disputed, improper or not suitable for payment.

8.12 Occupancy by CITY Prior to Acceptance

CITY reserves the right to Beneficial Occupancy and without charge by CONTRACTOR. In those areas of the Work which are completed, CITY may store materials, equipment, and supplies, and may perform partial operation.

8.13 Substantial Completion

When CONTRACTOR considers the entire Work complete and ready for its intended use, CONTRACTOR shall certify in writing to CITY that the entire Work is substantially complete provide CITY with a Certificate of Substantial Completion. Within a reasonable time thereafter, CITY and CONTRACTOR shall make an inspection of the Work to determine the status of completion. If CITY does not consider the Work substantially complete, CITY will notify CONTRACTOR in writing giving reasons therefor. If CITY considers the Work substantially complete, CITY will accept a corresponding partial Certificate of Substantial Completion. There shall be attached to the Certificate a Punch List of items to be completed or corrected before Final Acceptance and Final Payment.

8.14 Final Completion

When the Work is fully completed, CONTRACTOR shall provide CITY with a Certificate of Final Completion and shall request final inspection in writing. Additionally, CONTRACTOR shall provide legally effective releases or waivers satisfactory to CITY of all lien rights arising out of or liens filed in connection with the Work. Within ten (10) calendar days of receipt of such completed request form, CITY shall make final inspection. If following final inspection, CITY determines that the Work (including all Punch List items) has been fully completed, CITY will process a Notice of Completion. If CITY determines that the Work is not complete after receipt of certification from CONTRACTOR, CONTRACTOR shall be notified in writing of deficiencies. After the deficiencies have been corrected, the procedure for final inspection as set forth above shall again be initiated by CONTRACTOR. In the

event CITY determines the Work is fully completed, CITY shall initiate process of attaining a notice of completion.

8.15 Waiver of Claims at Final Payment

Acceptance of final payment by CONTRACTOR shall constitute a waiver of all claims by CONTRACTOR, except those previously made in writing and identified as unsettled at the time of final payment.

8.16 Construction Allowance Items

CONTRACTOR must have prior written authorization from CITY to begin work on allowance item scope. Upon approval of an invoice for work covered by an allowance item, the CITY shall pay for CONTRACTOR's performance under this Agreement the actual Cost of the Work and Fee (as described in Exhibit D - CONSTRUCTION ALLOWANCE ITEMS AND AMOUNTS hereto). When the approved invoices for the actual Cost of the Work is more or less than the amount of an allowance item, the Contract GMP will be adjusted by Change Order; provided, however, that the sum of the actual total cost of each allowance item shall not exceed the approved Allowance Amount of each, as adjusted by Change Order/Directive in accordance with the Contract Documents.

8.17 Contingency [reserved]

8.18 Audits and Access to Records.

The Contractor must maintain all books, records, documents, and other evidence directly pertinent to the performance of the Work in accordance with generally accepted accounting principles and practices. The Contractor must also maintain all financial information and data used by the Contractor in the preparation or support of any cost submission, including the Contractor's estimate, any Change Order, Dispute, Claim, Pay Application, or other request for equitable adjustment. City and its representatives will have access upon five (5) business days advanced written notice, during normal business hours, to all Contractor's books, summary reports, records, accounts, estimates, documents, detailed financial information, certified payroll records, AIS records and all other information and documentation relevant to the Work for the purposes of inspection, audit, and copying. The Contractor will, at no cost to City, provide reasonable facilities for such access, and inspection purposes. The City will arrange for and pay all costs of copying.

The Contractor agrees to include and make the requirements of this article, applicable to all subcontractors listed in their DESIGNATION OF SUBCONTRACTORS list.

Audits conducted pursuant to this article, will be in accordance with general accepted auditing standards and established procedures and guidelines of the reviewing or audit agency.

The Contractor agrees to provide requested information and reports resulting from access to records to City, subject to execution of an appropriate confidentiality order if requested.

Records must be maintained and made available during the performance of the Work and for four (4) years after Final Payment, and until final settlement of all Disputes or Claims, whichever occurs later.

The right of access provisions of this article, applies to all financial records pertaining to the Agreement:

A. To the extent the records pertain directly to Agreement performance;

B. To the extent required for verification of the costs incurred where such costs are the basis for billings pursuant to the Agreement including Change Orders;

C. To the extent there is credible evidence that Contractor has violated the federal False Claims Act and the California False Claims Act or that fraud, gross abuse, or corrupt practices may be involved; and

D. If the Agreement is terminated for default or convenience.

Access to records is not limited to the required retention periods. City's Authorized Representative or designee must be granted access to records at any reasonable time for as long as the records are required to be maintained.

In the event that City's audit determines that Contractor has billed for any costs that are ineligible for reimbursement or for any reason should not have been paid, or the Contractor's fee has been improperly applied or calculated, Contractor shall promptly refund all improper payments following receipt of City's written notice and explanation of the alleged overpayments or improper fee and shall be responsible to pay City for the City's reasonable costs to perform the audit unless the Contractor establishes that the overpayment or improper fee was the result of an unintentional, inadvertent clerical error.

ARTICLE 9 - CHANGES IN THE WORK

9.1 Contract Held Valid.

Any change in the Scope of Work or deviation from the Contract Documents including, without limitation, Extra Work or Omitted Work, shall not invalidate the original Contract, and shall be performed under the terms of the Contract Documents. The difference in cost of the work affected by such change will be added to or deducted from the Guaranteed Maximum Price (GMP), as the case may be.

9.2 Execution of Changes

A. Only the Contractor or the City may initiate changes in scope of Work or deviation from Contract Documents.

B. Changes in the Work may be accomplished after execution of the Contract where they are documented by an executed Field Directive, Field Order, or Change Order in accordance with applicable provisions of the Contract Documents.

C. Changes in the Work shall be performed under applicable provisions of the Contract Documents. If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a proposed Change Order or Change Directive that application of such unit prices to quantities of Work proposed will cause substantial inequity to CITY or CONTRACTOR, the applicable unit prices for such change order/directive shall be equitably adjusted. No GMP adjustment on account of a Change Order shall include CONTRACTOR's or Subcontractor's profit, Fee, home office overhead or a formula allocation of indirect costs unless otherwise specifically allowed hereunder.

D. The prices agreed upon and any agreed upon adjustment in Contract Time shall be incorporated in the written order issued by the City, which shall be written so as to show acceptance on the part of the Contractor as evidenced by its signature. By signature of the Change Order, the Contractor acknowledges that the adjustments to the GMP and Contract Time contained in the Change Order are in full satisfaction and accord and so waives any right to claim any further cost and time impacts at any time during and after completion of the Contract for the changes encompassed by the Change Order.

9.3 Definitions

9.3.1 Incidental Work

Incidental work includes reasonably implied parts of the work not shown on Drawings nor described in Specifications, but which is necessary or normally or customarily required as a part of the Work shown on the Drawings or described in the Specifications to provide a complete installation which is fully connected and tied into the existing facilities and processes and is fully functional and operational. Incidental work shall be treated as if fully described in Specifications and shown on Drawings, and expense thereof shall be included in the Guaranteed Maximum Price (GMP). Incidental work shall be performed by Contractor and included in the Cost of the Work without an increase in the GMP.

9.3.2 Extra Work

New or unforeseen work, or added work of a different character or function; or that involves revisions of the details of the Work on which Contractor based its GMP. If the extra work increases the Contractor's Cost of the Work and/or time to perform the Work, and is approved by the City via a written Change Order, the GMP and/or Contract Times shall be adjusted as provided in the Contract Documents. Extra Work shall not include Work which is shown, detailed or specified in the Contract Documents or which constitutes "Incidental Work" as defined within the Contract Documents definition above.

9.4 Change Directives

Changes in the Work may be directed by a Construction Change Directive prepared and signed by the OWNER'S REPRESENTATIVE. A Construction Change Directive signed by the CONTRACTOR indicates agreement of the CONTRACTOR with the actions specified in the Directive, including the inclusion or absence of an adjustment in Contract Amount or Contract Time or the method for determining them. The following procedures shall apply with respect to Change Directives.

A. Upon receipt of a Change Directive signed by CITY, CONTRACTOR shall promptly proceed with the change in the Work involved and advise CITY of CONTRACTOR's agreement or disagreement with the method, if any, provided in the Change Directive for determining the proposed adjustment in the GMP or the Schedule. If CONTRACTOR receives a written communication signed by CITY which CONTRACTOR believes is a Change Directive but is not so identified, it shall not proceed with the change in the Work until it receives from CITY a written confirmation that such communication is in fact a Change Directive.

B. A Change Directive signed by CONTRACTOR indicates the agreement of CONTRACTOR with the contents thereof, and shall convert the Change Directive to a Change Order.

C. If CONTRACTOR does not respond promptly or disagrees with the method for adjustment in the GMP or Schedule, the method and adjustment shall be determined as provided in these contract documents. In such case, CONTRACTOR shall keep and present, in such form as CITY may request, an itemized accounting, together with appropriate supporting data.

D. Pending final determination of cost to CITY, amounts not in dispute shall be included in Applications for Payment. The amount of credit to be allowed by CONTRACTOR to CITY for a deletion or change which results in a net decrease in the GMP shall be actual net cost. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for Fee shall be figured on the basis of net increase, if any, with respect to that change.

E. If CITY and CONTRACTOR do not agree with the adjustment in the Schedule or the GMP, such disagreement shall be submitted for dispute resolution in accordance with the provisions of this Contract.

9.5 Contract Modification Procedures

9.5.1 Request for Proposal (RFP)

A. The City may issue a Request for Proposal (RFP) to the Contractor in connection with the City considering an addition to, or deletion from, or other change in the Work. RFPs shall not be deemed to be directions to proceed with any addition, deletion or change to the Work.

B. Whenever the Contractor is required to prepare a cost proposal in response to an RFP, and whenever Contractor is entitled to submit a cost proposal and elects to do so, Contractor shall prepare and submit to City for consideration a cost proposal using a form provided by the CM or the Contractor may submit another form if deemed acceptable to the Construction Manager. All cost proposals must contain a complete breakdown of costs of credits, deducts, and extras; and itemize materials, labor, equipment, special services, taxes, and markups. All Subcontractor Work shall be so indicated. Individual entries on the Cost Proposal form shall follow the cost items defined in Cost Determination in this Section. The Contractor shall provide all required cost information requested by an RFP within fourteen (14) days after receiving the RFP.

C. Upon receipt of the Contractor's cost proposal, which shall include a detailed itemized breakdown as prescribed in this Section, the Construction Manager will act promptly thereon. If Construction Manager takes no exception to the cost proposal, Construction Manager will prepare Change Order for City and Contractor signatures, provided that City has elected to proceed with the changed Work. If a cost proposal is not acceptable to the Construction Manager, the Construction Manager will indicate to Contractor the unacceptable items in the proposal. Except as otherwise provided in this Section, Contractor shall have seven (7) days in which to respond to Construction Manager with a revised cost proposal.

D. If the parties do not agree on the price or time adjustment in response to an RFP, City may issue a unilateral change order pursuant to the Agreement, Article 9.5.3-FIELD ORDER-FORCE ACCOUNT WORK. Contractor shall perform the changed Work, notwithstanding any claims or disagreements of any nature, with the understanding that it preserves all rights to pursue adjustments to the GMP and/or Contract Time in connection with the change.

E. When the necessity to proceed with a change does not allow the Construction Manager sufficient time to conduct a proper check of the Contractor's cost proposal (or revised cost proposal), Construction Manager may order Contractor to proceed with the change, with the understanding that parties will negotiate in good faith to determine the value of the change at the earliest practical date. In this event, the value of change, with corresponding equitable adjustment to the GMP, shall not be more than any increase or less than any decrease proposed by the Contractor's cost proposal.

9.5.2 Field Directive/Supplemental Instruction Resulting from RFI's, Submittals or other instructions from the Engineer and/or City

A. The Contractor may be issued a Field Directive or Supplemental Instructions resulting from an RFI, Submittal or other instructions from the Engineer and/or City.

B. If the Contractor is satisfied with Field Directive or Supplemental Instruction and does not

request change in the GMP or Contract Time, then the Field Directive or Supplemental Instruction shall be executed by the Contractor without a Change Order.

C. If the Contractor believes the Field Directive/Supplemental Instruction results in additional Cost of the Work or a change in the GMP or Contract Time, then Contractor must notify the Construction Manager within ten (10) days following receipt of Field Directive/Supplemental Instruction and before proceeding with this work. If the Construction Manager considers Contractor's notice to be justified, the instructions of the Field Directive/Supplemental Instructions will be revised or a proposed Change Order will be issued for the City's consideration. The Contractor shall have no claim for additional compensation or extension of the schedule because of any such additional instructions unless the Contractor provides the Construction Manager written notice thereof within the time frame specified above, unless the City is not Prejudiced by Contractor's untimely notice In addition, the Contractor shall within fifteen (15) days from the date of the Contractor furnishing written notice provide a detailed justification and analysis as well as estimated pricing and Time Impact Analysis to support any request for time extension. Should the work at issue impact Contractor's operations for a period longer than fifteen (15) days, Contractor shall update its request for additional compensation and/or additional time, every thirty (30) days until the disputed work is no longer allegedly impacting Contractor's operations. In addition, Contractor shall comply with the requirements of the Agreement concerning Records of Disputed Work and Submission of Disputed Work Costs, respectively.

D. Should the Contractor proceed with the work affected before receipt of a response from the Construction Manager, any portion of the work which is not done in accordance with the City's interpretation, clarifications, instructions, or decisions is at Contractor's risk.

E. If the Contractor and Construction Manager still do not agree on the Field Directive's impact to the GMP or Contract Time, then Contractor may appeal to the Engineer for decision. If the Engineer concurs with the Construction Manager's position, the Contractor will be directed again in writing to make the changes covered in the Field Directive/Supplemental Instructions and Contractor shall do so notwithstanding any claims or disagreements of any nature. Contractor may file a Notice of Potential Claim and Claim in accordance with the Agreement.

9.5.3 Field Order- Force Account Work

A. If either the amount of work or payment for a Change Order cannot be determined or agreed upon beforehand, the City may direct by issuing a unilateral Change Order or Field Order that the work be done on a force account basis. The term "force account" shall be understood to mean that payment for the work will be made based on an accounting of the Contractor's Cost of the Work as described in the Agreement, Exhibit C-Guaranteed Maximum Price, Cost of Work and Fee, and Article 9.6-Cost Determination.

B. Prior to the commencement of force account work, the Contractor shall notify the Construction Manager of its intent to begin work. The Contractor shall maintain accurate cost records, separate from the cost categories for the balance of the Work, which depict all costs incurred for the authorized force account work. Upon request by the Construction Manager or City, these cost records must be made available for review as provided in the Agreement.

C. All subcontractors that expend labor, equipment and materials on force account work shall record those costs daily by using a form provided by or approved by the Construction Manager. The subcontractor reports, if found to be correct, shall be signed by the

subcontractor, Contractor and Construction Manager, or inspector, and a copy of which shall be furnished to the Construction Manager no later than the working day following the subcontractor's performance of said work. The Daily Extra Work Report sheet shall thereafter be considered the true record of force account work provided by the subcontractor. If the Construction Manager, or inspector, does not agree with the labor, equipment and/or materials listed on the subcontractor's daily force account report, the Construction Manager, or inspector, shall sign-off on the items on which they are in agreement. The Construction Manager shall then review the items of disagreement and will advise the Contractor, in writing, of its determination. If the Contractor disagrees with this determination, it shall have the right to file a claim notice per the Agreement.

D. The Contractor shall maintain its records in such a manner as to provide a clear distinction between the direct costs of subcontractor work paid for on a force account basis and the costs of other operations.

E. To receive partial payments and final payment for force account work, the Contractor shall submit, in a manner approved by the Construction Manager, detailed and complete documented verification of the Contractor's and any of its subcontractor's Costs of the Work involved in the force account pursuant to the pertinent unilateral Change Order or Field Order. Such costs shall be submitted within thirty (30) days after said work has been performed. No payments will be made for work billed and submitted to the Construction Manager after the thirty (30) day period has expired, unless City is not prejudiced by Contractor's untimely billing and submittal of costs.

9.5.4 Construction Change Directive (CCD)

A. CCD is a written order prepared by the Construction Manager and signed by the City, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Price or Contract Time.

B. If at any time the City believes in good faith that a timely Change Order will not be agreed upon using the foregoing procedures, the City may issue a CCD with its recommended cost and/or time adjustment. Upon receipt of CCD, Contractor shall promptly proceed with the change of Work involved and concurrently respond to City's CCD within ten (10) calendar days.

C. Contractor's response must be any one of following:

1. Return CCD signed, thereby accepting City's response, time, and cost.
2. Submit a (revised if applicable) Cost Proposal with supporting documentation (if applicable, reference original Cost Proposal number followed by letter A, B, etc. for each revision), if City so requests.
3. Give notice of intent to submit a Claim as described in the Agreement.

D. If the CCD provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

1. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation.
2. Unit prices stated in the Contract Documents or subsequently agreed upon.
3. Cost to be determined in a manner agreed by the City and Contractor.
4. Cost to be determined pursuant to Article 9.6-Cost Determination.

E. A CCD signed by Contractor indicates the agreement of Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

F. If Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by Construction Manager on the basis of reasonable expenditures and savings of those performing the Work attributable to the change including, in case of an increase in the Contract Sum, an allowance for overhead and profit in accordance with Articles 9.6.3 and 9.6.4-Allowable Markups. If the parties still do not agree on the price for a CCD, Contractor may file a Claim in accordance with the Agreement. Contractor shall keep and present, in such form as Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this paragraph shall be limited to those provided in Article 9.6-Cost Determination.

G. Pending final determination of cost to the City, amounts not in dispute may be included in Applications for Payment.

9.5.5 Documentation for All Changes

A. Upon request of the Construction Manager, the Contractor shall provide the following information to support the request for change in cost or time:

1. Copy of original quotations, purchase order or invoices to verify costs included in original pricing.
2. Copy of all quotations, purchase order or actual invoices to support new costs submitted.
3. Copy of all insurance and bond costs resulting from change.
4. Copy of all quantity takeoff sheets for materials, labor and equipment.
5. Certified payroll records.
6. A list of equipment with manufacturer's name and model number and the alphanumeric designation used in the Equipment Rental Rates prepared by the California Department of Transportation, unless the equipment is included in the Agreement, Exhibit C-Guaranteed Maximum Price, Cost of Work and Fee.
7. Invoices for all non-owned rental equipment.
8. Other information, as reasonably required, to document the labor, equipment and materials used.

B. Correlation of Other Items:

1. Contractor shall revise Application for Payment forms to record each authorized Change Order or CCD as a separate line item and adjust the GMP on the next monthly progress billing.
2. Contractor shall revise the Progress Schedules prior to the next monthly pay period to reflect the effects of all authorized Change Orders or CCDs.
3. Contractor shall enter changes in Project Record Documents prior to the next monthly pay period and provide a copy to the Engineer with progress billing.

9.6 Cost Determination

With respect to Change Orders which increase or decrease the Scope of Work described in Exhibit B-Contractor's Technical Proposal, are not due to the errors or omissions of CONTRACTOR and are not attributable to Excusable Delays or the contingencies set forth in Article 9.7 below, the GMP shall be increased (or decreased) by the following "Scope Change Costs":

9.6.1 Contractor's Direct Cost Categories

The Contractor's allowed direct costs are found in the Agreement, Exhibit C-Guaranteed Maximum Price, Cost of Work and Fees.

9.6.2 Subcontractor's Direct Cost Categories

The categories described below are defined to be direct costs for subcontractors at all tier levels.

No other type of costs will be allowable as a direct cost. Direct costs shall not include any labor costs or indirect costs pertaining to the subcontractor's managers or superintendents, their office and engineering staffs, the cost of their offices, facilities, vehicles, or anyone not directly employed on such work, nor small tools (as defined in item C-Subcontractor's Construction Equipment Rental Cost of this Article 9.6.2) nor supplies. All such items are considered indirect costs which form a part of the Contractor's and subcontractors' overhead expenses.

A. Subcontractor's Direct Field Labor

1. The cost of labor for workers (including forepersons when authorized by the Construction Manager) used in actual and direct performance of the work by the subcontractor will be the sum of the following:

    a. The actual wages paid plus any employer payments to, or on behalf of workers for fringe benefits including health and welfare, pension, vacation and similar purposes.

    b. All payments imposed by State and Federal Laws including, but not limited to, workers' compensation insurance, and social security payments. The rates used for workers' compensation insurance shall be actual rates paid by the subcontractor for each specific craft and broken down by wage rate if applicable to that craft.

    c. General Liability insurance burden, if applied to subcontractor's payroll. By formal submittal, the subcontractor shall provide adequate backup information to Construction Manager to verify this burden rate is indicative of the actual rates paid by the Contractor as a percent of labor.

2. Except as otherwise may be agreed to in writing by the Construction Manager, the actual wages and benefits paid for manual classifications of subcontractor's on- site workers will not, in the aggregate, be less than the current applicable wage for each classification as established by the State of California Department of Industrial Relations.

3. Specifically prohibited from the subcontractor's labor costs are other payroll burden factors such as small tools (as defined in item C below), bonuses of any kind and safety incentives.

4. Subcontractor shall include the actual travel and/or subsistence costs, if any, as a separate line item under the labor cost category. Except as otherwise may be agreed to

in writing by the Construction Manager, the actual travel and/or subsistence costs will not be less than established in the State of California Department of Industrial Relations.

B. Subcontractor's Materials

1. The cost of all materials, including all factory testing, freight and delivery costs of materials, accepted by the City and used in performing the work will be the cost to the subcontractor from the supplier thereof. All discounts for early payment shall accrue to the subcontractor unless the City's payment to subcontractor is paid to subcontractor before discount payment is due in which case discount savings will be fully credited to City on next progress billing. All rebates and all returns from the sale of surplus materials shall be credited to the Cost of the Work.

2. At the request of the Construction Manager, the subcontractor will obtain more than one quote for materials to be used to complete change order or force account work. Copies of all quotes shall be shown to the Construction Manager.

3. For materials used in construction of the Project which may have additional uses on other projects for the subcontractor's benefit, such as dimensional lumber, beams and plywood to form concrete or temporary diversion pipes, the subcontractor shall submit a material unit cost to cover use of these types of materials for the approval of the City prior to delivery to the Work Site. This unit cost shall take into account the use of such materials on other past and future projects.

C. Subcontractor's Construction Equipment Rental Cost

1. The cost of construction machinery and equipment for changes shall be based on fair rental cost or equivalent rental cost of owned equipment. Such costs will be allowed for only those days or hours during which the equipment is in actual use. Payment shall be based on actual rental and transportation invoices but shall not exceed the rental rates listed for such equipment in the State of California Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates" which is in effect on the date upon which the work is performed. City-operated equipment rates shall not exceed the rates in the aforesaid Rental Rate publication plus the labor costs as provided in this section.

2. The aforesaid rental rates shall be deemed to include the cost of fuel, power, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of all kinds, depreciation, storage, insurance, labor except for construction equipment operators and any and all costs to the subcontractor incidental to the use of such construction equipment. All equipment must be in good working condition and suitable for the purpose for which it is to be used, as judged solely by the Construction Manager. Rental time will not be allowed while equipment is inoperative due to breakdowns.

3. Compensation for idle time of equipment through delays caused by the City will be made consistent with Section 8-1.09, Right of Way Delays, of the Caltrans Standard Specifications.

4. Small Tools. Individual pieces of equipment or tools having a replacement value of $500 or less, whether or not consumed by use, are considered to be small tools and no rental payment will be made unless it can be demonstrated that the particular item is needed and purchased by the subcontractor solely for the completion of the Change Order work.

5. The rental time to be paid for equipment used to complete change order and force account work will be the time the equipment is in operation on the change order or force

account work being performed or an approved outside rental rate from an equipment rental company provided such rental rate was approved by the Construction Manager prior to the equipment's transportation to the project for use in the change order or force account work.

6. For equipment not already on the project site to complete other portions of the Work, loading and transporting costs will be allowed for equipment approved by the Construction Manager to complete change order or force account work. The cost of transporting equipment in low bed trailers shall not exceed the hourly rates charged by established haulers in the area. The cost of transporting equipment shall not exceed the applicable minimum established rates of the California Department of Transportation.

D. Special Services used by Subcontractor

When the Construction Manager and the Contractor, by agreement, determine that special service or item of extra Work cannot be performed by forces of a subcontractor, service or extra Work item may be performed by a specialist. These types of services will be paid based on current market rates, subject to Construction Manager approval, which approval will not unreasonably be withheld.

9.6.3 Allowable Mark-Ups - Contractor

The Contractor's allowed mark-ups are found in Exhibit C Guaranteed Maximum Price, Cost of Work and Fees.

9.6.4 Allowable Mark-Ups – Contractor's Subcontractor(s)

The subcontractors shall be entitled to compensation for indirect field and home office overhead costs, and profit for Change Order work. This compensation shall be in the form of markup percentages applied to the direct cost of the Change Order increase or decrease of work, as further described below. The maximum markup which will be allowed for the subcontractor's combined overhead and profit will be:

A. For work by its own organization, the subcontractor may add up to the following percentages:

- Direct Field Labor: 15 percent
- Materials: 10 percent
- Equipment (owned or rented): 10 percent
- Special Services: 5 percent

B. For all such work done by subtier-subcontractors, such sub-subcontractors may add the same percentages as the subcontractor as listed in (9.6.4.A) above to its actual net increase in costs for combined overhead and profit. The subcontractor may then add up to five percent (5%) of the sub-subcontractor's total for its combined overhead and profit. No additional mark-ups will be allowed for further tier-ed subcontracts below a sub-subcontractor.

C. When both additional and deleted work are involved in any one change order, the combined overhead and profit shall be calculated on the basis of the net change, whether an increase or decrease. For Change Order work which results in a net decrease in cost a minimum of five percent (5%) markup shall be added by the subcontractor to the sum of the direct labor, materials and equipment as a deduction for overhead, profit, and reduction in bond and insurance. The subcontractor shall not be entitled to nor claim for anticipated profits on work that has been omitted.

D. To the total of the subcontractor's actual costs and fees allowed herein under, not more than

two percent (2%) shall be added for additional bonds, if bonds were required by the Contractor. The compensable percentage for the subcontractor's bonds shall be based on the subcontractor's actual bond costs, as substantiated through documentation formally submitted to the Construction Manager.

E. The added fixed fees shall be considered to be full compensation, covering the cost of general supervision, overhead, profit, small tools, incidentals and any other general expenses. The above fixed fees represent the maximum limits which will be allowed, and they include, but are not limited, to the subcontractors' indirect field and home office expenses and all other costs for cost proposal preparation, schedule analysis and preparation, operation and maintenance manual documentation, and record documents and change order administration.

9.6.5 Materials On Order at Time of Change Order

If acceptable material is ordered by the subcontractor for the deleted work prior to the date of notification of such deletion by the Construction Manager, and if orders for such material cannot be canceled, the subcontractor will be paid at the actual cost. In such case, the material paid for shall become the property of the City and City will pay for the actual cost of any further handling. If the material is returnable to the vendor, and if the Construction Manager so directs, the material shall be returned and the subcontractor will be paid for the actual costs of charges made by the vendor for returning the material. The actual cost of handling returned material will be paid for by the City.

9.6.6 Disallowed Costs in Change Order and Force Account Work

Disallowed subcontractor costs in Change Orders include, but are not limited to:

A. Interest cost of any type other than those mandated by statute;

B. Change Order preparation and review costs;

C. Meetings related to Change Orders;

D. Schedule preparation costs;

E. Submittal preparation costs;

F. Accounting and Invoicing costs related to Change Orders;

G. Developing and/or updating as-built drawings.

9.7 Change Orders on Account of Contingencies

With respect to Change Orders which are attributable to the following contingencies, the GMP shall be adjusted (increased or decreased) by the following **"Contingency Costs,"** consisting of the following:

9.7.1 Taxes

With respect to new, increases, or decreases in taxes arising after the date of this Agreement (other than taxes assessed based on the income of CONTRACTOR), the Change Order shall consist of the incremental amount of such new, increased or decreased taxes only.

9.7.2 Permit Fees

With respect to increases or decreases in fees for permits or other governmental certificates or instruments arising after the date of this Agreement, the Change Order shall consist of the incremental amount of such

increases or decreases. To the extent this Agreement states that a permit or certificate is not required and CONTRACTOR is later required to procure such permit or certificate, all out-of-pocket costs reasonably associated therewith shall be included in the Change Order

9.8 Change Orders on Account of Excusable Delays

9.8.1 Construction Delay Costs

With respect to Change Orders, which are attributable to Excusable Delays, and subject to the exceptions set forth in Article 9.8.2 below, the GMP shall be increased by the following "Delay Costs":

A. Increased allowable labor costs resulting from wage increases paid due to the delay;

B. Premiums for overtime and extra shifts incurred in accelerating the Work, but only if acceleration is required in advance by CITY;

C. Additional general conditions costs which would not have been incurred but for the delay (itemized, and not based on a formula allocation);

D. Demobilization and remobilization costs; and

E. Additional items of Cost of the Work attributable to the Excusable Delay and which would not have been incurred but for the Excusable Delay.

9.8.2 Exceptions

With respect to the Excusable Delays described in Article 7.4.2, the following exceptions to the cost provisions of Article 9.8.1 above shall apply:

A. Failure or inability of CITY to make available any or all of the Site in accordance with the requirements of the Schedule is not a compensable delay if such Excusable Delay occurs prior to the commencement of the Construction Work.

B. Failure or inability of CITY or CONTRACTOR to obtain necessary zoning changes, variances, code changes, permits or approvals from any governmental authority; is not a compensable delay if such Excusable Delay occurs prior to the commencement of the Construction Work.

C. Changes in Applicable Laws. Additional compensation shall only be paid if the change in Applicable Law is not a change in law of general application (e.g., CAL/OSHA), but is a change in law specifically affecting the Project.

9.9 Change Orders on Account of Differing Site Conditions

If CONTRACTOR encounters conditions described in Article 7.3.3-Excusable Delays, in addition to the increase in the GMP on account of delay costs incurred by CONTRACTOR (as described in Section 9.8.1), the GMP shall also be increased by the additional Cost of the Work attributable to such conditions which would not have been incurred but for such conditions.

9.10 Cost Pricing Data and Access To Records

A. All cost and pricing data submitted by the Contractor with respect to any change, prospective or executed, or any claim for extra compensation shall be a true, complete, accurate and current representation of actual cost and pricing of the work. The Construction

Manager may require a formal certification as to cost and pricing data submitted by the Contractor.

B. The Construction Manager shall have access to the records of Contractor and Subcontractors as provided in Article 8.18-Audits and Access to Records.

9.11 Time Extensions on Account of Change Orders.

CONTRACTOR shall be entitled to a time extension in connection with any Change Order to the extent its time of performance is extended due to such Change Order. CONTRACTOR shall present to CITY a CPM analysis showing how the Change Order affects the critical path of the Work.

9.12 Force Majeure

There shall be no additional compensation to CONTRACTOR on account of Force Majeure.

ARTICLE 10 - CORRECTION OF WORK

10.1 Correction of Work Prior to Completion

Prior to the date of Final Completion, CONTRACTOR shall correct Work which (a) CITY reasonably rejects as being defective or nonconforming to the requirements of the Contract Documents in a written notice delivered to CONTRACTOR or (b) CONTRACTOR recognizes is defective or nonconforming to the Contract Documents. If other portions of the Work are adversely affected by or are damaged by such defective Work, CONTRACTOR shall also correct, repair or replace such affected or damaged Work, as well as any other property of CITY or others damaged by such defective or nonconforming Work. Prior to the date of Final Completion, the cost of correcting any damaged or defective work shall be paid as a Cost of the Work.

10.2 Correction of Work After Completion

For defects identified by CITY and for which CITY has notified CONTRACTOR within a period of twelve (12) months after the date of Final Completion, or within such longer period as may be provided by special warranties contained in the Contract Documents, CONTRACTOR shall re-execute, correct, repair or replace all Work found to be defective or nonconforming to the Contract Documents (whether arising from a construction defect, error, omission or deficiency). If other portions of the Work are adversely affected by or damaged by such defective Work, CONTRACTOR shall also correct, repair or replace such affected or damaged Work, as well as any other property of CITY or others damaged by such defective or nonconforming Work.

10.3 Acceptance of Nonconforming Work

If CITY prefers to accept Work, which is not in accordance with the requirements of the Contract Documents, CITY may do so instead of requiring its removal and correction, in which case the GMP will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

10.4 No Effect on Limitations

Nothing contained in this Article shall be construed to establish a period of limitation with respect to other obligations, which CONTRACTOR may have under the Contract Documents.

ARTICLE 11 - INSURANCE AND BONDS; INDEMNIFICATION

11.1 Insurance to be provided by CONTRACTOR

CONTRACTOR shall, at all times, maintain in full force and effect at a minimum the insurance required by this section; and CONTRACTOR shall not allow any subcontractor to commence Work until similar insurance required of the subcontractor has been obtained and filed.

11.2 Evidence of Coverage

CONTRACTOR shall, at all times, maintain in full force and effect at a minimum the insurance required by this section; and CONTRACTOR shall not allow any subcontractor to commence Work until similar insurance required of the subcontractor has been obtained and filed. An original Certificate of Insurance, and copies of all required endorsements, all in a form approved by the Risk Manager, evidencing all required coverage or policies shall be filed after the award of the bid and prior to approval of the Contract by the City Council. CONTRACTOR shall provide ten (10) Days prior written notice to CITY of any reduction of coverage limits or cancellation of the coverage or policies shall be given to the City of Roseville as Certificate holder.

11.3 Qualifying Insurers

With the exception of the State Compensation Insurance Fund, all required insurance policies shall be issued by companies licensed to do business in the State of California and who hold a current policy holders alphabetic and financial size category rating of not less than AVII according to the most recent issue of Best's Insurance Reports.

11.4 Summary of Insurance Requirements

Commercial General Liability, automobile liability, and worker's compensation insurance shall be maintained as shown in the table below.

Table 1: Summary of Insurance Required

Coverage	Limits
Commercial General Liability Minor Construction Projects (Projects under $1,000,000)	$2,000,000 each occurrence $4,000,000 aggregate Personal Injury: $2,000,000 each occurrence $4,000,000 aggregate
Commercial General Liability Major Construction Projects (Projects over $1,000,000)	$5,000,000 each occurrence $10,000,000 aggregate Personal Injury: $5,000,000 each occurrence $10,000,000 aggregate

Coverage	Limits
Comprehensive Automobile Liability For bodily injury (including death) and property damage which provides	Total limits of not less than One Million Dollars ($1,000,000) combined single limits per accident, applicable to all owned, non-owned, and hired vehicles
Statutory Workers' Compensation and Employer's Liability Insurance	Limits of not less than One Million Dollars ($1,000,000) per occurrence.
Builder's Risk/Course of Construction Insurance	All Risk" type of builder's Risk Insurance of the type covering one hundred percent (100%) of the value of the Work performed under this Contract
Contractor's Pollution Liability Insurance	Combined Single Limit for each occurrence: $2,000,000 General Aggregate: $2,000,000
Professional Liability Submittals prepared by licensed California Engineer	Limit per claim of at least $2,000,000, and a $4,000,000 in the aggregate for errors and omissions.

11.5 Commercial General Liability.

11.5.1 Coverage or Endorsements

The Commercial General Liability policy shall include coverage or endorsements for:

A. Completed operations.

B. Losses related to independent contractors, products and equipment.

C. Explosion, collapse and underground hazards.

11.5.2 Copies to be Provided

The Commercial General Liability Insurance shall include the following, copies of which shall be provided:

A. Inclusion of the CITY of Roseville, and its officers, agents, employees and volunteers, as additional insured (except for workers' compensation as respects services or operations under the Contract. The additional insured endorsement for the general liability policy shall be at least as broad as the Insurance Services Office ("ISO") CG 20 38 04 13 or an equivalent, blanket endorsement or section of the policy. Endorsements must include coverage for on-going and completed operations. Endorsements shall cover the CITY of Roseville, its officers, agents, employees, and volunteers.

B. Cross liability and severability of interest clauses providing that the insurance applies separately to each insured except with respect to the limits of liability.

C. Stipulation that the insurance is primary and noncontributory, as evidenced by a separate endorsement (CG 20 01 04 13 or an equivalent) or section of the policy, and that neither CITY nor its insurers will be called upon to contribute to a loss.

D. Such insurance shall specifically cover the contractual liability of the CONTRACTOR.

E. Any available insurance proceeds in excess of the specified minimum insurance coverage requirements and limits shall be available to the additional insureds. Furthermore, the requirements for coverage and limits shall be: (1) the minimum coverage and limits specified in this Agreement; or (2) the full coverage and maximum limits of any insurance proceeds available to the named insureds, whichever is greater.

F. Waiver of subrogation endorsement.

G. CONTRACTOR shall furnish a certificate for the period covered.

11.5.3 Claims Made Coverage – Special Notice

SPECIAL NOTICE - CLAIMS MADE COVERAGE:

Liability insurance coverage may not be written on a "claims made" basis. The Certificate of Insurance must clearly provide that the coverage is on an "occurrence" basis.

11.6 Comprehensive Automobile Liability

Comprehensive Automobile Liability for bodily injury (including death) and property damage which provides total limits of not less than One Million Dollars ($1,000,000) combined single limits per accident, applicable to all owned, non-owned, and hired vehicles.

11.7 Statutory Workers' Compensation and Employer's Liability Insurance

Statutory Workers' Compensation and Employer's Liability Insurance, including a waiver of subrogation endorsement and a Broad Form "All-States" Endorsement for all employees engaged in services or operations under the Contract. The employer's liability insurance shall provide limits of not less than One Million Dollars ($1,000,000) per occurrence. Both the worker's compensation and employer's liability policies shall contain the Insurer's waiver of subrogation in favor of CITY, its officers, agents, employees, and volunteers.

11.8 Builder's Risk/Course of Construction Insurance

CONTRACTOR shall be responsible for all loss, damage or destruction whatsoever to the Work called for by this Contract until the approval of a Notice of Completion. CONTRACTOR shall secure "All Risk" type of builder's Risk Insurance of the type covering one hundred percent (100%) of the value of the Work performed under this Contract (the value is presumed to be the Contract amount unless otherwise stated in Supplemental Conditions) and all materials, equipment, or other items to be incorporated therein while the same are located at the construction site, a bonded warehouse, or its place of manufacture. At any time, the policy shall cover the value of the Work completed. The policy shall cover hazards including the losses due to fire, explosion, hail, rain, lightning, flood (separate insurance as needed), vandalism, malicious mischief, wind, collapse, aircraft, and smoke.

The policies providing such insurance shall name CITY as a loss payee as its respective interests may appear, and certified copies of such policies shall be filed with CITY. The maximum deductible allowable under the Builder's All Risk policy shall be five percent (5%) of the Contract amount.

Builder's Risk Insurance is not required for coverage of losses in excess of five percent (5%) of the Contract amount for damages resulting from earthquake in excess of a magnitude of 3.5 on the Richter scale, or tidal waves. Coverage in the amount of five percent (5%) of the Contract amount for such losses is required.

11.9 Contractor's Pollution Liability Insurance

Contractor's Pollution Liability Insurance. The Contractor shall obtain Pollution Liability Insurance. This insurance shall be written in comprehensive form either as a separate policy or as an endorsement to Contractor's general liability coverage and shall cover liability for bodily injury, property damage, and environmental damage resulting from pollution and related cleanup costs incurred, all arising out of any Work to be performed under the Agreement, including liability for and defense of lawsuits and regulatory actions. Coverage shall be provided for both Work performed on Site, as well as during the transport of hazardous materials. Coverage shall apply to sudden as well as gradual pollution conditions, including without limitation conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids, or gases, natural gas, waste materials, or other irritants, contaminants, or pollutants, including asbestos. The liability limits shall be not less than:

- Combined Single Limit for each occurrence: $2,000,000.
- General Aggregate: $2,000,000.

If the coverage required is written on a claims-made coverage form:

- The retroactive date must be shown, and this date must be before the award date of the Agreement.
- Insurance must be maintained, and evidence of insurance must be provided for at least five (5) years after final payment.
- If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the Agreement award date, the Contractor must purchase extended reporting period coverage for a minimum of five (5) years after Final Payment.
- A copy of the claims reporting requirements must be submitted to the City for review.

11.10 Professional Liability Insurance

All submittals required of the Contractor which are to be prepared by a licensed California engineer shall be prepared only by a licensed engineer who is covered by a professional liability insurance policy issued by a California-admitted carrier or a carrier authorized to do business in California with a Best's rating of A-: VII or better, with an limit per claim of at least $2,000,000, and a $4,000,000 in the aggregate for errors and omissions. Such insurance shall be maintained in effect by said engineer at all times while performing Work on the Project and for at least three (3) years after Final Completion of the Project. Contractor shall submit an insurance certificate for such engineer prior to beginning Work for approval by the City.

11.11 Other Insurance Provisions.

A. The requirements of the Contract Conditions as to types and limits of insurance coverage to be maintained by CONTRACTOR, and any approval of insurance by CITY, are not intended to, and shall not in any manner limit or qualify the liabilities and obligations otherwise assumed by CONTRACTOR pursuant to the Contract, including, but not limited to, the provisions concerning indemnification, nor preclude CITY from taking any other action available to it under any other provision of the Contract or law.

B. CITY acknowledges that some insurance requirements contained in the Contract Conditions may be fulfilled by self-insurance on the part of CONTRACTOR. However, this shall not in any way limit liabilities assumed by CONTRACTOR under the Contract. Any self-

insurance must be approved in writing by CITY, in its sole discretion and shall not reduce the limits of liability. Any deductibles or self-insured retentions ("SIR") must be declared on the certificate of insurance and approved by CITY in writing. Policies containing any SIR provision shall provide or be endorsed to provide that the SIR may be satisfied by either the named insured or CITY. CITY reserves the right to obtain a full certified copy of any insurance policy and endorsements. The failure to exercise this right shall not constitute a waiver of such right.

C. CONTRACTOR agrees to include in its contracts with all subcontractors the same requirements and provisions of this Contract, including the indemnity and insurance requirements, to the extent they apply to the scope of the subcontractor's work. Furthermore, CONTRACTOR shall require its subcontractors to agree to be bound to CONTRACTOR and CITY in the same manner and to the same extent as CONTRACTOR is bound to CITY under this Contract. Additionally, CONTRACTOR shall obligate its subcontractors to comply with these same provisions with respect to any tertiary subcontractor, regardless of tier. A copy of CITY'S indemnity and insurance provisions will be furnished to the subcontractor or tertiary subcontractor upon request. Alternatively, CONTRACTOR may insure subcontractor(s) under its own policy.

D. CITY, its officers, agents, employees and volunteers are to be covered as insureds with respect to liability arising out of automobiles owned, leased, hired or borrowed by or on behalf of CONTRACTOR; and with respect to liability arising out of work or operations performed by or on behalf of CONTRACTOR including materials, parts or equipment furnished in connection with such work or operations. Coverage shall not extend to any indemnity coverage for the active negligence of the additional insured in any case where an agreement to indemnify the additional insured would be invalid under California Insurance Code Section 11580.04. In addition, the insurance policy may not contain language which prohibits additional insureds or other insurers from satisfying the self-insured retention or deductible.

E. The limits of insurance required in this Contract may be satisfied by a combination of primary and excess insurance. Any excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and noncontributory basis for the benefit of CITY (if agreed to in a written contract) before the CITY'S own insurance shall be called upon to protect it as a named insured.

F. In the event CONTRACTOR retains the Architect/Engineer, CONTRACTOR shall require its Architect/Engineer to provide professional liability (errors and omissions) insurance (certificate and additional insured endorsement) in the amount of $2,000,000.

G. CITY RESERVES THE RIGHT TO WITHHOLD ANY PROGRESS PAYMENTS TO CONTRACTOR IN THE EVENT OF NONCOMPLIANCE WITH ANY INSURANCE REQUIREMENTS.

11.12 Payment, Performance and Warranty Bonds

CONTRACTOR shall furnish and deliver to CITY Performance, Labor & Materials, and Warranty Bonds issued by a surety prior to, and as a condition precedent to, commencement of the Construction Work on the Site; provided, however, the Warranty Bond shall be waived if such bond is not required pursuant to CITY'S request for proposals for the Project. The Labor & Materials and Performance Bonds shall be in a penal sum equal to one hundred percent (100%) of the GMP, and the Warranty Bond shall be in the penal sum equal to ten percent (10%) of the GMP. All bonds shall be in the form as set forth in Exhibit G

hereto. All premiums for the Performance, Labor & Materials, and Warranty Bonds shall be a Cost of the Work. CITY shall have the right to withhold any payment(s) under this Agreement until CONTRACTOR has fully complied with this sub-section.

Table 2: Summary of Bonding Requirements

Bond Type	Requirement
Performance	100% of the Total Contract Price
Labor and Materials	100% of the Total Contract Price
Warranty	One year following the date of Final Completion Penal sum equal to ten percent (10%) of the GMP

11.13 Indemnification

To the fullest extent allowed by law, CONTRACTOR shall defend, indemnify, and hold harmless, CITY, its officers, employees, agents, and volunteers, and each and every one of them, from and against all actions, damages, claims, losses, expenses or other liabilities of every type and description, including reasonable attorney fees, to which they may be subjected or put, by reason of, or resulting from, the performance of the Work, whether upon or off the Work, including the loss of use thereof, that is caused in whole or in part by willful or reckless misconduct and/or any negligent or wrongful act or omission of CONTRACTOR, any Subcontractor, and anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, whether or not it is caused in part by a party indemnified hereunder, except for such claims arising from the sole or active negligence of CITY. The parties intend that this provision shall be broadly construed.

CONTRACTOR's responsibility for such defense and indemnity obligations shall survive the termination or completion of this Agreement for the full period of time allowed by law. The defense and indemnity obligations of this Agreement are undertaken in addition to, and shall not in any way be limited by, the insurance obligations contained in this Agreement.

ARTICLE 12 - SAFETY: PROTECTION OF PERSONS AND PROPERTY

12.1 Contractor's Responsibility for Site Safety

It is the intent of the parties that CITY is not an exposing, creating, controlling, or correcting employer under California Labor Code Section 6400. In accordance with generally accepted fabrication and construction practices and all applicable Laws and Standards and Codes, CONTRACTOR shall have the authority and be solely and completely responsible for the safety of all property utilized and all persons performing under this Agreement. Moreover, the CONTRACTOR shall be the controlling employer and has the authority and responsibility to enforce safety for all fabrication, construction work, and Work performed under this Agreement.

The services of CITY'S contract administrator, if any, in conducting a review of CONTRACTOR's performance under this Agreement is not intended to include a review of the adequacy of CONTRACTOR's work methods, equipment or safety measures. If CITY and/or its contract administrator observes a safety violation related to the CONTRACTOR's performance under this Agreement, then CITY and/or its contract administrator will report the violation to the CONTRACTOR who is then responsible for assuring the violation is abated.

A. CONTRACTOR shall be responsible for initiating, maintaining and providing supervision of

safety precautions and programs in connection with the Work, and shall also comply with any and all insurance carrier-mandated safety requirements and programs.

B. CONTRACTOR is hereby informed that work on this Project could be hazardous. CONTRACTOR shall carefully instruct all personnel performing under this Agreement in potentially hazardous work areas as to potential dangers and shall provide such necessary safety equipment and instructions as are necessary to prevent injury to personnel and damage to property.

C. All Equipment, Work and materials provided under this Agreement shall be in strict accordance with all applicable Laws and Standards and Codes, and attention is drawn to the requirements of CAL/OSHA.

D. CONTRACTOR shall perform under this Agreement so as not to expose personnel to, or to discharge into the atmosphere from any materials brought to the Site by CONTRACTOR, smoke, dust, asbestos, toxic chemicals or other air contaminants in violation of applicable Laws and Standards and Codes.

E. The Contractor shall indemnify, defend and hold CITY and Construction Manager, Engineer, Funding Agencies and their respective officers, officials, employees, agents and volunteers or other authorized representatives harmless to the full extent permitted by law concerning liability related to the Contractor's safety obligations in accordance with Article 11.14-Indemnification.

F. If death or serious injuries or serious damages occur, the accident shall be reported immediately by telephone or messenger to both the Construction Manager and the CITY. In addition, the Contractor shall furnish the Construction Manager with a copy of the Employer's Report of Injury immediately following any incident requiring the filing of said report during the prosecution of the Work under this Agreement. The Contractor shall also furnish the Construction Manager with a copy of the Employer's Report of Injury involving any subcontractors on this Project. The Contractor shall make all reports as are, or may be, required by any authority having jurisdiction, and permit all safety inspections of the Work being performed under this Agreement.

G. If a claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Construction Manager, giving full details of the claim.

12.2 Safety Program

The Contractor shall establish, implement, and maintain a written injury prevention program as required by Labor Code Section 6401.7. Before beginning the Work, the Contractor shall file with the Construction Manager a written Contractor Safety Program that provides for the implementation of all of the Contractor's safety responsibilities in connection with the Work at the Site and the coordination of that program and its associated procedures and precautions with safety programs, precautions and procedures of each of its subcontractors and other Contractors performing work at the Site. The Contractor shall be solely responsible for initiating, maintaining, monitoring, coordinating, and supervising all safety programs, precautions, and procedures in connection with the Work and for coordinating its programs, precautions, and procedures of the other contractors and subcontractors performing the Work at the Site. The Safety Program should contain all the necessary elements for the Contractor to administer its program on the Site

The Contractor's compliance with requirements for safety and/or the Construction Manager's acceptance for filing of the Contractor's Safety Program shall not relieve or decrease the liability of the Contractor

for safety. The Construction Manager's review of the Contractor's Safety Program is only to determine if the above listed elements are included in the program. The Contractor's completion of review of the Safety Program does not confirm adequacy of the Program to protect workers. The Contractor is solely responsible to determine adequacy of the program to protect workers per the applicable Labor Code Section.

12.3 Safety Supervisor

The Contractor shall appoint an employee as safety supervisor who is qualified and authorized to supervise and enforce compliance with the Safety Program. The Contractor shall notify the Construction Manager in writing prior to the commencement of work of the name of the person who will act as the Contractor's safety supervisor and furnish the safety supervisor's resume to the Construction Manager.

The Contractor will, through and with its Safety Supervisor, ensure that all of its employees and its subcontractors of any tier, fully comply with the Project Safety Policies. The Safety Supervisor shall be a full-time employee of the Contractor whose responsibility shall be for supervising compliance with applicable safety requirements on the Site and for developing and implementing safety training classes for all job personnel. The CITY shall have the authority to require removal of the Contractor's Safety Supervisor if the representative is judged to be improperly or inadequately performing the duties; however, this authority shall not in any way affect the Contractor's sole responsibility for performing this work safely, nor shall it impose any obligation upon the CITY to ensure the Contractor performs its work safely.

12.4 Applicable Laws

The Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss and shall erect and maintain all necessary safeguards for such safety and protection.

12.5 Safety Notices

In connection with the performance of the Work, CONTRACTOR shall provide notices and comply with all Applicable Laws bearing on the safety of persons and property and their protection from damage, injury or loss. The Contractor shall notify owners of adjacent property and of underground facilities and utility districts when prosecution of the Work may affect them and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

12.6 Reasonable Precautions

CONTRACTOR shall take all precautions and implement all safety measures and requirements imposed by any Applicable Law. Without limiting the generality of the foregoing, CONTRACTOR shall take necessary precautions for the safety of, and shall provide necessary protection to prevent damage, injury or loss to:

A. Employees on the Work and other persons who may be affected thereby;

B. The Work and materials and equipment to be incorporated therein, whether in storage on or off the Site under care, custody or control of CONTRACTOR; and

C. Other property at the Site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of the Construction Work.

12.7 Specific Precautions

12.7.1 Confined Spaces

The Project requires work in confined spaces and requires compliance with CAL/OSHA and Federal OSHA requirements. Confined spaces for the purposes of this article shall be as defined by the Division of Industrial Safety. Work within confined spaces of this Project is subject to the definitions and applicable provisions of Section 5156 et seq., Title 8, Division 1, Chapter 4, Subchapter 7, Group 16, Article 108 of California Code of Regulations, and Title 29 Part 1926 of the Code of Federal Regulations.

In addition, the CITY classifies the following existing facilities as confined space: the interior of pipelines, vaults, manholes, reservoirs and any other such structure or space which is similarly surrounded by confining surfaces as to permit the accumulation of dangerous gases or vapors. The confined spaces are "permit" confined spaces as defined by OSHA and CAL/OSHA and therefore entry is allowed only through compliance with a confined space entry permit program by the Contractor that meets the requirements of 8 C.C.R. Section 5157. While the above-mentioned locations have been identified as permit confined spaces, other permit confined spaces may exist. It shall be the responsibility of the Contractor to identify and classify these confined spaces.

It is anticipated that the Contractor may encounter hazardous conditions within these permit confined spaces which include, but are not limited to the following:

A. Exposure to hydrogen sulfide, methane, carbon dioxide and other gases and vapors commonly found in municipal sewers which could have or has the potential of having Immediate Danger to Life or Health Conditions (IDLH).

B. Exposure to atmosphere containing insufficient oxygen to support human life.

C. Exposure to combustible, flammable and/or explosive atmosphere.

D. Exposure to sewage which may contain bacteriological, chemical and other constituents harmful to humans.

E. Work in conditions where engulfment or entrapment may occur.

F. Work in environments which may be slippery and/or have uneven work surfaces.

G. Work in structures where workers may trip, slip and/or fall several feet.

H. Exposure to an oxygen enriched environment.

12.7.2 Excavation Safety

A. Section 6705. In accordance with the provisions of Section 6705 of the Labor Code, the Contractor shall submit, in advance of excavation of any trench or trenches five feet or more in depth, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plans vary from the shoring system standards set forth in the Construction Safety Orders of the Division of Industrial Safety in Title 8, Subchapter 4, Article 6, California Code of Regulations, the plans shall be prepared and signed by a registered civil or structural engineer employed by the Contractor, and all costs therefore shall be included in the price named in the Agreement for completion of the Work as set forth in the Contract Documents. Nothing in this article shall be deemed to allow the use of a shoring, bracing, sloping, or other protective system less effective than that required by the Construction Safety Orders. Nothing in this article shall be construed to impose a tort liability on the CITY, the

Engineer, the Construction Manager, nor any of their officers, officials, employees, agents, consultants or volunteers. The CITY'S review of the Contractor's excavation plan is only for general conformance to the Construction Safety Orders.

Prior to commencing any excavation, the Contractor shall designate in writing to the Construction Manager the "competent person(s)" with the authority and responsibilities designated in the Construction Safety Orders.

B. Section 6707. Pursuant to the provisions of California Labor Code Section 6707, each Proposal submitted in response to this RFBP shall contain, as a separate cost item, adequate sheeting, shoring, and bracing, or equivalent method, for the protection of life or limb in trenches and open excavation, exceeding five (5) feet, which shall conform to applicable safety orders. By entering an amount for this cost item below, the Proposer warrants that its action does not convey tort liability to the City, the Engineer, the Construction Manager, the Funding Agencies and their respective officers, employees, agents, and subconsultants.

12.7.1 Equipment Safety Provisions

The completed Work shall include the specified permanent safety devices, such as machinery guards and similar safety items, required by the State and Federal (OSHA) industrial authorities and applicable local and national codes. Further, any features of the Work, including CITY-selected equipment, subject to such safety regulations shall be fabricated, furnished, and installed in compliance with these requirements. All equipment furnished shall be grounded and provided guards and protection as required by safety codes. Where vapor-tight or explosion-proof electrical installation is required by safety codes, this shall be provided. Contractors and manufacturers of equipment shall be held responsible for compliance with the requirements included herein. The Contractor shall notify all equipment suppliers and subcontractors of the provisions of this paragraph.

12.7.1 Use of Explosives

Use of explosives is prohibited, unless approved in advance in writing by CITY. CITY may impose reasonable conditions on the use of explosives.

12.7.1 Loading Capacity

The Contractor shall determine safe loading capacities and shall not overload any structure, building, pipe or other existing facility beyond its safe capacity during construction. In addition to any requirements imposed by law, the Contractor shall shore up, brace, underpin and protect as may be necessary all foundations and other parts of all existing structures, facilities and improvements on the Site or adjacent to the Site which are in any way affected by the Contractor's excavations or other operations connected with the Work. Prior to commencing any work which in any way affects adjoining or adjacent land or buildings thereon, or public utilities, the Contractor shall notify the Construction Manager to discuss responsibilities for properly notifying the owners/occupants of adjacent land and the protective measures taken by the Contractor. Upon request of the Construction Manager, the Contractor shall meet with the recipient of any notice or attend local public meetings as proper public outreach on local impacts caused by completion of the Work should be communicated to any parties that may be affected prior to commencing any work.

12.8 Safety Violations

Should the Contractor fail to correct an unsafe condition, the CITY shall have the right to notify the Contractor through the Construction Manager that an unsafe condition may exist and must be corrected or the Work in question can be stopped in accordance with Article 4.6, CITY's Right to Stop the Work, until the condition is corrected to the satisfaction of the CITY. No extension of time or additional compensation will be granted as a result of any stop order so issued. The notification and suspension of such Work or the failure to provide such notification and suspension by the CITY shall not relieve the Contractor of its sole responsibility and liability for safety and the correction of any unsafe conditions.

The CITY shall have the authority to require the removal from the Project of any worker and the foreman and/or superintendent in responsible charge of the work where safety violations occur. The CITY also delegates such authority to the Construction Manager as well.

12.9 Public Safety and Convenience

The Contractor shall conduct its work so as to ensure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the Work and to ensure the protection of persons and property. No road or street shall be closed to the public except with the permission of the Construction Manager and the written approval by the proper governmental authority. Fire hydrants on or adjacent to the Work shall be accessible to firefighting equipment. Temporary provisions shall be made by the Contractor to ensure the use of sidewalks, private and public driveways and proper functioning of gutters, sewer inlets, drainage ditches and culverts, irrigation ditches and natural water courses.

12.10 Emergencies

In an emergency affecting the safety of persons or property, CONTRACTOR shall act, at CONTRACTOR's discretion, to prevent threatened damage, injury or loss. Additional costs or extensions of time caused by CONTRACTOR on account of an emergency not caused by the fault or neglect of CONTRACTOR shall be determined as provided in Article 9.8-Change Orders on Account of Excusable Delay.

12.11 Safeguards

CONTRACTOR shall erect and maintain, as required by existing conditions and performance of the Work, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying CITY and users of adjacent sites and utilities, and shall comply fully with the requirements of CAL/OSHA.

12.12 Security

CONTRACTOR shall take any and all precautions that may be reasonably necessary to render all portions of the Work, the Site and any adjacent areas affected by the Work secure in all material respects, to decrease the likelihood of accidents, and to avoid vandalism and other contingencies which are liable to delay the Work or give rise to claims or liabilities. CONTRACTOR shall furnish and install all necessary facilities to provide safe means of access to all points where Work is being performed. CONTRACTOR shall take all precautions and measures as may be reasonably necessary to secure the Project at all hours, including evenings, holidays and non-work hours. Such precautions may include provision of security guards.

12.13 Damage to Property at the Site

CONTRACTOR shall be responsible for any and all damage or loss to property at the Site, except to the extent caused by the acts or omissions of CITY or its representatives, agents or employees. The costs and expenses incurred by CONTRACTOR under this Article shall be paid as a Cost of the Work to the extent that such costs and expenses are in excess of or are not covered by required insurance, and to the extent of any deductibles. If such damage or loss is caused by CONTRACTOR, payment of such costs as Cost of the Work shall be limited by the provisions of Article 2.19.4 hereof.

12.14 Damage to Property of Others

A. CONTRACTOR shall avoid damage, as a result of CONTRACTOR's operations, to existing sidewalks, curbs, streets, alleys, pavements, utilities, adjacent property, the work of Separate Contractors and the property of CITY. CONTRACTOR shall repair any such damage caused by the operations of CONTRACTOR, which costs shall be paid as a Cost of the Work to the extent that such costs and expenses are in excess of or are not covered by required insurance, and to the extent of any deductible.

B. Failure of CONTRACTOR to Repair Damage. If CONTRACTOR fails to commence the repair of damage to property as set forth in this Article, and/or diligently pursue such repair, then CITY, after ten (10) Days prior written notice to CONTRACTOR (provided CONTRACTOR has not commenced such repair during such ten (10) Day period), may elect to repair such damages with its own forces and to deduct from payments due or to become due to CONTRACTOR amounts paid or incurred by CITY is correcting such damage.

12.15 Remedy of Damage

CONTRACTOR shall promptly remedy damage and loss to property referred to in Article 12.14-Damage to Property of Others (items B and C) caused in whole or in part by CONTRACTOR, or anyone employed by or in control of CONTRACTOR, or any Subcontractor. All costs incurred by CONTRACTOR in connection with its obligations under this Section shall be cost of the Work, but shall not increase the GMP.

ARTICLE 13 - DISPUTES

13.1 Disputes between CITY and CONTRACTOR

In the event of any dispute arising between CITY and CONTRACTOR regarding any part of the Contract or the Contract Documents, or the Parties' obligations or performance thereunder, and subject to any claims presentation requirements set forth in the Contract Documents, either Party may institute the dispute resolution procedures set forth herein. The Parties shall continue performance of their respective obligation hereunder notwithstanding the existence of a dispute.

13.2 Dispute Resolution Procedures

CONTRACTOR must submit all claims as defined in and in accordance with the claim resolution process set forth in Section 9204 of the Public Contract Code. Each such claim must be sent to CITY by registered mail or certified mail with return receipt requested and must contain reasonable documentation to support the claim. All claims must be received prior to acceptance of the Work and will be handled in accordance with the procedures set forth in Section 9204 of the Public Contract Code.

ARTICLE 14 - EVENTS OF DEFAULT AND REMEDIES; TERMINATION

14.1 CONTRACTOR Events of Default

The following shall be considered "CONTRACTOR Events of Default":

A. If CONTRACTOR fails or neglects to carry out the Work in accordance with the provisions of the Contract Documents, and fails, after seven (7) Days' notice from CITY, to commence a cure to correct such failure or neglect and thereafter diligently pursue such cure to completion;

B. If CONTRACTOR materially breaches this Agreement and fails, after seven (7) Days' notice from CITY, to commence a cure to correct such breach and thereafter diligently pursue such cure to completion (such breach to include, but not be limited to, failure to make payment to Subcontractors for materials or labor in accordance with the respective agreements between CONTRACTOR and the Subcontractors or violation of Applicable Laws);

C. If a custodian, trustee or receiver is appointed for CONTRACTOR, or if CONTRACTOR becomes insolvent or bankrupt, is generally not paying its debts as they become due or makes an assignment for the benefit of creditors, or CONTRACTOR causes or suffers an order for relief to be entered with respect to it under applicable bankruptcy law or applies for or consents to the appointment of a custodian, trustee or receiver for CONTRACTOR, or bankruptcy, reorganization, arrangement or insolvency proceedings, or other proceedings for relief under any bankruptcy or similar law or laws for the relief of debtors, are instituted by or against CONTRACTOR, and in any of the foregoing cases such action is not discharged or terminated within sixty (60) Days of its institution.

14.2 Remedies of CITY upon a CONTRACTOR Event of Default.

14.2.1 Termination of Contract

Upon the occurrence of a CONTRACTOR Event of Default, CITY shall have the right to terminate this Contract upon an additional seven (7) Days written notice to CONTRACTOR, provided that CONTRACTOR has not commenced a cure within such seven (7) Day period.

14.2.2 Without prejudice to any other rights or remedies of CITY, CITY may:

A. Take possession of the Site and of all materials, equipment, tools and construction equipment thereon owned by CONTRACTOR;

B. Accept assignment of Subcontracts; and

C. Finish the work by whatever reasonable method CITY may deem expedient.

D. When CITY terminates the Contract as aforesaid, CONTRACTOR shall not be entitled to receive further payment until the Work is finished. If the unpaid balance of the GMP exceeds costs incurred in finishing the Work, such excess shall be paid to CONTRACTOR, up to the amount due CONTRACTOR for work performed prior to termination. If such costs exceed the unpaid balance of the GMP, CONTRACTOR shall pay the difference to CITY.

14.3 Recourse to Payment and Performance Bonds

Upon the occurrence of a CONTRACTOR Event of Default and termination of this Contract by CITY, CITY may call upon the Surety to perform its/their obligations under the Payment and Performance Bonds, if applicable.

14.4 Remedies not Exclusive

Except as otherwise provided in this Agreement, no remedy hereunder is intended to be exclusive of any other remedy, but each and every such remedy shall be cumulative and shall be in addition to any other available legal or equitable remedy, existing now or hereafter. No delay or omission to exercise any right or power accruing shall impair any such right or power nor shall it be construed to be a waiver of any Event of Default or acquiescence therein, and every such right and power may be exercised from time to time as often as may be deemed expedient.

14.5 Termination or Suspension for Convenience.

14.5.1 Termination for Convenience.

CITY may, without cause, terminate this Contract, or any portion of Work to be performed hereunder at any time by a notice in writing from CITY to CONTRACTOR for CITY'S convenience. In such case, CITY shall pay to CONTRACTOR all funds due CONTRACTOR for work performed up to the date of termination, plus all demobilization and close-out costs, including, but not limited to, any amounts payable to Subcontractors for early termination, plus reasonable overhead and profit on Work performed. All funds due hereunder, including unpaid Retention, shall be released within thirty (30) Days of termination of the Contract for convenience, subject to any withholding required or authorized by any Applicable Law. In no event shall such amounts owed to CONTRACTOR exceed the GMP.

14.5.2 Suspension for Convenience

CITY may, without cause, order CONTRACTOR in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as CITY may determine. An adjustment shall be made for increases in the cost of performance of the Work, including Fee on the increased cost of performance, caused by the suspension, delay or interruption, in accordance with the Change Order provisions of this Contract. No adjustment shall be made to the extent (1) the performance is, was or would have been so suspended, delayed or interrupted by another cause for which CONTRACTOR is responsible or (2) that an equitable adjustment to the GMP and/or Schedule is made or denied under another provision of this Contract. Adjustments made in the cost of performance may have a mutually agreed fixed or percentage Fee.

ARTICLE 15 - MISCELLANEOUS PROVISIONS

15.1 Governing Law

This Contract shall be construed with and governed by the laws of the State of California.

15.2 Successors and Assigns

CITY and CONTRACTOR respectively bind themselves, their partners, shareholders, successors, assigns and legal representatives to the other Party hereto and to shareholders, successors, assigns and legal

representatives of such other Party in respect to covenants, agreements and obligations contained in the Contract Documents. Neither Party shall assign the Contract without the prior written consent of the other.

15.3 Notice

Any notices to Parties required by this Agreement shall be delivered or mailed, U.S. first class, postage prepaid, addressed as follows:

If to CITY:	If to CONTRACTOR:
City of Roseville Attn: City Clerk 311 Vernon Street Roseville, CA 95678	Auburn Constructors, LLC Attn: Dean Bailey 730 West Stadium Lane Sacramento, CA 95834

Address for Notice may be changed by Notice to the other Party.

15.4 Modifications

No Modifications or Change Orders shall be valid unless in writing and signed by CITY and CONTRACTOR.

15.5 Interpretation

Any and all headings of this Agreement are for convenience of reference only and do not modify, define or limit the provisions thereof. Words of any gender shall be deemed and construed to include correlative words of the other gender. Words importing the singular number shall include the plural number and vice versa, unless the context shall otherwise be deemed to include all supplements and/or amendments to any such exhibits or documents entered into in accordance with the terms hereof and thereof. All references to any person or entity shall be deemed to include any person or entity succeeding to the rights, duties and obligations of such person or entity in accordance with the terms of this Agreement. Where reference is made in this Agreement to another Contract Document, the reference refers to that provision as amended or supplemented by the other provisions of the Contract Documents. In the event of any conflict between or among the Contract Documents, the provisions of this Agreement shall govern.

15.6 Severability

If any provision of this Agreement is held to be inoperative or unenforceable as applied in any particular case because it conflicts with any other provision hereof or any constitution, statute, ordinance, rule of law or public policy, or for any other reason, such holding shall not have the effect of rendering the provision in question inoperative or unenforceable in any other case, or of rendering any other provision herein contained inoperative or unenforceable to any extent whatever. The invalidity of any one or more phrases, sentences, clauses or sections contained in this Agreement shall not affect the remaining portions of this Agreement or any part hereof, and they shall otherwise remain in full force and effect.

15.7 Whole Agreement

This Agreement, the Exhibits hereto and the Contract Documents, specifications and Drawings shall constitute the entire agreement between the Parties, and no inducements, considerations, promises or other references shall be implied in this Agreement that are not expressly addressed herein

15.8 Accounting Records

CONTRACTOR shall keep full and detailed accounts and exercise such controls as may be necessary for proper financial management under this Agreement; the accounting and control systems shall be reasonably satisfactory to CITY. CITY and CITY'S accountants shall be afforded access to CONTRACTOR's records, books, correspondence, instructions, drawings, receipts, Subcontracts, vouchers, memoranda and other data relating to this Agreement, and CONTRACTOR shall preserve these for a period of three (3) years after final payment, or for such longer period as may be required by law.

15.9 No Waiver

Neither the inspection by CITY or its agents, nor any order or certificate for payment of money, nor payment for, nor acceptance of the whole or any part of the work by CITY, nor any extensions of time, nor any position taken by CITY or its agents shall operate as a waiver of any provision of this Agreement or of any power herein reserved to CITY or any right to damages herein provided, nor shall any waiver of any breach of this Agreement be held to be a waiver of any other or subsequent breach.

15.10 CONTRACTOR Shall Assume Risks

Until the Final Completion or acceptance by CITY of all Work under this Contract, the Work shall be under CONTRACTOR's responsible care and charge. CONTRACTOR shall rebuild, repair, restore and make good all injuries, damages, corrections, and repairs occasioned or rendered necessary by accidental causes of any nature, to all or any portions of the Work, except as otherwise stipulated.

15.11 General Liability of CONTRACTOR

Except as otherwise herein expressly stipulated, CONTRACTOR shall perform all the work and furnish all the labor, materials, tools power and light, and appliances, necessary or proper for performing and completing the Work herein required in the manner within the time herein specified. The mention of any specific duty or liability of CONTRACTOR shall not be construed as a limitation or restriction of any general liability or duty of CONTRACTOR and, any reference to any specific duty or liability shall be construed to be the purpose of explanation.

15.12 Attorney's Fees and Venue

If either Party commences any legal action against the other Party arising out of this Agreement or the performance thereof, the prevailing Party shall be entitled to recover its reasonable litigation expenses, including but not limited to, court costs, expert witness fees, discovery expenses, and attorney's fees. Any action arising out of this Agreement shall be brought in Placer County, California, regardless of where else venue may lie. To the extent permitted by applicable law, each Party waives any defense that it may have based on lack of *in personam* jurisdiction or *forum nonconveniens*.

15.13 Third Party Beneficiaries

There are no third party beneficiaries to this Agreement.

IN WITNESS WHEREOF, the City of Roseville, a municipal corporation, has authorized the execution of this Agreement in duplicate by its City Manager and attested to by its City Clerk under the authority of Resolution No. _____, adopted by the Council of the City of Roseville on the ___ day of _____, 20___, and CONTRACTOR has caused this Agreement to be executed.

CITY OF ROSEVILLE,
a municipal corporation:

BY:_____
DOMINICK CASEY
City Manager

ATTEST:

BY:_____
SONIA OROZCO
City Clerk

AUBURN CONSTRUCTORS, LLC,
a California limited liability company:

BY:_____
J. Jean Bailey

its: President

and

BY:_____
John West

its: Vice President

APPROVED AS TO FORM:

BY: _____
MICHELLE SHEIDENBERGER
City Attorney

APPROVED AS TO SUBSTANCE

BY: _____
RICHARD D. PLECKER
Environmental Utilities Director

LIST OF EXHIBITS

Exhibit A	Contractor's Statement of Pre-Qualification [Not Used]
Exhibit B	Contractor's Technical Proposal
Exhibit C	Guaranteed Maximum Price, Cost of Work, and Fee
Exhibit D	Construction Allowance Items and Amounts
Exhibit E	Hazardous Materials
Exhibit F	In Lieu of Securities Escrow Agreement
Exhibit G	Bond Forms; Performance, Labor & Materials, and Warranty Bonds Note: Warranty Bond requirement may be waived at the option of CITY.
Exhibit H	Completion Times and Liquidated Damages

EXHIBIT A - CONTRACTOR'S STATEMENTS OF PRE-QUALIFICATION (SOPQ)

[NOT USED].

END OF EXHIBIT A

EXHIBIT B - CONTRACTOR'S TECHNICAL PROPOSAL

Auburn Constructors LLC

October 5, 2021

Janice R. Gainey, P.E. **Sent via email**
City of Roseville Environmental Utilities – Engineering
2005 Hilltop Circle
Roseville, CA 95747

RE: Design-Assist and Construction of Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project Proposal

Dear Janice:

Auburn Constructors, LLC respectfully submits this proposal for Design-Assist and Construction of Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire). For this critically important project due to the current drought conditions the City intends to utilize the Design-Assist Guaranteed Maximum Price (GMP) with shared savings contract delivery method. This method will effectively make the selected contractor a vital member of the project team, alongside the City and Carollo Engineers – who has been retained for engineering, design, and construction management services.

The Design-Assist GMP method benefits the City immensely as it allows for a qualifications-based bidding approach and provides for early contractor engagement and collaboration. Through collaboration, this method fosters cost appropriate approaches to the work and constructability opportunities. We are confident you will find AUBURN to be qualified, prepared, and a highly collaborative candidate to join the Design-Assist Team.

PROJECT OVERVIEW

Continued growth in the City's western water distribution area and an extended regional drought requires additional water facilities to be constructed to support water supply within the City's Pressure Zone 4 (PZ4) service area.

In 2020, the City initiated a project to expand the existing Aquifer Storage and Recovery

(ASR) Well Program. Preliminary design was completed for an initial set of well sites. Due to the current drought conditions two well sites were prioritized for implementation that already have wells drilled and ready for equipping.

Phase 1 Preliminary Engineering Design of the two facilities was completed by Carollo Engineers and the City's Environmental Utilities Department. This work included geotechnical investigations, site surveys, and preliminary design of the two sites.

SCOPE OF SERVICES

AUBURN shall furnish all labor, equipment, materials, and services specified for the Design-Assist and Construction of the improvements at the Well 9 (Westbrook) and Well 18 (Solaire) sites based on the **50% design level plans and partial draft technical specifications** included herein.

The scope of the construction work for each well site is summarized below (not including administrative tasks such as submittal preparation, startup, testing, etc.):

Site Work

- Construction of two (2) new cast-in-place concrete air gap structure with screened discharge pipe, structural supports, grating, and wood fencing.
- Tie into existing water distribution system with new 16-inch piping.
- Installation of yard piping for sewer, storm drain, drain, potable water, recycled water, and natural gas (if used). Yard piping includes all potholing, trenching, backfill, restrained fittings, thrust blocks and pavement saw cutting and repair. Piping includes all buried and above ground isolation valves, flow meters, vaults, and backflow devices.
- Cathodic protection (allowance).
- Installation of storm drain and sewer manholes.
- Site grading and construction of curbs, gutters, and paving.
- Construction of City standard CMU perimeter wall with an automatic gate at Well No. 9 and manual gate(s) at Well 18.
- Installation or repair of site concrete work including curb, gutter, sidewalk, door stoops, walkways, and equipment pads.
- Relocating and connecting to existing recycled water distribution system, installation of irrigation system in the landscaped strip between the back of curb and the building.
- Installation of site erosion control measures.
- Landscaping and Irrigation.

Building

- Construction of Concrete Masonry Unity (CMU) block well building to house well pump, sodium hypochlorite storage and feed system, fluoride storage and feed system, electrical and control equipment, and restroom.
- Installation of three (3) coiling overhead doors for vehicle access into pump room.
- Installation of two (2) exterior double doors and three (3) interior single doors.
- Installation of ventilation fans in the pump and chemical rooms, heaters in the pump and electrical room, and air conditioning for electrical room.
- Installation of fire protection system designed to meet NFPA and local requirements. The system will include smoke and carbon monoxide detectors connected to a fire alarm panel and to the City SCADA system. The installation of sprinklers will be determined on a room-by-room basis. It is assumed that flow and pressure will be provided by City distribution system and that a fire booster pump and fire room will not be required. At a minimum fire extinguishers, signage, and chemical hazard signage mounted inside and outside the building.
- Installation of trench drains with grating for building drainage and small diameter pipe routing in pump room.
- Installation of one (1) roof hatch over well pump with winch operated rigging to allow operators to open the hatch from ground level.
- Installation of one line shaft deep well vertical turbine pump and VFD motor.
- Installation of 12” downhole control valve. Assume Baski pneumatically operated, or 3R hydraulically operated valves. Installed 300 feet below ground surface.
- Installation of four (4) motor operated valves, and one (1) motor operated flow control valve in pump room. Assume two (2) 8-inch and three (3) 12-inch butterfly valves. Sizes may change during design.
- Installation of combination hydraulic diaphragm type flow control with pressure reducing valve and H-type strainer in pump room.
- Installation of piping, pipe supports, valves and appurtenances associated with pumping system.
- Installation of one (1) 2 hp deep well submersible vertical turbine monitoring well pump w/ VFD, set at approximately 300 ft below ground surface. Monitoring well head improvements, equipping and 1” PVC discharge pipe to storm drain air-gap structure.
- Installation of unisex handicap accessible restroom facility with lighting and ventilation.

Chemical

- Installation of one (1) 1,100-gallon dual contained sodium hypochlorite storage tank located in chemical room.
- Installation of dual skid-mounted progressive cavity sodium hypochlorite metering

pumping systems.

- Installation of skid-mounted progressive cavity fluoride metering pumping system including water softening system.
- Installation of one (1) 55-gallon dual contained fluoride saturation tank and one (1) 70-gallon pump tank located in chemical room.
- Installation of laboratory grade counters, top, sink, cabinets, and workstation inside chemical room.
- Installation of cast-in-place chemical containment sump with manual drain valve, grate, and level sensor located inside the chemical room.
- Installation of one (1) emergency eyewash and shower system with tepid water system.
- Installation of piping, pipe supports, valves and appurtenances associated with chemical systems.
- Installation of trench drains with grating for building drainage and small diameter pipe routing in chemical room.

Electrical

- Coordination with electric utility and installation of electric service to site including transformer, vaults, conduit, and wiring.
- Installation of exterior switchboard at Well Pump Station.
- Installation of interior manual Kirk Key interlock, distribution sections, panelboard, transformer, and control panel in electrical room of Well Pump Station.
- Installation of one (1) variable frequency drive in electrical room of Well Pump Station. Installation of one (1) monitoring well sample pump w/ VFD.
- Installation of light fixtures on and in the Well Pump Station and light poles throughout the site.
- Installation of all conduits, wire, supports, pull boxes, etc. to support the new system.
- Installation of temporary generator point of connection.
- Installation of all motor operated valves and flow control valve.
- Installation of Fiber Optic System.
- Electrical NETA Testing.
- Installation of grounding system.

Instrumentation and Controls

- Programmable logic controller (PLC) and control panel to monitor and control the new system.
- Door, hatch, and panel enclosure intrusion switches.
- Level measuring devices in downhole production and monitoring wells, chemical

containment sump, chemical storage tank and backwash tank.

- Residual chlorine analyzer, fluoride analyzer, conductivity sensor, and turbidity meter.
- Pressure transmitter on pump discharge header, and both sides of H-strainer and combination flow control/ pressure reducing valve.
- Bi-directional 24-inch magnetic flowmeter for aquifer injection and extraction flow measurement.
- Site access and security system, including fiber optic network tied into City fiber optic cable pathways and SCADA system.
- Miscellaneous instrumentation.

Fiter and Backwash Equipment

- Structural reinforced concrete slabs for equipment mounting, including for future sand separators.
- Complete filtration system for iron removal including filter vessels and media, system valving, PLC based controls with Touchscreen OIT, and System commissioning.
- 4,900-gal Backwash Waste/Equalization storage tank.
- Installation of piping, pipe supports, valves and appurtenances associated with the filtration and backwashing equipment. Installation of air-gap structure for backwash water to sewer.

AUBURN'S APPROACH

AUBURN'S goal is to deliver the ASR Wells 9 & 18 Project to the City on time and for a lower cost than budgeted. Throughout the project, our experienced staff will collaborate with the City, Engineer, Subcontractors and Suppliers to blend form and function with budget and time. We pay attention to every detail in order to deliver a quality project as cost-effectively as possible. Likewise, our highly skilled field staff will self-perform installation of underground and aboveground utilities, structural concrete, site electrical, mechanical equipment, and filter systems.

AUBURN has included a detailed GMP cost proposal for this Project. Along with an accurate budget, AUBURN will provide weekly updates to ensure opportunities are recognized, and any problems that need to be remedied are done so in a timely manner. This open book approach will give the City confidence that every dollar is being allocated efficiently.

A detailed project schedule has been developed for this project which highlights the level

of attention we put into every project we construct. In addition to all critical items being recognized at the onset, AUBURN will provide monthly progress reports summarizing activities performed during the reporting period, identify activities planned for the next reporting period, and identify performance and expenditures. AUBURN has never been assessed liquidated damages, which we attribute to our ability to produce and maintain excellent project schedules.

Long after construction is completed, this project will be highly visible to the public and provide a critical service to the surrounding community. AUBURN recognizes the great importance of this project to the City and will provide our distinguished attention to detail that we bring to every project we perform. AUBURN has an excellent track record of doing quality work and going the extra mile to ensure that all parties are satisfied with both function and aesthetics.

DESIGN ASSIST

Based on the 50% Design Level Drawings and Partial Draft Technical Specifications included herein, and in accordance with the Contract Documents Article 2.1-Scope of Work (Volume 2 - Agreement), AUBURN shall be a Design-Assist Team member with responsibility to complete the following design assist activities. Coordination with other members of the Design-Assist Team will be required; the City, Design Engineer, and Construction Manager.

AUBURN is currently under contract with the City to perform the following 30% and 60% level Design-Assist preconstruction services which shall overlap with this Project of which the costs are not included in the GMP:

30% Level Design Pre-construction Services

- Constructability review and design input to Design Consultant; Carollo Engineers.
- Prepare preliminary project schedule.
- Attend Design-Assist meetings with City of Roseville and Carollo.
- Prepare scopes and obtain pricing for long lead items.
    - Integrator
    - VFD’s
    - Well pump and motor
    - Downhole flow control valve
    - Filter vessels
    - Backwash tank
- Negotiate terms with vendors, prepare purchase orders, and release upon

approval from City of Roseville.
- Update schedule to reflect vendor commitments.

60% Level Design Preconstruction Services

- Constructability review and design input to Design Consultant; Carollo Engineers.
- Attend Design-Assist meetings with City of Roseville and Carollo.
- Provide submittals for long lead items from 50% Design.
- Prepare scopes and obtain pricing for balance of project.
- Provide City of Roseville with GMP pricing.
- Negotiate terms with vendors and subcontractors, prepare agreements, and release upon approval from City of Roseville.
- Update schedule to reflect vendor/subcontractor commitments.

AUBURN shall continue to work with the City and Carollo Engineers through the final design, providing our combined insight on construction means and methods to offer potential cost and schedule saving ideas that provide an overall benefit to the project. We shall participate in up to sixteen (16) Design Coordination Meetings lasting up to four (4) hours each to present and work collaboratively to allow for issuance of the Project Drawings and Specifications for construction.

PRELIMINARY PROJECT SCHEDULE

AUBURN has developed a detailed preliminary schedule for the project. Please see the separate attachment for further details.

ASSUMPTIONS/CONDITIONS/CLARIFICATIONS

The following items are details of the proposal for clarification as to inclusions or exclusions of our pricing. Items in which a budget is listed are intended to be competitively bid at a later date upon receipt of resolute specifications and plans for the specific work. Many of these budget items are generated from recent particularly familiar project budgets and/or past estimates. We are mindful of the potential variances in budgeted values versus competitively bid items. We will strongly consider, be transparent and be collaborative with each of these budgeted items in order to determine the best value selection for the project.

- Project specific licenses and permits are not included.
- Construction water to be supplied at no cost to the project.

- An onsite office trailer for use by the Engineer or Construction Manager is not included.
- Pursuant to discussions with Carollo Engineers, the building roof structural system shall be a wood framed system.
- Water Softener system shall be furnished and installed by a vendor such as Culligan Water which will become a vendor of the City of Roseville upon project completion.
- Overhead/Roll-up Doors at the buildings are included at a budget price of $19,500 per door system, which assumes automatic control is included.
- Building HVAC system is included with a budget of $125,000 per building.
- Sound enclosure panels are included for the pump room of the buildings at a budget of $50,000 per building.
- Framing and drywall for the building is included at a budget of $40,000 per building.
- Precast concrete systems (i.e. manholes, drop inlets, etc.) are included at a budget of $64,000.
- Third party engineering is included for the pipe support systems (racks) at the Filter System piping only.
- First fill/use of respective treatment chemicals are included at a budget of $2,000 per well site.
- Quality Control (general soils & concrete materials testing and lab work) is included at a budget of $122,000.
- Coordination with Roseville Electric and installation of transformer, conduit and wiring for new electrical service. All fees, permits and transformer costs are not included.
- Meter/Main switchboard installed inside electric rooms.
- Motor Control Centers with manual Kirk Key interlock, distribution sections, monitoring well pump VFD's, panelboards and transformers inside electric rooms.
- Master control panel inside electric rooms.
- Well pump VFD inside electric rooms, (1) at each Well Pump Station.
- Site and building light fixtures including (3) site pole lights at each Well Pump Station.
- Installation of all conduits, wire, supports, pull boxes, etc. to support the new electrical system.
- Temporary generator point of connection.
- Grounding system.
- Electrical NETA testing.
- Instrumentation.
- Programming for the Master PLC.
- Conduit, fiber optic cable, testing for a complete fiber optic system.

- Fire alarm system.

ALLOWANCES

- Landscaping (undefined at this time)
- Well Pumps & Motors (to be used for potential design changes)
- Cathodic Protection (design additions)

AUBURN looks forward to the opportunity to bring a focused, effective, and efficient team of the right people to work in a collaborative and cooperative manner with the City, and Carollo Engineers on this critically important project. We will build on our individual talents along with our successful history of working together in the delivery of the ASR Well Projects to bring the City a creative, innovative, high-quality project which is both responsive to operational improvements and responsible to the budgetary realities of the project.

As you review this proposal, please contact us in our Sacramento office at 916.924.0344 if you have any questions.

Sincerely,

J. Dean Bailey

J. Dean Bailey
President

ATTACHMENTS TO PROPOSAL

FOR DESIGN-ASSIST CONSTRUCTION OF
Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire)

FORM 1- PROPOSER'S CERTIFICATION

FORM 2 - LICENSES and DIR REGISTRATION

FORM 3 - STATEMENT OF SUBCONTRACTORS

FORM 4 – ASSURANCE OF DESIGNATED PROJECT TEAM

FORM 5 – NO CONFLICT OF INTEREST DECLARATION

FORM 6 – NON-COLLUSION DECLARATION

FORM 7 - IRAN CONTRACTING ACT DISCLOSURE FORM

FORM 8 - GUARANTEED MAXIMUM PRICE, COST OF WORK AND FEE

FORM 9 – ESCROW PROPOSAL DOCUMENT CERTIFICATION

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FORM 1- PROPOSER'S CERTIFICATION

Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project

In response to the Request for Scope and Fee Proposal, the undersigned hereby proposes to City to furnish all plant, labor, technical and professional services, supervision, materials, and equipment (other than materials and equipment specified as furnished by City), and to perform all operations necessary and required for construction of the Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project, in accordance with the Contract Documents, and any Addenda thereto, for the Total Guaranteed Maximum Price (GMP) and all other terms submitted in the Proposal.

This Proposal constitutes a firm offer to City, which cannot be withdrawn for forty-five (45) days from and after the date set for receiving Proposals, or until the Agreement is fully executed by City, whichever is earlier.

It is understood that this Proposal is based upon completion of the Work within a period outlined in Exhibit H-COMPLETION TIMES AND LIQUIDATED DAMAGES, of the Agreement commencing on the date specified in the Notice to Proceed.

The undersigned Proposer hereby certifies that it has examined and is fully familiar with all of the provisions of the Contract Documents; has carefully checked all of the words and figures shown on its Proposal; has carefully reviewed the accuracy of all statements in this Proposal and attachments hereto; and understands and agrees that City will not be responsible for any errors or omissions on the part of the undersigned in preparing this Proposal.

The undersigned Proposer has, by careful examination of the Contract Documents, and by examination of the actual Site conditions, satisfied itself as to the nature and location of all Work, the general and local conditions to be encountered in the performance of any Work, the requirements of the Contract Documents, and all other matters that can in any way affect the Work or the cost thereof.

The undersigned agrees to execute the Agreement and provide City the executed Agreement, the required insurance certificates, endorsements, and waivers of subrogation, and the required surety bonds within fifteen (15) business days after the undersigned's receipt of the City's unsigned Agreement.

I further certify that this proposal is made without prior understanding, agreement, connection, discussion, or conspiracy with any other person, firm or corporation submitting a proposal for the same product or service; that this proposal is fair and made without outside control, collusion, fraud or illegal action; that no officer, employee or agent of the City or any other proposer is financially interested in said proposal; that no undue influence or pressure was used against or in concert with any officer, employee or agent of the City in connection with the award or terms of the contract that will be executed; and that the undersigned executed this Proposer's Certification with full knowledge and understanding of the matters therein contained and was duly authorized to do so.

Type of Organization:

____ Sole Proprietorship ____ Corporation _____ State of Incorporation

____ Partnership _X_ Limited Liability Company

Certification if proposing firm is a **Sole Proprietorship:**

Name (typed or printed):			
By:			
	(Individual's signature)		
Doing business as:			
Business Address:			
Phone Number:	( )	FAX Number:	( )
Email Address of Authorized Representative:			

Certification if proposing firm is a **Partnership**

Partnership Name (typed or printed):			
By:			
	(Signature of general partner- attach evidence of authority to sign)		
Name (typed or printed):			
Business Address:			
Phone Number:	( )	FAX Number:	( )
Email Address of Authorized Representative:			

Certification if proposing firm is a **Corporation:**

Corporation Name (typed or printed):			
State of Incorporation:			
By:			
		(Signature - attach evidence of authority to sign – Board Resolution)	
Name (typed or printed):			
Title:			
(CORPORATE SEAL)			
Attest:			
		(Signature of Corporate Secretary)	
Name:			
Date of Qualification to do business:			
Business Address:			
Phone Number:	( )	FAX Number:	( )
Email Address of Authorized Representative:			

***If person executing on behalf of a Corporation is not the President or Vice President, evidence of authority to sign on behalf of Corporation must be attached.**

Certification if proposing firm is a **Limited Liability Company:**

Limited Liability Company Name:	Auburn Constructors, LLC		
By:			
	(Signature of Managing Member - attach evidence of authority to bind the LLC under the LLC's articles of organization)		
Name (typed or printed):	J. Dean Bailey		
Title:	President		
Business Address:	730 W. Stadium Lane Sacramento, CA 95834		
Phone Number:	(916).924.0344	FAX Number:	(916).924.1800
Email Address of Authorized Representative:	dbailey@auburnconstructors.com		

****END OF FORM 1****

LIMITED LIABILITY COMPANY – SIGNATURE AUTHORITY
AUBURN CONSTRUCTORS, LLC

The special meeting of the Members of Auburn Constructors, LLC was held at Sacramento, CA on January 15, 2021 at 2:00 p.m., all Members present, J. Dean Bailey, Managing Member, presided over the meeting.

RESOLVED, that J. Dean. Bailey, as Managing Member, shall be duly authorized to sign all legal documents on behalf of Auburn Constructors, LLC.

John West
Member

Brian Couper
Member

Rich White
Member

Secretary of State
Statement of Information
(Limited Liability Company)

LLC-12

20-B85129

FILED

In the office of the Secretary of State
of the State of California

MAY 01, 2020

This Space For Office Use Only

IMPORTANT — Read instructions **before completing this form.**

Filing Fee – $20.00

Copy Fees – First page $1.00; each attachment page $0.50;
Certification Fee - $5.00 plus copy fees

1. Limited Liability Company Name (Enter the exact name of the LLC. If you registered in California using an alternate name, see instructions.)

AUBURN CONSTRUCTORS, LLC

2. 12-Digit Secretary of State File Number	3. State, Foreign Country or Place of Organization (only if formed outside of California)
201815110028	CALIFORNIA

4. Business Addresses

	City (no abbreviations)	State	Zip Code
a. Street Address of Principal Office - Do not list a P.O. Box: 730 W. Stadium Lane	Sacramento	CA	95834
b. Mailing Address of LLC, **if different than item 4a**: 730 W. Stadium Lane	Sacramento	CA	95834
c. Street Address of **California** Office, if Item 4a is not in California - Do not list a P.O. Box: 730 W. Stadium Lane	Sacramento	**CA**	95834

5. Manager(s) or Member(s)

If no **managers** have been appointed or elected, provide the name and address of each **member**. At least one name **and** address must be listed. If the manager/member is an individual, complete Items 5a and 5c (leave Item 5b blank). If the manager/member is an entity, complete Items 5b and 5c (leave Item 5a blank). Note: The LLC cannot serve as its own manager or member. If the LLC has additional managers/members, enter the name(s) and addresses on Form LLC-12A (see instructions).

a. First Name, if an individual - Do not complete Item 5b	Middle Name	Last Name	Suffix
JACK	Dean	Bailey	

b. Entity Name - Do not complete Item 5a

Address	City (no abbreviations)	State	Zip Code
8840 CARRIAGE DR	Granite Bay	CA	95746

6. Service of Process (Must provide either Individual **OR** Corporation.)

INDIVIDUAL – Complete Items 6a and 6b only. Must include agent's full name and California street address.

a. California Agent's First Name (if agent is **not** a corporation)	Middle Name	Last Name	Suffix
JACK	Dean	Bailey	

b. Street Address (if agent is **not** a corporation) - **Do not enter a P.O. Box**	City (no abbreviations)	State	Zip Code
8840 CARRIAGE DR	GRANITE BAY	**CA**	95746

CORPORATION – Complete Item 6c only. Only include the name of the registered agent Corporation.

c. California Registered Corporate Agent's Name (if agent is a corporation) – Do not complete Item 6a or 6b

7. Type of Business

a. Describe the type of business or services of the Limited Liability Company
General Engineering Contractor

8. Chief Executive Officer, if elected or appointed

a. First Name	Middle Name	Last Name	Suffix
JACK	Dean	Bailey	

b. Address	City (no abbreviations)	State	Zip Code
8840 CARRIAGE DR	GRANITE BAY	CA	95746

9. The Information contained herein, including any attachments, is true and correct.

05/01/2020	JACK Dean Bailey	President	
Date	Type or Print Name of Person Completing the Form	Title	Signature

Return Address (Optional) (For communication from the Secretary of State related to this document, or if purchasing a copy of the filed document enter the name of a person or company and the mailing address. This information will become public when filed. SEE INSTRUCTIONS BEFORE COMPLETING.)

Name: [ ]

Company:

Address:

City/State/Zip: [ ]

Attachment to Statement of Information (Limited Liability Company)

LLC-12A Attachment

19-A23281

A. Limited Liability Company Name

AUBURN CONSTRUCTORS, LLC

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B. 12-Digit Secretary of State File Number	C. State or Place of Organization (only if formed outside of California)
201815110028	CALIFORNIA

D. List of Additional Manager(s) or Member(s) - If the manager/member is an individual, enter the individual's name and address. If the manager/member is an entity, enter the entity's name and address. Note: The LLC cannot serve as its own manager or member.

First Name	Middle Name	Last Name	Suffix
Brian		Couper	
Entity Name			
Address	City (no abbreviations)	State	Zip Code
730 W. Stadium Lane	Sacramento	CA	95834
First Name	Middle Name	Last Name	Suffix
John		West	
Entity Name			
Address	City (no abbreviations)	State	Zip Code
730 W. Stadium Lane	Sacramento	CA	95834
First Name	Middle Name	Last Name	Suffix
Richard		White	
Entity Name			
Address	City (no abbreviations)	State	Zip Code
730 W. Stadium Lane	Sacramento	CA	95834
First Name	Middle Name	Last Name	Suffix
Entity Name			
Address	City (no abbreviations)	State	Zip Code
First Name	Middle Name	Last Name	Suffix
Entity Name			
Address	City (no abbreviations)	State	Zip Code
First Name	Middle Name	Last Name	Suffix
Entity Name			
Address	City (no abbreviations)	State	Zip Code
First Name	Middle Name	Last Name	Suffix
Entity Name			
Address	City (no abbreviations)	State	Zip Code

FORM 2 - LICENSES and DIR REGISTRATION

Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project

List the licenses held by your company and/or employees. The following representations are made under penalty of perjury.

A. CONTRACTOR'S LICENSES

CA State License No.	Name on License	Class/Type	Expiration Date
1043407	Auburn Constructors, LLC	A, B, C-10	08/31/2022

B. CITY OF ROSEVILLE BUSINESS LICENSE

Contractors are not required to have a City of Roseville Business license to submit a proposal; however, it will be required before executing a contract. Contractors may apply for a business license at: https://www.roseville.ca.us/government/departments/finance/licensing/business

Do you currently have a City of Roseville Business License? X Yes _____ No

License No. 00838961

C. DEPARTMENT OF INDUSTRIAL RELATIONS CONTRACTOR REGISTRATION

***For Public Works Projects (SB854)**: Contractors must register with the Department of Industrial Relations (DIR) pursuant to Labor Code section 1725.5. The Contractor shall provide proof of current registration with the Department of Industrial Relations for both itself and all listed subcontractors with their proposal. Contractors may register at: http://www.dir.ca.gov/public-works/publicworks.html

DIR contractor registration number and expiration date:

No.: 1000060543 Expiration Date: 06/30/2022

****END OF FORM 2****

dca
DEPARTMENT OF CONSUMER AFFAIRS

CONTRACTORS
STATE LICENSE BOARD
ACTIVE LICENSE

License Number **1043407** Entity LLC

Business Name AUBURN CONSTRUCTORS LLC

Classification(s) A B C10

Expiration Date 08/31/2022 www.cslb.ca.gov

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FORM 3 - STATEMENT OF SUBCONTRACTORS

Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project

The undersigned Proposer submits herewith a list of subcontractors the Contractor proposes to employ on the Work that will each perform **Work in an amount greater than one half of one percent (0.5%) of the Total GMP** submitted in their Cost Proposal.

This list shall include the proper firm name, their license number and class, city and state of each subcontractor, and the portion of the Work to be done by each subcontractor with the understanding that failure to name such subcontractors shall be witness that the Contractor shall have agreed to perform such portion of the Work themselves; and that the Contractor shall not subcontract said portion of the Work.

If a subcontractor is listed, there shall be no substitution of that subcontractor without first obtaining written permission of City Council pursuant to the provisions of Section 4107 of the Public Contract Code.

The Contractor shall list only one subcontractor for each portion of the Work to be done as defined by the Contract Documents. The City will determine the percentage of the Work self-performed by the Proposer, by subtracting the total percentage of below listed subcontractors work from 100%.

Table 4-1: Statement of Subcontractors

Work to be done by Subcontractor	Percent of Total GMP	Name of Subcontractor	Place of Business (City and State)	CSLB Contractor License Number	DIR Registration Number, and Expiration Date
Framing/Drywall		TBD			
Gates		TBD			
HVAC		TBD			
Landscape		TBD			
Masonry	5.2%	PTS Masonry Inc.	Sacramento, CA	704533	1000000391
Overhead Doors		TBD			

Work to be done by Subcontractor	Percent of Total GMP	Name of Subcontractor	Place of Business (City and State)	CSLB Contractor License Number	DIR Registration Number, and Expiration Date
Paints & Coatings	1.4%	Mason Painting	Orangevale, CA	819987	1000008947
Reinforcing Steel		TBD			
Roofing	0.9%	Kodiak Union Roofing Services, Inc.	Roseville, CA	911674	1000003650

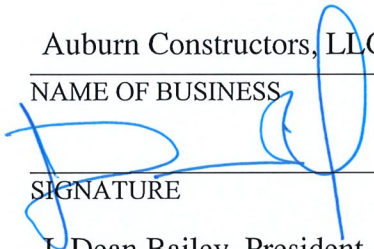
****END OF FORM 3****

FORM 4 – ASSURANCE OF DESIGNATED PROJECT TEAM

Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project

The undersigned Proposer certifies that the designated project team, including subcontractors, will be used for this Project. Departure or reassignment of, or substitution for, any member of the designated project team or subcontractors shall not be made without the prior written approval of the City.

Auburn Constructors, LLC
NAME OF BUSINESS


SIGNATURE

J. Dean Bailey, President
NAME & TITLE, TYPED OR PRINTED

730 W. Stadium Lane, Sacramento, CA 95834
MAILING ADDRESS

916.924.0344
TELEPHONE NUMBER

dbailey@auburnconstructors.com
EMAIL

****END OF FORM 4***

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FORM 5 – NO CONFLICT OF INTEREST DECLARATION

Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project

The undersigned Proposer certifies that no official or employee of the City has an interest, has been employed or retained to solicit or aid in the procuring of the resulting agreement, nor that any such person will be employed in the performance of such work without immediate divulgence of such fact to the City. Proposers submitting a Proposal must disclose any actual, apparent, direct, indirect, or potential conflicts of interest that may exist with respect to the Proposer or the Proposer's management or employees relative to the services to be provided to the City. Conflict of interest issues may require consultation with legal counsel. **If a Proposer has no conflicts of interest, a statement to that effect must be added to this FORM 7**. Violation of this section shall be a material breach of the Agreement entitling the City to any and all remedies by law or in equity.

The undersigned Proposer certifies that no undue influence or pressure is used against or in concert with any officer or employee of the City in connection with the award or terms of the Agreement that will be executed, including any method of coercion, confidential financial arrangement or financial inducement. No officer or employee of the City shall receive compensation, directly or indirectly, from the Proposer, or from any officer, employee or agent of the Proposer, in connection with the award of the Agreement or any Work to be conducted. Violation of these requirements shall be a material breach of the contract entitling the City to any and all remedies by law or in equity.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on 09/29/2021 [date], at Sacramento [city], California [state].

(Signature of Declarant)

****END OF FORM 5****

Auburn Constructors LLC

Assurance of Absence of Conflict of Interest

Auburn Constructors, LLC. hereby assures the City that no official or employee of the City has an interest, has been employed or retained to solicit or aid in the procuring of the resulting contract, nor that any such person will be employed in the performance of such contract without immediate divulgence of such fact to the City. AUBURN does not have any actual, apparent, direct, or potential conflicts of interest that may exist with respect to AUBURN or AUBURN's management or employees relative to the services to be provided to the City. AUBURN understands that any violation of the conflict of interest clause shall be a material breach of the contract entitling the City to any and all remedies by law or in equity.

Sincerely,

J. Dean Bailey
President

730 West Stadium Lane • Sacramento, CA 95834-1130 • (916) 924-0344 • Fax (916) 924-1800

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FORM 6 – NON-COLLUSION DECLARATION

Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project

NONCOLLUSION DECLARATION TO BE EXECUTED BY BIDDER AND SUBMITTED WITH PROPOSAL

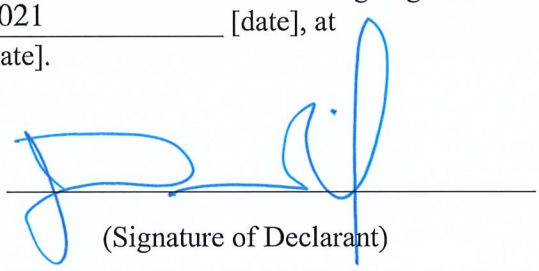
The undersigned declares:

I am the President of Auburn Constructors, LLC, the party making the foregoing Proposal.

The Proposal is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The Proposal is genuine and not collusive or sham. The Proposer has not directly or indirectly induced or solicited any other Proposer to put in a false or sham Proposal. The Proposer has not directly or indirectly colluded, conspired, connived, or agreed with any Proposer or anyone else to put in a sham Proposal, or to refrain from proposing. The Proposer has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the Proposal price of the Proposer or any other Proposer, or to fix any overhead, profit, or cost element of the Proposer price, or of that of any other Proposer. All statements contained in the Proposal are true. The Proposer has not, directly or indirectly, submitted his or her Proposal price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham Proposal, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a Proposer that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the Proposer.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on 09/29/2021 [date], at Sacramento [city], California [state].



(Signature of Declarant)

****END OF FORM 6****

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FORM 7 - IRAN CONTRACTING ACT DISCLOSURE FORM

GENERAL REQUIREMENTS

Pursuant to the Iran Contract Act of 2010 (California Public Contract Code, Sections 2202-2208), Proposers are ineligible to propose on projects with a public entity for goods or services of one million dollars ($1,000,000) or more if the Proposer engages in investment activities in Iran.

Proposers must provide the below disclosure form as a mandatory submittal for all projects in excess of $1,000,000. The Iran Contracting Act Disclosure Form shall be submitted by all Proposers as a mandatory submittal.

(California Public Contract, Sections 2202-2208)

When responding to a bid or proposal or executing a contract or renewal for a City contract for goods or services of $1,000,000 or more, a vendor must either: a) certify it is **not** on the current list of persons engaged in investment activities in Iran created by the California Department of General Services ("DGS") pursuant to Public Contract Code section 2203(b) and is not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS; or b) demonstrate it has been exempted from the certification requirement for that solicitation or contract pursuant to Public Contract Code Section 2203(c) or (d).

To comply with this requirement, please provide your vendor or financial institution name and complete **one** of the options on the following page. Please note: California law establishes penalties for providing false certifications, including civil penalties equal to the greater of $250,000 or twice the amount of the contract for which the false certification was made; contract termination; and three-year ineligibility to bid on contracts. (Public Contract Code section 2205.)

OPTION #1 – CERTIFICATION

I, the official named below, certify I am duly authorized to execute this certification on behalf of the vendor/financial institution identified below, and the vendor/financial institution identified below is **not** on the current list of persons engaged in investment activities in Iran created by DGS and is not a financial institution extending twenty million ($20,000,000) or more in credit to another person/vendor, for 45 days or more, if that other person/vendor will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

Vendor Name/Financial Institution (Printed) Auburn Constructors, LLC	
By (Authorized Signature)	
Printed Name and Title of Person Signing J. Dean Bailey, President	
Date Executed 09/29/2021	*Executed in* Sacramento, California

OPTION #2 – EXEMPTION

Pursuant to Public Contract Code sections 2203(c) and (d), a public entity may permit a vendor/financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to bid on, submit a proposal for, or enters into or renews, a contract for goods and services.

If you have obtained an exemption from the certification requirement under the Iran Contracting Act, please fill out the information below, and attach documentation demonstrating the exemption approval.

Vendor Name/Financial Institution (Printed)	
By (Authorized Signature)	
Printed Name and Title of Person Signing	
Date Executed	*Executed in*

****END OF FORM 7****

FORM 8 - GUARANTEED MAXIMUM PRICE, COST OF WORK AND FEE

Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project

1.0 TOTAL PROPOSED GUARANTEED MAXIMUM PRICE (GMP)

The undersigned proposes and agrees to contract with the City to perform all of the Work for the Design Assist and Construction of the Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project including subsidiary obligations as defined in the Contract, for a **Guaranteed Maximum Price ("GMP")** of Fourteen Million Five Hundred Twenty Five Thousand Three Hundred dollars ($14,525,300.00), U.S. Currency.

Subject to the provisions of this Proposal and the Contract, the costs and expenses which the Contractor may include in the Cost of Work for purposes of determining that aspect of the Contractor's compensation are as set forth below. The Contractor's total compensation, including Fee and allowable mark-ups, shall not exceed the GMP.

The GMP may be adjusted by Change Order in accordance with the Agreement.

2.0 BREAKDOWN OF GUARANTEED MAXIMUM PRICE

Proposer provides the breakdown of the Contractor's GMP by major items of work as shown in **Table 8-1: Breakdown of Guaranteed Maximum Price** for each of the well sites. The cost breakdown should sum to a total that equals the GMP given in this FORM 8 Section 1.0: Total Proposed Guaranteed Maximum Price.

Table 8-1: Breakdown of Guaranteed Maximum Price

	Scope Area	Cost
1	**Design Assist Services**	**$500,300.00**
2	**Mobilization, Demobilization, Bonds & Insurance**	**$750,000.00**
3	**Sheeting/Shoring/Bracing per Labor Code Section 6707 (From 8, Table 8-5: Total Amount for Worker Protection for CA Labor Code Section 6707)**	**$50,000.00**
	Well 9 – Westbrook (scope areas start with W)	
W-1	Sitework: Grading, Paving, Other Surfacings, Perimeter Fence, Gates, Landscaping	$550.000.00
W-2	Yard Piping: All Underground Piping including 16" Potable Water (PW), 18" Storm Drain (SD), 8" Sanitary Sewer (SS), 2" Potable Water (PW), Floor Drain System w/ Trench Drain, Backwash Waste (BWW), Filter Drain (FD), 10" Pump to Waste (AF), 12" Filter Influent	$415,000.00

	Scope Area	Cost
W-3	ASR Well Building: Slab Foundation, CMU walls, Roof System, Man & Roll-up Doors, Plumbing, HVAC, Paints & Coatings, 7'x7' Roof Hatch	$1,075,000.00
W-4	Well Pump & Motor: Well Pump, Motor, Baski Valve (nitrogen system), and Associated Piping & Supports, Monitoring Well Pump & Equipping	$1,235,000.00
W-5	Chemical System: Storage Tanks, Feed Systems, and Associated Piping & Supports	$170,000.00
W-6	Filter System: Filter Vessels, Backwash Waste & Equalization Tank, and Associated Piping & Support	$1,750,000.00
W-7	Electrical & Instrumentation: Conduit, Conductors, Trenching, Pull Boxes, Junction Boxes, Lighting, Wire Devices, VFDs , Supports Data Cables, Panels, Sensors, Instruments, Switches, Terminations, Calibration Start-up & Commission, PLC Programming and Configuration	$1,400,000.00
W-8	All Other Work	$215,000.00
	Westbrook (Well 9) GMP Subtotal:	**$6,810,000.00**
	Well 18 – Solaire (scope areas start with S)	
S-1	Sitework: Grading, Paving, Other Surfacings, Perimeter Fence, Gates, Landscaping	$580,000.00
S-2	Yard Piping: All Underground Piping including 16" Potable Water (PW), 18" Storm Drain (SD), 8" Sanitary Sewer (SS), 2" Potable Water (PW), Floor Drain System w/ Trench Drain, Backwash Waste (BWW), Filter Drain (FD), 10" Pump to Waste (AF), 12" Filter Influent	$425,000.00
S-3	ASR Well Building: Slab Foundation, CMU walls, Roof System, Man & Roll-up Doors, Plumbing, HVAC, Paints & Coatings, 7'x7' Roof Hatch	$1,060,000.00
S-4	Well Pump & Motor: Well Pump, Motor, Baski Valve (nitrogen system), and Associated Piping & Supports, Monitoring Well Pump and Equipping	$1,090,000.00
S-5	Chemical System: Storage Tanks, Feed Systems, and Associated Piping & Supports	$165,000.00
S-6	Filter System: Filter Vessels, Associated Pumps, Blowers, Backwash Waste & Equalization Tank, and Associated Piping & Support	$1,300,000.00
S-7	Electrical & Instrumentation: Conduit, Conductors, Trenching, Pull Boxes, Junction Boxes, Lighting, Wire Devices, VFDs , Supports Data Cables, Panels, Sensors, Instruments, Switches,	$1,240,000.00

	Scope Area	Cost
	Terminations, Calibration Start-up & Commissioning, PLC Programming and Configuration	
S-8	All Other Work	$210,000.00
	Solaire (Well 18) GMP Subtotal:	**$6,070,000.00**
4	**Allowances Item Total (From Table 8-6)**	**$345,000.00**
	Total GMP:	**$14,525,300.00**

3.0 COST OF THE WORK

The term "Cost of Work" means the sum of all costs necessarily incurred and paid by the Contractor for labor, materials, equipment, subcontractors, special services, bonds, liability, workers' compensation and errors and omissions insurance, direct job overhead expenses, taxes and other necessary expenses incurred in the performance of the Work, that do not exceed the GMP.

3.1 Hourly Field Labor

The cost of hourly field craft labor for workers used in actual and direct performance of the work by the Contractor will be the sum of the following:

A. The actual wages paid plus any employer payments to, or on behalf of workers for fringe benefits including health and welfare, pension, vacation and similar purposes.

B. All payments imposed by State and Federal Laws including, but not limited to, workers' compensation insurance, and social security payments. The rates used for workers' compensation insurance shall be actual rates paid by the Contractor for each specific craft and broken down by wage rate if applicable to that craft.

C. Actual General Liability insurance burden, if applied to Contractor's payroll.

3.2 Hourly Field Craft Labor Rates Limitations

The cost of hourly field craft labor for workers used in actual and direct performance of the work by the Contractor will be limited by the following:

A. Except as otherwise may be agreed to in writing by the City, the actual wages and benefits paid for manual classifications of Contractor's on-site workers will not, in the aggregate, be greater than the current applicable wage for each classification as established by the State of California Department of Industrial Relations.

B. Specifically prohibited from the labor costs are other payroll burden factors such as small tools (as defined in FORM 8 Section 3.6-Construction Equipment), bonuses of any kind and safety incentives.

B. Specifically prohibited from the labor costs are other payroll burden factors such as small tools (as defined in FORM 8 Section 3.6-Construction Equipment), bonuses of any kind and safety incentives.

C. The Hourly Field Labor Rates will remain unchanged for the duration of the Project unless changed in accordance with an Industry Master Labor Agreement, if the Contractor is signatory to any such Agreements, changes by the Department of Industrial Relations, or changes made company-wide in the Contractor's organization for a craft classification in the Project's geographic area. All changes to these hourly field labor rates must be submitted by the Contractor to the City for review and approval prior to billing the City for work performed with new hourly labor rates. Increase in labor rates is not an allowable increase in the GMP.

3.3 Contractor's Hourly Field Craft Labor Rates

A. Based on the requirements and limitations of Sections; 3.1-Hourly Field Craft Labor, and 3.2- Hourly Field Craft Labor Rates Limitations, the undersigned Proposer provides their hourly field labor rates set forth in **Table 8-2** for all labor employed by Contractor used in the performance all of the Work for the Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project.

B. The proposer is to list the crafts and classifications, up to foreman level, they anticipate using in the performance of the work when completing this **Table 8-2**. Should the contractor ultimately use a craft classification not listed in table below, the contractor will submit backup cost information for that craft classification to the city.

C. Contractor shall include the actual travel and/or subsistence costs, if any, as a separate line item under the labor cost category when submitting progress billings to the City. Except as otherwise may be agreed to in writing by the City, the actual travel and/or subsistence costs will not be more than established in an applicable Master Labor Agreement or the State of California Department of Industrial Relations.

Table 8-2: Hourly Rates. **Contractor Name:** Auburn Constructors, LLC

Craft	Classification	Base Wage	Fringes Plus Vacation	P/R Tax & Insurance	Straight Time Hourly Rate	Overtime Daily /Saturday Rate (1.5 X)	Overtime Sunday /Holiday Rate (2 X)
CARPENTER	Foreman	55.07	30.78	11.78	97.63	129.48	161.32
(Area 3) 7/1/21 to 6/30/22	Journeyman - Leadman	51.07	30.78	10.93	92.78	122.31	151.84
	Journeyman	50.07	30.78	10.71	91.56	120.52	149.47
MILLWRIGHT	Foreman	56.57	32.38	12.11	101.06	133.77	166.48
(Area 3) 7/1/21 to 6/30/22	Journeyman	52.57	32.38	11.25	96.20	126.60	157.00
CEMENT MASON	Foreman	50.29	23.88	10.86	85.03	114.11	143.19
7/1/21 to 6/30/22	Journeyman - Leadman	45.53	23.88	9.83	79.24	105.57	131.90
	Journeyman	44.53	23.88	9.62	78.03	103.78	129.53
OPERATOR	Lg Crane -Gp 2A (45-100tn)	54.04	31.03	10.34	95.41	126.66	157.91
(Area 3) 6/26/21/to 6/25/22	Backhoe/Excavator (Gp 3)	51.91	31.03	9.94	92.88	122.89	152.91
	Crane (Gp 3 < 45 ton)	52.30	31.03	10.01	93.34	123.58	153.83
	Loader (Gp 4)	50.53	31.03	9.67	91.23	120.45	149.67
	Compactor (Gp 5)	49.26	31.03	9.43	89.72	118.20	146.69
	Boomtruck (Gp 7)	46.80	31.03	8.96	86.79	113.85	140.91
LABORER	Specialist-Foreman	55.07	23.86	10.54	89.47	121.31	153.16
(Area 2) 7/1/21 to 6/30/22	Specialist - Leadman 1	40.35	19.99	7.72	68.06	91.40	114.73
	Specialist - Leadman 2	40.35	22.34	7.72	70.41	93.75	117.08
	Specialist - Journeyman	36.10	24.24	6.91	67.25	88.12	109.00
TEAMSTER	Journeyman - Group 2	38.49	28.48	7.37	74.34	96.59	118.85
7/1/21 to 6/30/22	Journeyman - Group 3	38.79	28.48	7.42	74.69	97.12	119.56
INSIDE WIREMAN	Foreman	49.18	31.30	8.33	89.30	117.74	146.17
(Placer County)	Journeyman	45.18	31.30	7.65	84.58	110.71	136.83
8/22/21 to 1/31/22							

3.4 Management and Administrative Labor

A. Wages and Salaries of Contractor's supervisory and administrative personnel assigned to this Project to directly manage and administer the Work: These positions may include a Principal-in-Charge, On-site Project Manager, On-site Project Engineer, On-site Superintendents, Yardman/Delivery Driver and On-site Administrative Assistant. These positions will be paid in accordance with the following Table 3 for entire duration of the Project and include all labor burden, overhead and profit mark-ups. The Principal-in-Charge can only charge for hours worked at the Site for this Project and can also charge for attendance of on-site Project Meetings. Any off-site Principal-in-Charge time spent on this Project shall be included in **Table 8-3: Management and Administrative Labor Rates**.

B. The Contractor is allowed to charge up to a maximum of fifty (50) hours per week for each full-time assigned supervisory and administrative personnel even if an employee works more than fifty (50) hours in a week. The Contractor can only charge for supervisory and administrative hours if they also pay those same hours to the employee that worked up to fifty (50) hours in any given week. The Contractor is not allowed to charge for any supervisory and administrative personnel hours not paid to any employee.

Other company personnel such as Corporate Officers and Division/Area Managers (unless either are designated as the Principle-in-Charge), Quality Control Managers, Safety Officers, Project Schedulers, Project Coordinators, Estimators, Business Supervisors and Accountants are not allowed to charge any hours to the Project. The Proposer should include the anticipated cost of such personnel in the **Table 8-3: Management and Administrative Labor Rates**.

C. Based on the above requirements for Management and Administrative Labor, the undersigned Proposer proposes the rates set forth in **Table 8-3** for all Management and Administrative labor employed by Contractor used in the performance all of the Work for the Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project.

Table 8-3: Management and Administrative Labor Rates

Management and Administrative Position	Hourly Rate
Principal-in-Charge	$ 150.00
Project Manager	$ 135.00
Electrical Project Manager	$ 135.00
Electrical Superintendent	$ 125.00
Estimator	$ 125.00
Yard Man/Delivery Driver	$ 50.00

3.5 Materials

The cost of all materials, including all factory testing, freight and delivery costs of materials, used in performing the work will be the cost to the Contractor from the supplier thereof. All discounts for early payment shall accrue to the Contractor unless the City's payment to Contractor is paid to Contractor before discount payment is due in which case discount savings will be fully credited to the City on next progress billing. All rebates and all returns from the sale of surplus materials shall be credited to the Cost of the Work. Any rebates from future use of re-usable materials, such as concrete forming materials, shall be negotiated between the Contractor and City as materials are evaluated for possible Contractor re-use on other projects.

3.6 Construction Equipment

A. The undersigned Proposer proposes the initial Contractor Owned Equipment Rates set forth in **Table 8-4** for all Contractor Owned Equipment used in the performance all of the Work for the Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project. The rates found in this table for equipment owned by the Contractor will, in all cases, be understood to cover all fuel, supplies, repairs, maintenance, insurance, ownership, and incidental costs and no further allowances will be made for those items, unless specifically approved in writing by the City.

B. Equipment owned by Contractor will only be paid for the actual time equipment is used in performing work and will be rounded to the closest full hour if paid by an hourly rate.

C. Compensation for idle time of equipment through delays caused by the City will be made consistent with Article 9-Changes in the Work in the Design-Assist Agreement; however, that the Owned Equipment Rates set forth below in **Table 8-4** will apply.

D. All changes to these equipment rates must be submitted by the Contractor to the City for review and approval prior to billing the City for work performed with new hourly labor rates. Approved changes to equipment rates are not an allowable increase in the GMP.

E. The Proposer is to list the contractor owned construction equipment they anticipate using in the performance of the work when completing this table. Should the contractor ultimately use equipment not listed in table below, the contractor will submit backup cost information for that equipment item to the City for approval.

F. Equipment not owned by Contractor which is rented by Contractor and used in performing work will be paid by the City based on actual invoiced cost to Contractor, plus actual fuel/lube costs, provided the rental rate is not in excess of rental rates established by distributors or equipment rental companies in the local area. Owner-operated equipment will also be paid by the City based on actual invoiced cost to Contractor provided the City does not deem any charges excessive. All transportation costs to move equipment on and off the Work will be paid by the City up to a maximum of four (4) hours total travel time each way.

G. For equipment with a value less than $500.00: The Contractor will be paid an amount of three percent (3%) of total hourly field labor costs as defined in paragraph 4.3-Contractor's Hourly Field Craft Labor Rates above to cover the cost of small tools and safety supplies for work directly performed at the Site.

1/2

Table 8-4: Contractor Owned Equipment. Contractor Name: Auburn Constructors, LLC

Equipment Description	Hourly Rate	Daily Rate
1/2 Ton Pick-Up	15.00	
3/4 Ton Pick-Up	18.00	
1 Ton Pick-Up with lift gate	19.00	
Backhoe/Loader	55.00	
XUV Gator	10.00	
All Terrain Reach Lift	60.00	
Air Compressor/Breaker	35.00	
Power Sweeper	45.00	
Water Truck	25.00	
500 Gallon Water Wagon	10.00	
Sandblast Equipment		110.00
Spyder Crane		400.00
Honda Portable Generator		90.00
Hi-Cycle Generator		70.00
25 KW Diesel Generator		275.00

Attach additional sheets as needed.

3.7 Subcontractors and Sub Tier Subcontractors

The Contractor will be paid for all work performed by a subcontractor at the actual invoiced amount. Should a Subcontractor be required to perform extra work caused by a contract change order, the subcontractor will be allowed a mark-up as provided for in the General Conditions.

3.8 Bonds and Insurance

The Contractor will be paid the actual cost for the 100% payment bond and 100% performance bond, as well as the cost of all insurance costs required for the Work (such costs are deemed a Cost of Work and are therefore contained within the GMP). Additional details regarding requirements for Bonds and Insurance are included in Agreement Article 11 – Insurance and Bonds; Indemnification.

Table 8-4: Contractor Owned Equipment. Contractor Name: Auburn Constructors, LLC

Equipment Description	Hourly Rate	Daily Rate
3" Trash Pump		75.00
Large Conduit Bender		35.00
Large Pipe Threader		35.00
Large Wire Tugger		55.00
Termination Lug Compression Equipment		85.00
Construction Laser		50.00
Vibratory Plate Compactor		75.00
Air Tamper		52.00
Power Trowel		90.00
Welder		60.00
Concrete Saw		75.00

Attach additional sheets as needed.

3.7 Subcontractors and Sub Tier Subcontractors

The Contractor will be paid for all work performed by a subcontractor at the actual invoiced amount. Should a Subcontractor be required to perform extra work caused by a contract change order, the subcontractor will be allowed a mark-up as provided for in the General Conditions.

3.8 Bonds and Insurance

The Contractor will be paid the actual cost for the 100% payment bond and 100% performance bond, as well as the cost of all insurance costs required for the Work (such costs are deemed a Cost of Work and are therefore contained within the GMP). Additional details regarding requirements for Bonds and Insurance are included in Agreement Article 11 – Insurance and Bonds; Indemnification.

3.9 Direct Job Overhead Expenses

The Contractor will be paid for the actual cost of job overhead expenses which may include such expenses as office trailers, storage vans, temporary fencing/security, toilets, dumpsters, waste removal, water, utility power, jobsite landline telephone costs, jobsite internet provider costs, reasonable room and board subsistence for employees who live farther than 40 miles from the Work Site or as required by California prevailing wage laws, copy machine, water cooler and any office furniture required for the Work needs, including mobilization and demobilization of same. There will be no warranty reserve.

3.10 Taxes

The Contractor acknowledges it will be liable for all sales, use, gross receipts or other taxes, tariffs or duties related to the Work and that these taxes and tariffs are included in the GMP. All invoices to the City will include the applicable taxes and tariffs that are the Contractor's responsibility and will not be shown as a separate line item on the Contractor's invoice.

4.0 CALIFORNIA LABOR CODE SECTION 6707

Pursuant to the provisions of California Labor Code Section 6707, each Proposal shall contain, as a separate cost item, adequate sheeting, shoring, and bracing, or equivalent method, for the protection of life or limb in trenches and open excavation, exceeding five (5) feet, which shall conform to applicable safety orders. By entering an amount for this cost item below, the Proposer warrants that its action does not convey tort liability to the City, the Engineer, the Construction Manager, the Funding Agencies and their respective officers, employees, agents, and subconsultants.

Table 8-5: Total Amount for Worker Protection for CA Labor Code Section 6707

Protection in trenches and Open Excavations - Description	Total Cost
Westbrook (Well 9)	**$25,000.00**
Solaire (Well 18)	**$25,000.00**
Total:	**$50,000.00**

5.0 SPECIAL SERVICES

Special work or services are defined as that work not included in this agreement and characterized by extraordinary complexity, sophistication, or innovation or a combination of the foregoing attributes which are unique to the construction industry. These special services may include such services as registered land surveyor, licensed geotechnical engineer, licensed structural engineer, special testing or laboratory work. The Contractor will be paid for special services based on actual invoiced cost, provided the City does not determine any special services costs to be excessive.

6.0 ALLOWANCES

The Proposer is allowed to propose allowances for certain portions of the Work that are unclear at the execution of this agreement.

Each proposed allowance description must be well-defined and discussed during contract negotiations. Unused Allowances monies, if any, shall not be considered for compensation as defined in **SECTION 9: PROPOSED SHARED SAVINGS.**

The following Proposer's cost allowances and allowance amounts are included in the GMP:

Table 8-6: Allowances

Item#	Allowance Description	Allowance Amount
1	**Landscaping - additional landscaping as required**	**$125,000.00**
2	**Cathodic Protection – Cathodic protection system components and installation allowance. This system is not yet completely designed.**	**$120,000.00**
3	**Well Pump & Motor – Un-scoped well pump and motor and/or additional accessories as required.**	**$100,000.00**
	Total of Allowances:	**$345,000.00**

7.0 ITEMS NOT INCLUDED IN THE COST OF WORK:

A. Salaries and other compensation of Contractor's personnel stationed at Contractor's principal office or offices other than the Site, except as specifically provided in this **FORM 8 Section 3.4 – Management and Administrative Labor.**

B. Expenses of Contractor's principal office and offices, other than the Site office.

C. Contractor's General Overhead and Expenses, except as specifically provided for in the Contract Documents.

D. The capital expenses of Contractor, including interest on capital employed for the Work and charges to Contractor for delinquent payments.

E. Hours in excess of fifty (50) hours per week for each full-time assigned supervisory and administrative personnel even if a supervisory or administrative employee works more than fifty (50) hours in a week.

F. Costs due to correction of Defective Work, disposal of materials or equipment wrongfully supplied, and making good any damage to property.

G. Costs that would cause the GMP to be exceeded.

H. Any costs incurred after Owner's Final Acceptance of the Project.

8.0 CONTRACTOR'S FEE MARKUPS

A. The undersigned Proposer proposes the following mark-up fees for general overhead and profit in the performance all of the Work for the Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project as shown in **Table 8-7.**

Table 8-7: Contractor's Fee Mark-up Schedule

FORM 8 Section	Cost Category	Fee Mark-Ups For General Overhead And Profit
3.1-3.3	Hourly Field Labor	8.5 %
3.4	Management and Administrative Labor	Included in hourly rates
3.5	Materials	8.5 %
3.6	Construction Equipment	8.5 %
3.7	Subcontractors	8.5 %
3.8	Bonds and Insurance	8.5 %
3.9	Direct Job Overhead Expenses	8.5 %
3.10	Taxes	8.5 %

B. Based on the above percentages for each cost category, the Proposed Total Fee Markup-for General Overhead and Profit percentage included in the Contractor's GMP is 8.5 %.

9.0 PROPOSED SHARED SAVINGS

In the event the final Cost of Work, plus the Proposed Total Fee Mark-up for General Overhead and Profit, is less than the GMP, as adjusted by the Change Orders, the undersigned Proposer proposes a sharing of the savings as follows.

70 % of the savings to the City

30 % of the savings to the Contractor

Percent of Savings to the contractor must be a minimum of 20% plus the Total Fee Markup percentage for General Overhead and Profit as shown in the GMP (FORM 8, Section 8.0.B).

Should there be savings shared, City will pay the Contractor its share of the savings at the same time as the final retention payment.

****END OF FORM 8****

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FORM 9 – ESCROW PROPOSAL DOCUMENT CERTIFICATION

"ESCROW PROPOSAL DOCUMENT CERTIFICATION"

THE UNDERSIGNED HEREBY CERTIFIES THAT THE PROPOSAL DOCUMENTATION CONTAINED HEREIN CONSTITUTES ALL THE INFORMATION USED IN PREPARATION OF THE PROPOSAL AND THAT I HAVE PERSONALLY EXAMINED THESE CONTENTS AND HAVE FOUND THAT THIS PROPOSAL DOCUMENTATION IS COMPLETE.

SIGNATURE: _____

NAME: J. Dean Bailey

(Print)

TITLE: President

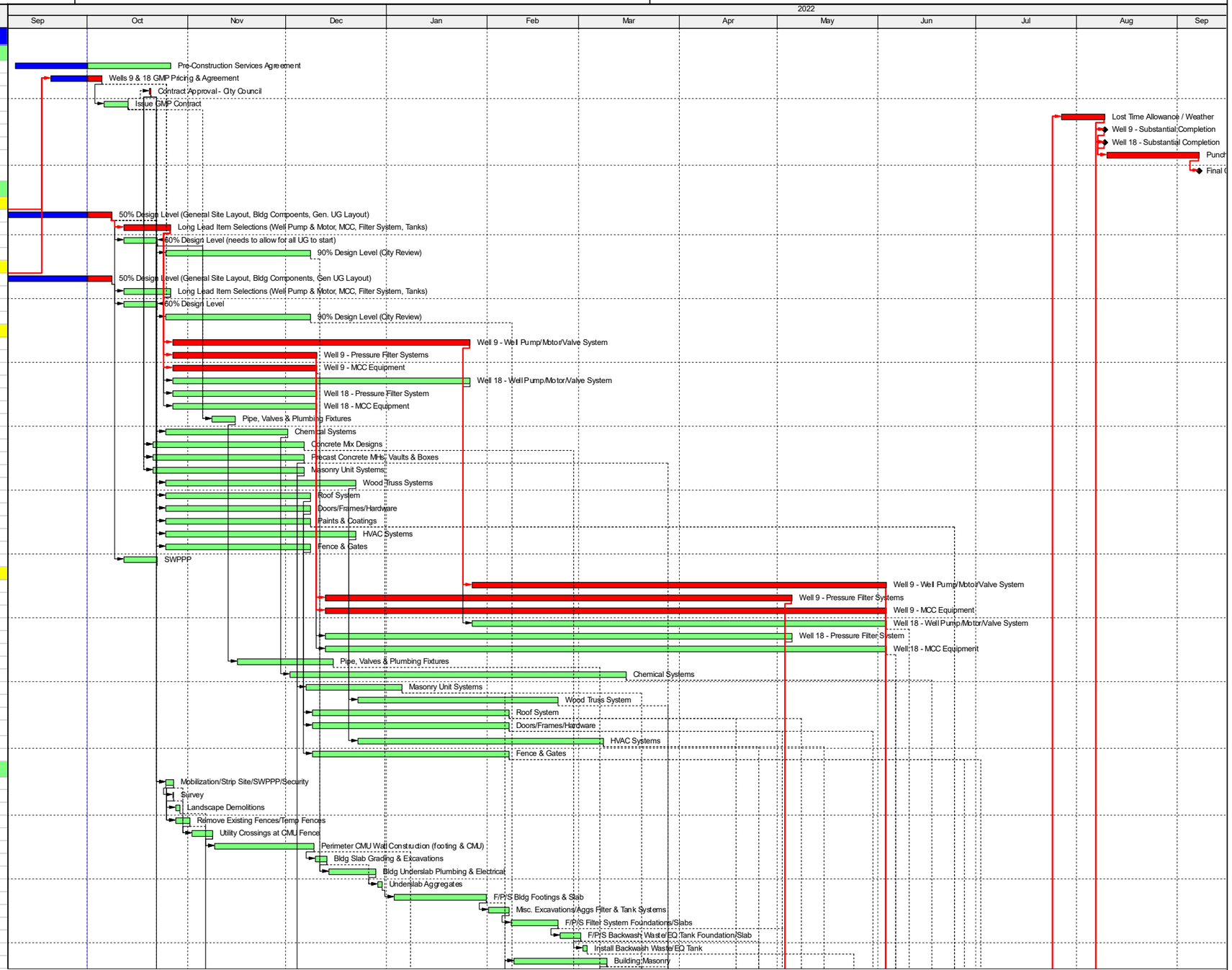
FIRM: Auburn Constructors, LLC

DATE: 09/29/2021

****END OF FORM 9****

TO BE SUBMITTED AFTER PROPOSAL ACCEPTANCE

Activity ID	Activity Name	Start	Finish	Original Duration	Actual Duration	Total Float	Resource IDs
City of Roseville ASR Well Projects		01-Sep-21 A	07-Sep-22	245	21	0	
Administrative/Contracts		09-Sep-21 A	07-Sep-22	245	16	0	
W1000	Pre-Construction Services Agreement	09-Sep-21 A	26-Oct-21	10	16	216	
W1790	Wells 9 & 18 GMP Pricing & Agreement	20-Sep-21 A	05-Oct-21*	3	9	0	
W1791	Contract Approval - City Council	20-Oct-21	20-Oct-21*	1	0	0	
W1792	Issue GMP Contract	06-Oct-21	13-Oct-21	5	0	4	
W1809	Lost Time Allowance / Weather	27-Jul-22	09-Aug-22	10	0	0	
W1810	Well 9 - Substantial Completion		09-Aug-22	0	0	0	
W1850	Well 18 - Substantial Completion		09-Aug-22	0	0	0	
W2320	Punchlist / Cleanup	10-Aug-22	07-Sep-22	20	0	0	
W2330	Final Completion		07-Sep-22	0	0	0	
Pre-Construction		01-Sep-21 A	03-Jun-22	179	21	30	
Well 9 - Design & Project Planning		01-Sep-21 A	08-Dec-21	57	21	15	
W1130	50% Design Level (General Site Layout, Bldg Com	01-Sep-21 A	08-Oct-21	10	21	0	
W1140	Long Lead Item Selections (Well Pump & Motor, M	12-Oct-21	26-Oct-21	11	0	0	
W1170	60% Design Level (needs to allow for all UG to star	12-Oct-21	22-Oct-21	9	0	15	
W1800	90% Design Level (City Review)	25-Oct-21	08-Dec-21	30	0	15	
Well 18 - Design & Project Planning		01-Sep-21 A	08-Dec-21	57	21	45	
W1150	50% Design Level (General Site Layout, Bldg Com	01-Sep-21 A	08-Oct-21	10	21	0	
W1160	Long Lead Item Selections (Well Pump & Motor, M	12-Oct-21	26-Oct-21	11	0	5	
W1780	60% Design Level	12-Oct-21	22-Oct-21	9	0	45	
W1860	90% Design Level (City Review)	25-Oct-21	08-Dec-21	30	0	45	
Submit/Review/Release		12-Oct-21	26-Jan-22	71	0	115	
W1010	Well 9 - Well Pump/Motor/Valve System	27-Oct-21	26-Jan-22	60	0	0	
W1030	Well 9 - Pressure Filter Systems	27-Oct-21	10-Dec-21	30	0	0	
W1050	Well 9 - MCC Equipment	27-Oct-21	10-Dec-21	30	0	0	
W1070	Well 18 - Well Pump/Motor/Valve System	27-Oct-21	26-Jan-22	60	0	5	
W1090	Well 18 - Pressure Filter System	27-Oct-21	10-Dec-21	30	0	20	
W1110	Well 18 - MCC Equipment	27-Oct-21	10-Dec-21	30	0	5	
W1180	Pipe, Valves & Plumbing Fixtures	08-Nov-21	15-Nov-21	5	0	62	
W1200	Chemical Systems	25-Oct-21	01-Dec-21	25	0	72	
W1220	Concrete Mix Designs	21-Oct-21	06-Dec-21	30	0	29	
W1230	Precast Concrete MHs, Vaults & Boxes	21-Oct-21	06-Dec-21	30	0	147	
W1240	Masonry Unit Systems	21-Oct-21	06-Dec-21	30	0	29	
W1260	Wood Truss Systems	25-Oct-21	22-Dec-21	40	0	32	
W1280	Roof System	25-Oct-21	08-Dec-21	30	0	57	
W1290	Doors/Frames/Hardware	25-Oct-21	08-Dec-21	30	0	77	
W1300	Paints & Coatings	25-Oct-21	08-Dec-21	30	0	147	
W1310	HVAC Systems	25-Oct-21	22-Dec-21	40	0	52	
W1320	Fence & Gates	25-Oct-21	08-Dec-21	30	0	112	
W1330	SWPPP	12-Oct-21	22-Oct-21	9	0	2	
Mfg/Fab/Deliver		16-Nov-21	03-Jun-22	137	0	30	
W1020	Well 9 - Well Pump/Motor/Valve System	27-Jan-22	03-Jun-22	90	0	0	
W1040	Well 9 - Pressure Filter Systems	13-Dec-21	05-May-22	100	0	0	
W1060	Well 9 - MCC Equipment	13-Dec-21	03-Jun-22	120	0	0	
W1080	Well 18 - Well Pump/Motor/Valve System	27-Jan-22	03-Jun-22	90	0	5	
W1100	Well 18 - Pressure Filter System	13-Dec-21	05-May-22	100	0	20	
W1120	Well 18 - MCC Equipment	13-Dec-21	03-Jun-22	120	0	5	
W1190	Pipe, Valves & Plumbing Fixtures	16-Nov-21	15-Dec-21	20	0	62	
W1210	Chemical Systems	02-Dec-21	15-Mar-22	70	0	72	
W1250	Masonry Unit Systems	07-Dec-21	05-Jan-22	20	0	29	
W1270	Wood Truss System	23-Dec-21	22-Feb-22	40	0	32	
W2280	Roof System	09-Dec-21	07-Feb-22	40	0	57	
W2290	Doors/Frames/Hardware	09-Dec-21	07-Feb-22	40	0	77	
W2300	HVAC Systems	23-Dec-21	08-Mar-22	50	0	52	
W2310	Fence & Gates	09-Dec-21	07-Feb-22	40	0	112	
Well Site 9 Westbrook Construction		25-Oct-21	26-Jul-22	188	0	0	
W1340	Mobilization/Strip Site/SWPPP/Security	25-Oct-21	27-Oct-21	3	0	2	PIPE-1
W1350	Survey	27-Oct-21	27-Oct-21	1	0	2	SUB
W1360	Landscape Demolitions	28-Oct-21	29-Oct-21	2	0	18	PIPE-1
W1370	Remove Existing Fences/Temp Fences	28-Oct-21	01-Nov-21	3	0	2	PIPE-1
W1380	Utility Crossings at CMU Fence	02-Nov-21	08-Nov-21	5	0	2	PIPE-1
W1390	Perimeter CMU Wall Construction (footing & CMU)	09-Nov-21	09-Dec-21	20	0	12	CMU
W1400	Bldg Slab Grading & Excavations	10-Dec-21	13-Dec-21	2	0	12	CARP-2, (
W1410	Bldg Underslab Plumbing & Electrical	14-Dec-21	28-Dec-21	10	0	12	ELEC, PII
W1420	Underslab Aggregates	29-Dec-21	30-Dec-21	2	0	12	CARP-2, (
W1430	F/P/S Bldg Footings & Slab	03-Jan-22	31-Jan-22	20	0	12	CARP-2, (
W1440	Misc. Excavations/Aggs Filter & Tank Systems	01-Feb-22	07-Feb-22	5	0	27	CARP-2, (
W1450	F/P/S Filter System Foundations/Slabs	08-Feb-22	22-Feb-22	10	0	27	CARP-2, (
W1460	F/P/S Backwash Waste/EQ Tank Foundation/Slab	23-Feb-22	01-Mar-22	5	0	27	CARP-2, (
W1470	Install Backwash Waste/EQ Tank	02-Mar-22	03-Mar-22	2	0	60	PIPE-1
W1480	Building Masonry	09-Feb-22	09-Mar-22	20	0	6	CMU



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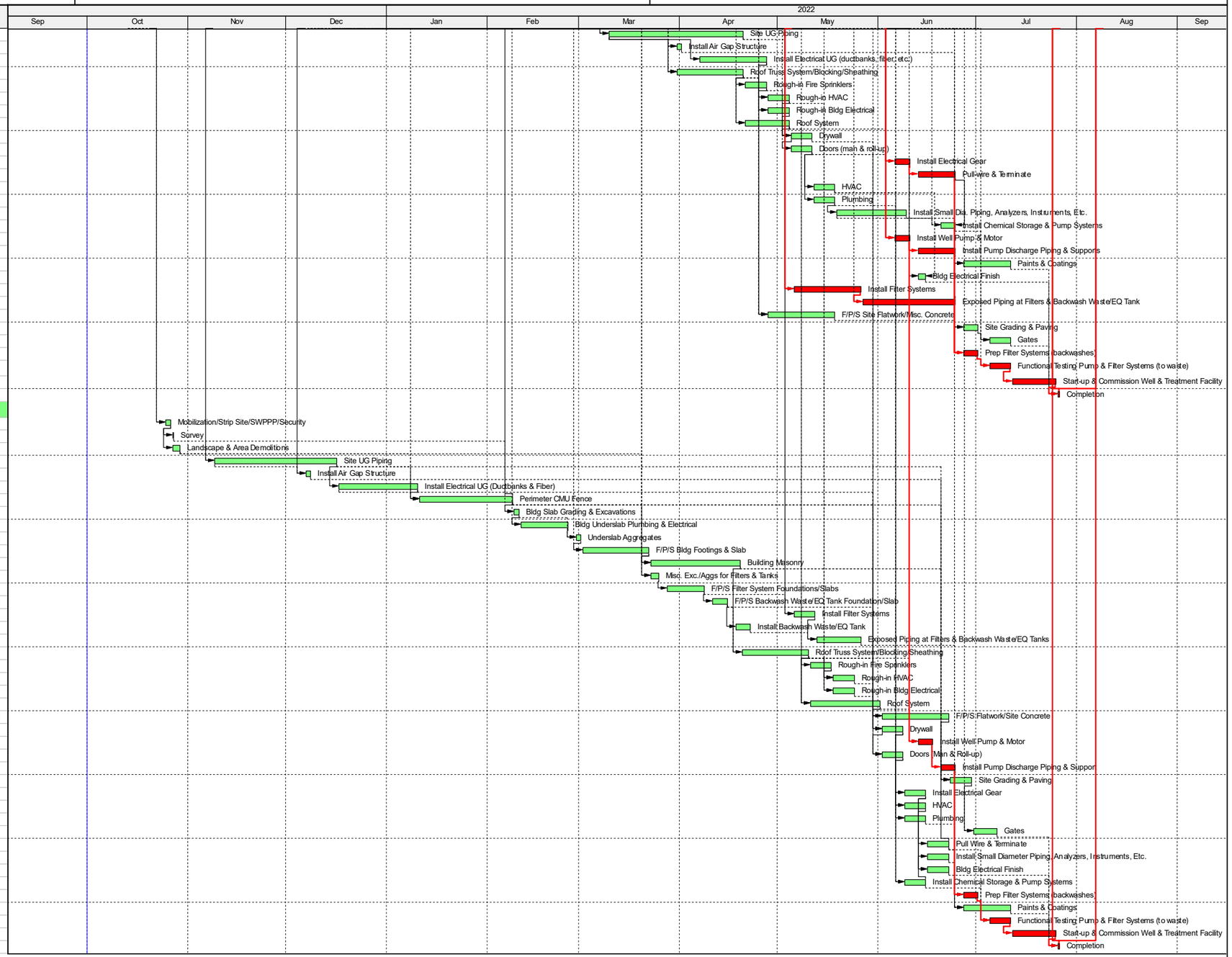
City of Roseville ASR Well Projects - Baseline
Print Date: 10/05/21

Auburn Constructors LLC

05-Oct-21 13:11

Activity ID	Activity Name	Start	Finish	Original Duration	Actual Duration	Total Float	Resource IDs
W1490	Site UG Piping	10-Mar-22	20-Apr-22	30	0	6	PIPE-1
W1500	Install Air Gap Structure	31-Mar-22	01-Apr-22	2	0	69	PIPE-1
W1510	Install Electrical UG (ductbanks, fiber, etc.)	07-Apr-22	27-Apr-22	15	0	16	ELEC
W1520	Roof Truss System/Blocking/Sheathing	31-Mar-22	20-Apr-22	15	0	6	CARP-2, (
W1530	Rough-in Fire Sprinklers	21-Apr-22	27-Apr-22	5	0	16	Bldg
W1540	Rough-in HVAC	28-Apr-22	04-May-22	5	0	16	Bldg
W1550	Rough-in Bldg Electrical	28-Apr-22	04-May-22	5	0	16	ELEC
W1560	Roof System	21-Apr-22	04-May-22	10	0	6	Bldg
W1570	Drywall	05-May-22	11-May-22	5	0	16	Bldg
W1580	Doors (man & roll-up)	05-May-22	11-May-22	5	0	16	Bldg
W1590	Install Electrical Gear	06-Jun-22	10-Jun-22	5	0	0	ELEC
W1600	Pull-wire & Terminate	13-Jun-22	24-Jun-22	10	0	0	ELEC
W1610	HVAC	12-May-22	18-May-22	5	0	36	Bldg
W1620	Plumbing	12-May-22	18-May-22	5	0	21	Bldg
W1630	Install Small Dia. Piping, Analyzers, Instruments, Et	19-May-22	09-Jun-22	15	0	21	PIPE-1
W1640	Install Chemical Storage & Pump Systems	20-Jun-22	24-Jun-22	5	0	5	PIPE-1
W1650	Install Well Pump & Motor	06-Jun-22	10-Jun-22	5	0	0	SUB
W1660	Install Pump Discharge Piping & Supports	13-Jun-22	24-Jun-22	10	0	0	PIPE-1
W1670	Paints & Coatings	27-Jun-22	11-Jul-22	10	0	10	SUB
W1680	Bldg Electrical Finish	13-Jun-22	15-Jun-22	3	0	27	ELEC
W1690	Install Filter Systems	06-May-22	26-May-22	15	0	0	PIPE-1
W1700	Exposed Piping at Filters & Backwash Waste/EQ Ta	27-May-22	24-Jun-22	20	0	0	PIPE-1
W1710	F/P/S Site Flatwork/Misc. Concrete	28-Apr-22	18-May-22	15	0	36	CARP-2, (
W1720	Site Grading & Paving	27-Jun-22	01-Jul-22	5	0	10	SUB
W1730	Gates	05-Jul-22	11-Jul-22	5	0	10	SUB
W1740	Prep Filter Systems (backwashes)	27-Jun-22	01-Jul-22	5	0	0	PIPE-1
W1750	Functional Testing Pump & Filter Systems (to waste	05-Jul-22	11-Jul-22	5	0	0	PIPE-1, E
W1760	Start-up & Commission Well & Treatment Facility	12-Jul-22	25-Jul-22	10	0	0	PIPE-1, E
W1770	Completion	26-Jul-22	26-Jul-22	1	0	0	Bldg, CAF
Well Site 18 Solaire		25-Oct-21	26-Jul-22	188	0	0	
W1820	Mobilization/Strip Site/SWPPP/Security	25-Oct-21	26-Oct-21	2	0	8	PIPE-1
W1830	Survey	27-Oct-21	27-Oct-21	1	0	70	SUB
W1840	Landscape & Area Demolitions	27-Oct-21	29-Oct-21	3	0	8	PIPE-1
W1870	Site UG Piping	09-Nov-21	16-Dec-21	25	0	2	PIPE-1
W1880	Install Air Gap Structure	07-Dec-21	08-Dec-21	2	0	147	PIPE-1
W1900	Install Electrical UG (Ductbanks & Fiber)	17-Dec-21	10-Jan-22	15	0	2	ELEC
W1910	Perimeter CMU Fence	11-Jan-22	08-Feb-22	20	0	2	CMU
W1920	Bldg Slab Grading & Excavations	09-Feb-22	10-Feb-22	2	0	2	CARP-1, (
W1930	Bldg Underslab Plumbing & Electrical	11-Feb-22	25-Feb-22	10	0	2	ELEC, Pll
W1940	Underslab Aggregates	28-Feb-22	01-Mar-22	2	0	2	CARP-1, (
W1950	F/P/S Bldg Footings & Slab	02-Mar-22	22-Mar-22	15	0	2	CARP-1, (
W1960	Building Masonry	23-Mar-22	19-Apr-22	20	0	2	CMU
W1970	Misc. Exc./Aggs for Filters & Tanks	23-Mar-22	25-Mar-22	3	0	4	CARP-1, (
W1980	F/P/S Filter System Foundations/Slabs	28-Mar-22	08-Apr-22	10	0	4	CARP-1, (
W1990	F/P/S Backwash Waste/EQ Tank Foundation/Slab	11-Apr-22	15-Apr-22	5	0	4	CARP-1, (
W2000	Install Filter Systems	06-May-22	12-May-22	5	0	20	PIPE-1
W2010	Install Backwash Waste/EQ Tank	18-Apr-22	22-Apr-22	5	0	34	PIPE-1
W2020	Exposed Piping at Filters & Backwash Waste/EQ Ta	13-May-22	26-May-22	10	0	20	PIPE-1
W2030	Roof Truss System/Blocking/Sheathing	20-Apr-22	10-May-22	15	0	2	CARP-2, (
W2040	Rough-in Fire Sprinklers	11-May-22	17-May-22	5	0	7	Bldg
W2050	Rough-in HVAC	18-May-22	24-May-22	5	0	7	Bldg
W2060	Rough-in Bldg Electrical	18-May-22	24-May-22	5	0	7	ELEC
W2070	Roof System	11-May-22	01-Jun-22	15	0	2	Bldg
W2080	F/P/S Flatwork/Site Concrete	02-Jun-22	22-Jun-22	15	0	12	CARP-1, (
W2090	Drywall	02-Jun-22	08-Jun-22	5	0	2	Bldg
W2100	Install Well Pump & Motor	13-Jun-22	17-Jun-22	5	0	0	SUB
W2110	Doors (Man & Roll-up)	02-Jun-22	08-Jun-22	5	0	2	Bldg
W2120	Install Pump Discharge Piping & Support	20-Jun-22	24-Jun-22	5	0	0	PIPE-1
W2130	Site Grading & Paving	23-Jun-22	29-Jun-22	5	0	12	SUB
W2140	Install Electrical Gear	09-Jun-22	15-Jun-22	5	0	2	ELEC
W2150	HVAC	09-Jun-22	15-Jun-22	5	0	22	Bldg
W2160	Plumbing	09-Jun-22	15-Jun-22	5	0	17	Bldg
W2170	Gates	30-Jun-22	07-Jul-22	5	0	12	SUB
W2180	Pull Wire & Terminate	16-Jun-22	22-Jun-22	5	0	2	ELEC
W2190	Install Small Diameter Piping, Analyzers, Instrumen	16-Jun-22	22-Jun-22	5	0	12	PIPE-1
W2200	Bldg Electrical Finish	16-Jun-22	22-Jun-22	5	0	22	ELEC
W2210	Install Chemical Storage & Pump Systems	09-Jun-22	15-Jun-22	5	0	12	PIPE-1
W2220	Prep Filter Systems (backwashes)	27-Jun-22	01-Jul-22	5	0	0	PIPE-1
W2230	Paints & Coatings	27-Jun-22	11-Jul-22	10	0	10	SUB
W2240	Functional Testing Pump & Filter Systems (to waste	05-Jul-22	11-Jul-22	5	0	0	PIPE-1, E
W2250	Start-up & Commission Well & Treatment Facility	12-Jul-22	25-Jul-22	10	0	0	PIPE-1, E
W2260	Completion	26-Jul-22	26-Jul-22	1	0	0	Bldg, CAF



Actual Work
Remaining Work
Critical Remaining Work
Milestone

TASK filter: All Activities

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EXHIBIT C - GUARANTEED MAXIMUM PRICE, COST OF WORK, AND FEE

A. GUARANTEED MAXIMUM PRICE: The Guaranteed Maximum Price as of the date of execution of this Agreement is Fourteen Million, Five Hundred Twenty-Five Thousand, Three Hundred dollars ($14,525,300.00), U.S. Currency.

B. FEE AND CONTINGENCY: The Fee and Contingency amounts, if any, are as detailed in the CONTRACTOR'S Proposal in Attachment Form 8-GUARANTEED MAXIMUM PRICE, COST OF WORK, and FEE.

C. COST OF THE WORK:

Cost of the Work. The term "Cost of the Work" shall mean costs incurred by CONTRACTOR in the performance of the Work, that do not exceed the GMP. The following are categories of cost and expense to be paid by CITY to CONTRACTOR as Cost of the Work:

1. Construction Costs.

1.1. Labor Costs.

1.1.1. Wages of construction workers directly employed by CONTRACTOR to perform the construction of the Work at the Site or, with CITY'S agreement, at off-site workshops.

1.1.2. Wages or salaries of CONTRACTOR's supervisory and administrative personnel when stationed at the Site and wages, salaries and other costs of project management, pre-construction services, form design, foundation engineering, manpower planning, purchasing, estimating and data processing, whether performed at the Site or in CONTRACTOR's offices, including, but not limited to services rendered during the Design Phase of the Project.

1.1.3. Wages and salaries of CONTRACTOR's supervisory or administrative personnel engaged at factories, workshops or on the road, in expediting the production or transportation of materials or equipment required for the Work, but only for that portion of their time required for the Work.

1.1.4. Costs paid or incurred by CONTRACTOR for taxes, insurance, contributions, assessments and benefits required by law or collective bargaining agreements and, for personnel not covered by such agreements, customary benefits such as sick leave, medical and health benefits, holidays, vacations and pensions, provided such costs are based on wages and salaries included in subsections 1.1.1 through 1.1.3 above.

1.2. **Subcontract Costs**. Amounts due Subcontractors in accordance with the requirements of the Subcontracts.

1.3. **Costs of Materials and Equipment Incorporated in the Completed Construction**. Costs, including transportation, of materials and equipment incorporated or to be incorporated in the completed construction.

1.4. **Costs of other Materials and Equipment, Temporary Facilities, and Related Items**.

1.4.1. Costs, including transportation, installation, maintenance, dismantling

and removal of materials, supplies, temporary facilities, machinery, equipment and hand tools not customarily owned by the construction workers, which are provided by CONTRACTOR at the Site and fully consumed in the performance of the Work; and cost, less salvage value, on such items if not fully consumed, whether sold to others or retained by CONTRACTOR. Costs for items previously used by CONTRACTOR shall mean fair market value.

1.4.2. Rental charges for temporary facilities, machinery, equipment and hand tools not customarily owned by the construction workers, which are provided by CONTRACTOR at the Site, whether rented from CONTRACTOR or others, and costs of transportation, installation, minor repairs and replacements, dismantling and removal thereof. Rental charges for equipment owned by CONTRACTOR shall be at then prevailing rates.

1.4.3. Costs of removal of debris from the Site.

1.4.4. Costs of facsimiles, telegrams and long distance telephone calls, postage and delivery charges (whether originating at the Site or at the offices of CONTRACTOR or CONTRACTOR), telephone service at the Site and reasonable petty cash expenses of the Site office.

1.5. Premiums; Taxes; Fees; Royalties.

1.5.1. That portion directly attributable to this Agreement of premiums for insurance and the Payment and Performance Bonds.

1.5.2. Sales, use, gross receipts or similar taxes imposed by a governmental authority, which are related to the Work and for which CONTRACTOR is liable.

1.5.3. Fees and assessments for any permits, licenses and inspections required by the Contract Documents.

1.5.4. Fees of testing laboratories for tests required by the Contract Documents or government authorities.

1.5.5. Royalties and license fees paid for the use of a particular design, process or product required by the Contract Documents. The costs of defending suits or claims for infringement of patent rights arising from such requirement by the Contract Documents; payments made in accordance with legal judgments against CONTRACTOR or CONTRACTOR resulting from such suits or claims and payments of settlements in connection therewith.

1.5.6. Deposits lost for cause other than CONTRACTOR's negligence.

1.6. **Emergencies**. Costs incurred in taking action to prevent threatened damage, injury or loss in case of emergency affecting the safety of persons and property, as provided in Article 12.10-EMERGENCIES of this Agreement.

1.7. **Other Costs.** Other costs incurred in the performance of the Work, if and to the extent approved in writing by CITY, which approval shall not be unreasonably withheld.

2. Items not Included in Cost of the Work.

2.1. Salaries and other compensation of CONTRACTOR's personnel stationed at CONTRACTOR's principal office or offices other than the Site, except as specifically provided in subsection 1 above.

2.2. Expenses of CONTRACTOR's principal office and offices, other than the Site office.

2.3. Overhead and general expenses, except as may be included in subsection 1 above.

2.4. The capital expenses of CONTRACTOR, including interest on capital employed for the Work.

2.5. Costs that would cause the GMP to be exceeded.

END OF EXHIBIT C

EXHIBIT D - CONSTRUCTION ALLOWANCE ITEMS AND AMOUNTS

A. The following cost allowances and allowance amounts are included in the GMP as part of the Agreement:

Table D-1: Allowance Descriptions

Item#	Allowance Description	Allowance Amount
1	Landscaping: Additional landscaping as required.	$125,000.00
2	Cathodic Protection: Cathodic protection system components and installation. This system is not yet completely designed	$120,000.00
3	Well Pump & Motor: Un-scoped well pump and motor and/or additional accessories as required.	$100,000.00
	Total of Allowances:	$345,000.00

B. DUTIES OF CONTRACTOR

1. Plan allowance Work collaboratively with the Construction Manager and CITY's Representative to control allowance costs and avoid impacts to the Progress Schedule.

2. Advise Construction Manager at least fifteen (15) days in advance of the need to purchase materials to avoid impacts to Progress Schedule.

3. Obtain competitive proposals from material suppliers, including:

3.1. Quantity.

3.2. Complete description of product and services provided under allowance.

3.3. Unit cost.

3.4. Total amount of purchase.

3.5. Taxes and delivery charges.

4. On notification of selection, enter into purchase agreement with designated supplier.

5. Arrange for delivery and unloading.

6. Install products in accordance with Contract Documents.

7. Maintain accurate cost records, separate from the cost categories for the balance of the Work, which depict the total cost incurred for each allowance item.

8. Monitor each allowance item total costs to date and immediately report to the Construction Manager should the total cost to date reach 80% of the total allowance amount of any allowance item amount shown in above table. Should the total cost of any allowance item reach 80% of the total allowance amount budgeted, the Contractor shall quantify and forecast the cost to complete the remaining known allowance item tasks and submit this forecasted quantity and completion cost to the Construction Manager**.**

C. DUTIES OF CONSTRUCTION MANAGER

1. Consult with Contractor and CITY in consideration of equipment or material and suppliers.

2. Provide Contractor with all required product, technical or design related information as it pertains to the allowance items.

3. Make equipment, supplier or system selection and request proposal from Contractor for these items covered by each allowance.

4. Notify Contractor of final equipment, supplier or system selection to allow Contractor to begin submittal and procurement.

5. Review cost to date information submitted by the Contractor and prepare Change Orders as required for CITY approval.

D. ADJUSTMENT OF COSTS

1. The Contractor shall not exceed the allowance amounts shown in above table without the written approval of the CITY. Should the Contractor exceed the allowance amounts without the written approval of the CITY, the Contractor will be responsible for all costs greater than the allowance amounts shown in above table.

2. Contractor will be paid the actual total cost of each allowance item as a Cost of the Work. When actual total cost is more or less than amount of allowance, the GMP will be adjusted by Change Order.

END OF EXHIBIT D

EXHIBIT E - HAZARDOUS MATERIALS

A. Certain Definitions.

1. "Hazardous Materials means any substance:

1.1. The presence of which requires investigation or remediation under federal, state or local law, statute, regulation, ordinance, order, action, policy or common law;

1.2. Which is or becomes defined as a "hazardous waste," "hazardous substance," pollutant or contaminant under any federal, state or local law, statute, regulation, rule or ordinance or amendments thereto, including, without limitation, the Comprehensive Environmental Response, Compensation and Liability Act, 42 USC §§9601 et seq. ("CERCLA"), as amended, or the Resource, Conservation and Recovery Act, as amended, 42 USC §§6901 et seq. ("RCRA");

1.3. Shall include the meaning provided in Section 100 of the Solid Waste Disposal Act (42 USC Section 6903 and/or Section 25117 of the California Health and Safety Code) as amended from time to time, or any other hazardous material, hazardous waste, hazardous substance, pollutant, and/or contaminant with requirements under federal, State of California, or local law, statute, regulation, rule, ordinance, order, action, policy or common law;

1.4. Which is petroleum, including crude oil or any fraction thereof not otherwise designated as a "hazardous substance" under CERCLA, including without limitation gasoline, diesel fuel or other petroleum hydrocarbons;

1.5. Which is toxic, explosive, corrosive, flammable, infectious, radioactive, carcinogenic, mutagenic, or otherwise hazardous and is or becomes regulated by any governmental authority or instrumentality;

1.6. The presence of which on the Site causes or threatens to cause a nuisance upon the Site or to the adjacent properties or poses or threatens to pose a hazard to the health or safety of persons on or about the Site; or

1.7. The presence of which on adjacent properties could constitute a trespass by CONTRACTOR or CITY.

2. "Underground Storage Tank" shall have the definition assigned to that term by RCRA §9001, 42 USC §6991, and also shall include:

2.1. Any tank of 1,100 gallons or less capacity used for storing motor fuel;

2.2. Any tank used for storing heating oil for consumption on the premises where stored;

2.3. Any septic tank; and any pipes connected to items A.2.1-A.2.3.

3. "Environmental Requirements" means all Applicable Laws, statutes, regulations, rules, ordinances, codes, licenses, permits, orders and similar items of all federal, state or local governmental agencies or other instrumentalities and all applicable judicial, administrative and regulatory decrees, judgments and orders relating to the protection of human health or the environment, including, without limitation:

3.1. All requirements, including but not limited to, those pertaining to reporting,

licensing, permitting, investigation and remediation of emissions, discharges, releases or threatened releases of Hazardous Materials into the air, surface water, ground water or land, or relating to the manufacture, processing, distribution, use, treatment, storage, disposal, transport or handling of Hazardous Materials; and

3.2. All requirements pertaining to the protection of the health and safety of employees or the public.

4. **"Environmental Damages"** means all claims, judgments, damages, losses, penalties, fines, liabilities, encumbrances, liens, costs and expenses of investigation and defense of any claim, including, without limitation, attorney's fees, which are incurred at any time as a result of the existence of Hazardous Materials upon, about or beneath the Site or migrating or threatening to migrate to or from the Site, and including, without limitation:

4.1. Damages for personal injury, or injury to property or to natural resources occurring upon or off the Site;

4.2. Fees incurred for the services of attorneys, consultants, CONTRACTOR, experts, laboratories and all other costs incurred in connection with the investigation or remediation of such Hazardous Materials or violation of Environmental Requirements; and

4.3. Liability to any third party or governmental agency or political subdivision to indemnify such party, agency or political subdivision for costs expended in connection with the items listed in subparagraph A.4.2.

5. **"Environmental Conditions"** means collectively, Hazardous Materials and Underground Storage Tanks existing on the Site and not brought there by CONTRACTOR or any Subcontractor.

B. Investigation of Site.

1. Upon written notice from CITY, CONTRACTOR shall prepare for approval and execution by CITY, one or more contracts ("Environmental Contracts") with suitably qualified consultants and/or engineers ("Environmental Engineers"), for purposes of performing an investigation and analysis of the Site prior to demolition and excavation activities, to determine the presence of any Environmental Conditions on, in or under the Site. The Environmental Contracts shall provide for a commercially reasonable scope of investigation approved by CITY, and may provide for conducting the investigation and testing in phases acceptable to CITY. The Environmental Contracts shall also provide that the Environmental Engineers shall begin their tests and inspections at the Site as soon as CITY is able to arrange access to the Site, or any portions thereof, for such purposes. The Environmental Contracts shall provide that CONTRACTOR, acting as agent of CITY, shall coordinate the activities of the Environmental Engineers.

2. The Environmental Contracts shall provide that the Environmental Engineers shall prepare such reports, feasibility studies and remedial plans ("Environmental Assessments") as may be reasonably necessary in order to identify and explain the quantity, scope and nature of the Environmental Conditions found to exist at the Site. The Environmental Assessments shall contain a detailed analysis of the Environmental Conditions discovered, and the actions ("Remedial Actions") required for the response, removal, cleanup or remediation of such Environmental Conditions (i) which are required by Environmental Requirements, or (ii) which are reasonably necessary to

mitigate Environmental Damages.

3. The Environmental Contracts shall provide that the Environmental Engineers shall promptly provide CITY and CONTRACTOR with a copy of each Environmental Assessment, together with any other reports and test results generated pursuant to the Environmental Contracts. CONTRACTOR shall, promptly after receipt of the foregoing matters from the Environmental Engineers, prepare and submit to CITY a written report setting forth CONTRACTOR's understanding of whether and to what extent any recommended Remedial Actions may result in an amendment to the Schedule and the progress of the Work.

4. The Environmental Contracts shall provide that it shall be the responsibility of the Environmental Engineers to give any necessary notice to the appropriate regulatory agency or agencies of the presence of any Environmental Conditions; to pursue all necessary negotiations with such agencies concerning preparation and approval of a plan for clean-up to the extent required; and to obtain all necessary permits to perform any Remedial Actions.

C. Remedial Actions.

1. If so instructed by CITY, based upon the results of the Environmental Assessments, CONTRACTOR shall, as agent for CITY, obtain bids from remediation contractors ("Remediation Contractors) suitably qualified and approved by CITY, to perform the Remedial Actions selected by CITY and shall submit such bids to CITY, together with CONTRACTOR's recommendation of the Remediation Contractor(s) to be retained. If CITY elects to go forward with all or any portion of the Remedial Actions covered by the bids submitted, CITY will so advise CONTRACTOR in a written notice on or before the date which is sixty (60) Days after receipt of the foregoing matters from CONTRACTOR. Promptly after receipt of such notice, CONTRACTOR shall prepare for CITY's execution remediation contracts ("Remediation Contracts") with the Remediation Contractors identified in such notice.

2. CONTRACTOR, as agent for CITY, shall be responsible for coordinating the work and services performed by the Remediation Contractors, and coordinating such remediation work with the Work.

3. If in the course of performance of the Work, CONTRACTOR encounters on the Site any Hazardous Materials not previously disclosed and remediated by the Environmental Engineers or the Remediation Contractors, CONTRACTOR shall immediately suspend the Work in the area affected and promptly thereafter report the condition to CITY.

D. Payments: Liability of CONTRACTOR.

1. All payments due under the Environmental Contracts and the Remediation Contracts shall be made by CITY directly to the Environmental Engineers and the Remediation Contractors. Such payments will be based on requisitions, which requisitions shall be approved by CONTRACTOR prior to submission to CITY.

2. All payments due under the Environmental Contracts, the Remediation Contracts and for Environmental Damages, shall not be a part of the GMP, and shall be the sole responsibility of CITY, except as expressly provided otherwise in Section 5 hereof.

3. It is understood and agreed that with respect to any Environmental Conditions existing on the Site, CONTRACTOR is not, and shall not be deemed to be, a generator, arranger, operator, treater, storer, transporter or disposer of, or otherwise responsible for, any such Environmental Conditions. It is understood and agreed that CONTRACTOR shall

have no right to direct the means or methods of performance of any Environmental Engineer or Remediation Contractor.

4. CITY shall indemnify, defend and hold harmless CONTRACTOR, from and against any Environmental Damages asserted against or sustained by CONTRACTOR as a result of CONTRACTOR being deemed or determined to be a generator, arranger, operator, treater, storer, transporter or disposer of, or otherwise responsible for, any such Environmental Conditions.

E. Environmental Responsibilities of CONTRACTOR.

1. CITY acknowledges and agrees that CONTRACTOR shall not commence or continue any demolition or construction activities on any portion of the Site on or in which Remedial Actions are to be performed until such Remedial Actions are to the point where construction activities will not interfere with such Remedial Actions, as evidenced by appropriate certification by the applicable Environmental Engineer and/or Remediation CONTRACTOR and any required approval of any applicable government agency. CONTRACTOR agrees to use good faith diligent efforts to adjust and reschedule its activities at the Site so as to minimize, to the extent reasonably practical, the adverse effect on the progress of the Work resulting from any Remedial Actions.

2. CONTRACTOR shall not bring Hazardous Materials to the Site, and shall not include Hazardous Materials in any construction materials, unless permitted by Environmental Requirements. CONTRACTOR shall comply, and shall cause all Subcontractors to comply, with all Environmental Requirements regarding the generation, handling, storage, treatment and disposal of Hazardous Materials.

3. CONTRACTOR shall indemnify, defend and hold harmless the Indemnified Parties from and against any Environmental Damages asserted against or sustained by such parties as a result of any Environmental Conditions caused or created by CONTRACTOR or any Subcontractor, or of any violation by CONTRACTOR or the Subcontractors, of any Environmental Requirement arising out of the performance of the Work.

END OF EXHIBIT E-HAZARDOUS MATERIALS

EXHIBIT F - IN LIEU OF SECURITIES ESCROW AGREEMENT

(Form of agreement follows this page)

(Use is optional by CONTRACTOR)

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

(Project: _____)

THIS ESCROW AGREEMENT is made and entered into on this ____ day of _____, 20__ by and between the:

CITY of Roseville, whose address is:
311 Vernon Street
Roseville, CA 95678

(hereinafter called "CITY"); and

_____, whose address is:

_____

_____

(hereinafter called "CONTRACTOR"); and

_____, whose address is:

_____

_____

(hereinafter called "ESCROW AGENT").

For the consideration hereinafter set forth, CITY, CONTRACTOR, and ESCROW AGENT agree as follows:

1. Pursuant to Section 22300 of the Public Contract Code of the State of California, CONTRACTOR has the option to deposit securities, subject to prior approval of CITY, with ESCROW AGENT, as a substitute for retention earnings required to be withheld by CITY pursuant to the contract for public works entered into between the CITY and CONTRACTOR for the Project in the amount of _____ _____ dollars ($_____) dated _____, (hereinafter referred to as the "Contract"). Alternatively, on written request of CONTRACTOR, CITY shall make payments of the retention earnings directly to the ESCROW AGENT.

When CONTRACTOR deposits the securities as a substitute for Contract earnings, the ESCROW AGENT shall notify CITY within ten (10) days of the deposit. The market value of the securities at the

time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between CITY and CONTRACTOR. Securities shall be held in the name of ESCROW AGENT, and shall designate CONTRACTOR as the beneficial owner, and shall be limited to those types of acceptable securities as described in Public Contract Code Section 22300.

2. CITY shall make progress payments to CONTRACTOR for those funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that ESCROW AGENT holds securities in the form and amount specified above.

3. When CITY makes payment of retentions earned directly to ESCROW AGENT, ESCROW AGENT shall hold them for the benefit of CONTRACTOR until the time that the escrow created under this Agreement is terminated. CONTRACTOR may direct the investment of the payments into securities. All terms and conditions of this Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when CITY pays ESCROW AGENT directly.

4. CONTRACTOR shall be responsible for paying all fees for the expenses incurred by ESCROW AGENT in administering the Escrow Account and all expenses of CITY. These expenses and payment terms shall be determined by CITY, CONTRACTOR, and ESCROW AGENT.

5. The interest earned on the securities or the money market accounts held in escrow and all interest earning on that interest shall be for the sole account of CONTRACTOR and shall be subject to withdrawal by CONTRACTOR at any time and from time to time without notice to CITY.

6. CONTRACTOR shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to ESCROW AGENT accompanied by written authorization from CITY to ESCROW AGENT that CITY consents to the withdrawal of the amount sought to be withdrawn by CONTRACTOR.

7. CITY shall have a right to draw upon the securities in the event of default by CONTRACTOR. Upon seven (7) days' written notice to ESCROW AGENT from CITY of the default, ESCROW AGENT shall immediately convert the securities to cash and shall distribute the cash as instructed by CITY.

8. Only upon receipt of written notification from CITY certifying that the Contract is final and complete, and that CONTRACTOR has complied with all requirements and procedures applicable to the Contract, ESCROW AGENT shall release to CONTRACTOR all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.

9. ESCROW AGENT shall rely on the written notifications from CITY and CONTRACTOR pursuant to Sections (5) to (8), inclusive, of this Agreement and CONTRACTOR shall hold ESCROW AGENT harmless from ESCROW AGENT's release and disbursement of the securities and interest as set forth above.

10. The parties hereto mutually agree that this Agreement is substantially similar to the form under Public Contracts Code Section 22300.

11. The names of the persons who are authorized to give written notice or to receive written notice on behalf of CITY and on behalf of CONTRACTOR in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of CITY:

_____

Title

_____

Name

_____

Signature

_____

Address

On behalf of CONTRACTOR:

_____

Title

_____

Name

_____

Signature

_____

Address

On behalf of ESCROW AGENT:

_____

Title

_____

Name

_____

Signature

_____

Address

12. At the time the Escrow Account is opened, CITY and CONTRACTOR shall deliver to ESCROW AGENT a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the City of Roseville, a municipal corporation, has authorized the execution of this Agreement by its City Manager and attestation by its City Clerk under the authority of Resolution No. 87-141, adopted by the Council of the City of Roseville on the 5th day of August, 1987, and CONTRACTOR and ESCROW AGENT have authorized the execution of this Agreement.

CITY OF ROSEVILLE, a municipal corporation:

BY:_____
DOMINICK CASEY

CONTRACTOR:

_____, a
_____

BY:_____

City Manager

ATTEST:

BY:_____

SONIA OROZCO

City Clerk

its:_____ and

BY:_____

its:_____

ESCROW AGENT:

BY:_____

its:_____

APPROVED AS TO FORM:

BY:_____

MICHELLE SHEIDENBERGER

City Attorney

and

BY:_____

its:_____

APPROVED AS TO SUBSTANCE:

BY:_____

DENNIS KAUFFMAN

Chief Financial Officer

ACKNOWLEDGED BY ADMINISTERING DEPARTMENT

BY:_____

END OF DOCUMENT-IN LIEU OF SECURITIES ESCROW AGREEMENT

Bond No._____

Premium $_____

EXHIBIT G - BOND FORMS

There are three (3) bond forms that constitute Exhibit G following this index sheet.

1. Performance Bond
2. Labor and Material Bond
3. Warranty Bond

Bond No._____

Premium $_____

PERFORMANCE BOND

This Performance Bond ("Performance Bond"), dated _____, 20___**,** is in the penal sum of _____ _____ Dollars ($_____), which is an amount not less than one hundred percent (100%) of the Total Contract Price, and is entered into by and between the undersigned _____ ("Principal" or "Contractor") and the undersigned _____

("Surety") to ensure the Principal's faithful performance of the Design Assist Construction Agreement for the _____ project ("Design Assist

Contract"). This Performance Bond consists of this page and the following Performance Bond

Terms and Conditions, Paragraphs 1 through 12. Any singular reference to the Principal, the Surety, the CITY of Roseville, California ("CITY") or other party shall be considered plural where applicable.

BOND TERMS AND CONDITIONS

1. The Principal and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the CITY for the complete and proper performance of the Design Assist Contract, which is incorporated herein by reference.

2. If the Principal completely and properly performs all of its obligations under the Design Assist Contract, the Surety and the Principal shall have no further obligation under this Performance Bond, except to participate in conferences as provided in Paragraph 3.1 below.

3. If there is no CITY Default, the Surety's obligation under this Performance Bond shall arise after:

    3.1 The CITY has notified the Contractor and the Surety at their respective addresses described in Paragraph 10 below, that the CITY is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than fifteen (15) days after receipt of such notice to discuss methods of performing the Design Assist Contract. If the CITY, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Design Assist Agreement, but such a mutual agreement shall not waive the CITY's right, if any, subsequently to declare a Contractor Default; and

    3.2 The CITY has declared a Contractor Default and formally terminated the Contractor's right to complete the Design Assist Contract. Such Contractor Default shall not be declared earlier than twenty (20) days after the Contractor and the Surety have received notice as provided in Paragraph 3.1 above.

    3.3 The CITY has agreed to pay the Balance of the Total Contract Price to:

        3.3.1 The Surety in accordance with the terms of this Performance Bond and the Design Assist Contract; or

        3.3.2 To a contractor selected to perform the Design Assist Contract in accordance with the terms of this Performance Bond and the Design Assist Contract.

4. When the CITY has satisfied the conditions of Paragraph 3 above, the Surety shall promptly (within thirty (30) days) and at the Surety's expense elect to take one of the following actions:

4.1 Arrange for the Contractor, with the CITY's consent, such consent to be in the CITY's sole discretion, to perform and complete the Design Assist Contract. If the

4.2 CITY withholds its consent, the Surety must elect an option described in Paragraphs 4.2, 4.3 or 4.4, below; or

4.3 Undertake to perform and complete the Design Assist Contract itself, through its agents or through independent contractors; or

4.4 Obtain proposals from qualified contractors acceptable to the CITY for a contract for performance and completion of the Design Assist Contract, and, upon determination by the CITY of the best value for the CITY, arrange for a contract to be prepared for execution by the CITY and the contractor selected, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Design Assist Contract; and, if the Surety's obligations defined in Paragraph 6 below exceed the Balance of the Total Contract Price, then the Surety shall pay to the CITY the amount of such excess; or

4.5 Waive its right to perform and complete the Design Assist Contract, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances, and, after investigation and consultation with the CITY, determine in good faith the amount for which it may then be liable to the CITY under Paragraph 6, below, for the performance and completion of the Design Assist Contract and, as soon as practicable after the amount is determined, tender payment therefor to the CITY with full explanation of the payment's calculation. If the CITY accepts the Surety's tender under this Paragraph 4.4, the CITY may still hold Surety liable for future damages then unknown or unliquidated resulting from the Seller Default. If the CITY disputes the amount of Surety's tender under this Paragraph 4.4, the CITY may exercise all remedies available to it at law to enforce the Surety's liability under Paragraph 6, below.

5. If the Surety does not proceed as provided in Paragraph 4, above, then the Surety shall be deemed to be in default on this Performance Bond ten (10) calendar days after receipt of an additional written notice from CITY to the Surety demanding that the Surety perform its obligations under this Performance Bond. At all times the CITY shall be entitled to enforce any remedy available to the CITY at law or under the Design Assist Contract including, without limitation, and by way of example only, rights to perform work, protect work, mitigate damages, or coordinate work with other consultants or contractors at Surety's sole expense.

6. The Surety's monetary obligation under this Performance Bond is limited by the amount of this Performance Bond. Subject to these limits, the Surety's obligations under this Bond are commensurate with the obligations of the Seller under the Design Assist Contract. The Surety's obligations shall include, but are not limited to:

6.1 The responsibilities of the Seller under the Design Assist Contract for completion of the Design Assist Contract and correction of defective work;

6.2 The responsibilities of the Seller under the Design Assist Contract to pay liquidated damages, and damages for which no liquidated damages are specified in the Design Assist Contract, including but not limited to, all valid and proper back charges, offsets, payments, indemnities, defense costs or other damages; and

6.3 Additional legal, design professional and delay costs resulting from the Seller Default or resulting from the actions or failure to act of the Surety under Paragraph 4, above.

7. The Surety shall not be liable to the CITY or others for the obligations of the Contractor that are unrelated to the Design Assist Contract, and the Balance of the Total Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Performance Bond to any person or entity other than the CITY or its heirs, executors, administrators, or successors.

8. The Surety hereby waives notice of any change, alteration or addition to the Design Assist Contract or to related subcontracts, purchase orders and other obligations, including but not limited to changes of time. The Surety consents to all terms of the Design Assist Contract, including provisions on changes to the Contract Documents. No extension of time, Change Order, alteration, Modification, deletion, or addition to the Contract Documents, or of the work required thereunder, shall release or exonerate Surety on this Performance Bond or in any way affect the obligations of Surety on this Performance Bond.

9. Any proceeding, legal or equitable, under this Performance Bond shall be instituted in any court of competent jurisdiction in Placer County, California within two (2) years after the Contractor Default or within two (2) years after the Contractor ceased working or within two (2) years after the Surety refuses or fails to perform its obligations under this Performance Bond, whichever occurs first. If the provisions of this Paragraph 9 are void or prohibited by law, the minimum period of limitation available to sureties as a defense in Placer County shall be applicable.

10. Notice to the Surety, the CITY or the Principal shall be mailed or delivered to the address shown on the signature page.

11. Any provision in this Performance Bond conflicting with any statutory or regulatory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Performance Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

    12.1 Balance of the Total Contract Price: The total amount payable by the CITY to the Contractor pursuant to the terms of the Design Assist Contract after all proper adjustments have been made under the Design Assist Contract, including, for example, deductions for progress payments made, deductions for liquidated damages owed, and increases/decreases for approved modifications to the Design Assist Contract.

    12.2 Design Assist Contract: The documents between the CITY and the Principal identified as the Contract Documents in that certain first above-mentioned Design Assist Construction Agreement, including all changes, Addenda and modifications thereto.

    12.3 Contractor Default: Material failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Design Assist Contract.

    12.4 CITY Default: Material failure of the CITY, which has neither been remedied nor waived, to pay the Contractor progress payments due under the Design Assist Contract or to perform other material terms of the Design Assist Contract, provided such failure is the cause of the asserted Contractor Default and is sufficient to justify Contractor termination of the Design Assist Contract.

IN WITNESS WHEREOF, the undersigned obligated parties have executed this instrument.

Bond No._____

Premium $_____

Principal:

Signature:

Name and Title:

Address:

(Corp. Seal)

Surety:

Signature:

Name and Title:

Address:

(Corp. Seal)

Attorney in Fact: _____

Surety shall submit the following documents along with this Performance Bond:

1. Verification that Surety is admitted to transact surety business in the State of California; and
2. Copy of Surety's Certificate of Authority, issued by the Insurance Commissioner of the State of California, along with a statement that said Certificate has not been surrendered, revoked, cancelled, annulled or suspended.

Approved: _____, CITY Attorney

END OF DOCUMENT – PERFORMANCE BOND

Bond No._____

Premium $_____

LABOR AND MATERIAL BOND

This Labor and Material Bond ("Labor and Material Bond") dated _____, 20____, is in the penal sum of _____ _____Dollars ($_____), which is an amount not less than one hundred percent (100%) of the Total Contract Price, and is entered into by and between the undersigned _____ ("Principal" or "Contractor") and the undersigned _____ ("Surety") to ensure the Principal's payment of claimants pursuant to the Design Assist Construction Agreement for the _____ project ("Design Assist Contract"). This Labor and Material Bond consists of this page and the following Labor and Material Bond Terms and Conditions, Paragraphs 1 through 15. Any singular reference to the Principal, the Surety, the CITY of Roseville, California ("CITY") or other party shall be considered plural where applicable.

BOND TERMS AND CONDITIONS

1. The Principal and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the CITY and to Claimants, to pay for labor, materials, Equipment furnished and Services provided in the performance of the Design Assist Contract, which is incorporated herein by reference.

2. With respect to the CITY, this obligation shall become null and void if and when the Principal:

   2.1 Promptly and fully makes payment, directly or indirectly, for all sums due Claimants, and

   2.2 Fully defends, indemnifies and holds harmless the CITY from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Design Assist Contact, provided the CITY has promptly notified the Principal and the Surety (at the address described in Paragraph 10 below) of any claims, demands, liens or suits and has tendered defense of such claims, demands, liens or suits to the Principal and the Surety, and provided there is no CITY Default. Otherwise, this Labor and Material Bond shall be, and remain, in full force and effect.

3. With respect to Claimants, this obligation shall become null and void if and when the Principal promptly and fully makes payment, directly or indirectly through its Subcontractors, for all sums due Claimants; otherwise, this Labor and Material Bond shall be, and remain, in full force and effect.

4. The Surety shall have no obligation to Claimants under this Labor and Material Bond until:

   4.1 Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the CITY, stating that a claim is being made under this Labor and Material Bond and, with substantial accuracy, the amount of the claim.

   4.2 Claimants who do not have a direct contract with the Contractor:

      4.2.1 Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the CITY, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the claim stating, with

substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

4.2.2 Have either received a rejection in whole or in part from the Contractor, or have not received within thirty (30) days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and

4.2.3 Not having been paid within the above thirty (30) days, have sent a written notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the CITY, stating that a claim is being made under this Labor and Material Bond and enclosing a copy of the previous written notice furnished to the Contractor.

5. If a notice required by Paragraph 4 above is given by the CITY to the Contractor or to the Surety, that is sufficient compliance.

6. When the Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1 Send an answer to the Claimant, with a copy to the CITY, within forty-five (45) days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2 Pay or arrange for payment of any undisputed amounts.

7. The Surety's total obligation shall not exceed the amount of this Labor and Material Bond, and the amount of this Labor and Material Bond shall be credited for any payments made in good faith by the Surety under this Labor and Material Bond.

8. Amounts due the Contractor under the Design Assist Contract shall be applied to satisfy claims, if any, under this Labor and Material Bond.

9. The Surety shall not be liable to the CITY, Claimants or others for obligations of the Contractor that are unrelated to the Design Assist Contract. The CITY shall not be liable for payment of any costs, expenses, or attorney's fees of any Claimant under this Labor and Material Bond, and shall have no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Labor and Material Bond.

10. The Surety hereby waives notice of any change, alteration or addition to the Design Assist Contract or to related subcontracts, purchase orders and other obligations, including but not limited to changes of time. The Surety consents to all terms of the Design Assist Contract, including provisions on changes to the Contract Documents. No extension of time, Change Order, alteration, modification, deletion, or addition to the Contract Documents, or of the work required thereunder, shall release or exonerate Surety on this Labor and Material Bond or in any way affect the obligations of Surety on this Labor and Material Bond.

11. Any proceeding, legal or equitable, under this Labor and Material Bond shall be instituted in any court of competent jurisdiction in Placer County, California within one (1) year from the date on which (i) the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.3.3, or (ii) the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Design Assist Contract, whichever of (i) or (ii) first occurs. If the provisions of this Paragraph 11 are void or prohibited by law, the minimum period of limitation available to sureties as a defense in Placer County shall be applicable.

Bond No._____

Premium $_____

12. Notice to the Surety, the CITY or the Principal shall be mailed or delivered to the address shown on the signature page below. Actual receipt of notice by the Surety, the CITY or the Principal, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page below.

13. Any provision in this Labor and Material Bond conflicting with any statutory or regulatory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein.
The intent is that this Labor and Material Bond shall be construed as a statutory bond and not as a common law bond.

14. Upon request by any person or entity appearing to be a potential beneficiary of this Labor and Material Bond, the Principal shall promptly furnish a copy of this Labor and Material Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1 CLAIMANT: An individual or entity having a direct contract with the Contractor or with a subcontractor (of any tier) of the Contractor to furnish labor, materials or equipment for use in the performance of the Design Assist Contract. The intent of this Labor and Material Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Design Assist Contract, architectural and engineering services used or reasonably required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien or stop payment notice might be asserted.

DESIGN ASSIST CONTRACT: The documents between the CITY and the Contractor identified as the Contract Documents in that certain first above-mentioned Design Assist Contract, including all changes, Addenda and modifications thereto.

15.2 CITY DEFAULT: Material failure of the CITY, which has neither been remedied nor waived, to pay the Contractor as required by the Design Assist Contract, provided such failure is the cause of the failure of Principal to pay the Claimants and is sufficient to justify Contractor termination of the Design Assist Contract.

IN WITNESS WHEREOF, the undersigned obligated parties have executed this security instrument.

Principal:

Signature:

Name and Title:

Address:

(Corp. Seal)

Bond No._____

Premium $_____

Surety:

Signature:

Name and Title:

Address:

(Corp. Seal)

Attorney in Fact: _____

Surety shall submit the following documents along with this Labor and Material Bond:

1. Verification that Surety is admitted to transact surety business in the State of California; and
2. Copy of Surety's Certificate of Authority, issued by the Insurance Commissioner of the State of California, along with a statement that said Certificate has not been surrendered, revoked, cancelled, annulled or suspended.

Approved: _____, CITY Attorney

END OF DOCUMENT – LABOR AND MATERIAL BOND

Bond No._____

Premium $_____

WARRANTY BOND

This Warranty Bond ("Warranty Bond"), dated _____, 20___**,** is in the penal sum of _____ for the Design-Assist Construction Agreement for the _____ project, and is entered into by and between the undersigned _____ ("Principal" or "Contractor") and the undersigned _____ ("Surety") to guaranty that all Equipment and Services provided by Seller under the above-mentioned Design Assist Contract will fulfill the requirements of Principal's warranties and guarantees included in the Contract Documents. This Warranty Bond consists of this page and the following Warranty Bond Terms and Conditions, Paragraphs 1 through 7. Any singular reference to the Principal, the Surety, the CITY of Roseville, California ("CITY") or other party shall be considered plural where applicable.

BOND TERMS AND CONDITIONS

1. The Principal and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the CITY for a period of one (1) year following the date of Final Acceptance, or such longer period specified in the Contract Documents, its unconditional warranty of the quality and adequacy of all of the work including, without limitation, all equipment and work provided by Contractor and its subcontractors and subvendors of all tiers in connection with the Design Assist Contract.

2. Neither final payment nor use or occupancy of the Equipment or Services performed by the Contractor shall constitute an acceptance of such Equipment or Services not done in accordance with this Warranty Bond or relieve Contractor of liability in respect to any express guarantees, warranties or responsibilities for faulty materials or workmanship, ordinary wear and tear excepted. If within one (1) year after the date of Final Acceptance, or such longer period of time as may be prescribed the terms of the Contract Documents, any Equipment or Services is found to be defective, Contractor and Surety shall promptly, without cost to CITY and in accordance with CITY's written instructions, correct such defective Equipment or Services. Contractor and Surety shall remove any defective Equipment rejected by CITY and replace it with Equipment that is not defective. If Contractor or Surety fails to promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, CITY may have the defective Equipment or Services corrected or removed and replaced. Contractor and Surety shall pay for all claims, costs, losses and damages caused by or resulting from such removal and replacement. Where Contractor and Surety fail to correct defective Equipment or Services, or defects are discovered outside the correction period, CITY shall have all rights and remedies granted by law.

3. As part of the obligation secured hereby and in addition to the face amount specified therefor, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by CITY.

Bond No._____

Premium $_____

4. The Surety hereby waives notice of any change, alteration or addition to the Design Assist Contract or to related subcontracts, purchase orders and other obligations, including but not limited to changes of time. The Surety consents to all terms of the Design Assist Contract, including provisions on changes to the Contract Documents. No extension of time, Change Order, alteration, Modification, deletion, or addition to the Contract Documents, or of the work required thereunder, shall release or exonerate Surety on this Warranty Bond or in any way affect the obligations of Surety on this Warranty Bond.

5. If the Surety does not proceed as provided in Paragraph 2 above, then the Surety shall be deemed to be in default on this Warranty Bond ten (10) calendar days after receipt of an additional written notice from CITY to the Surety demanding that the Surety perform its obligations under this Warranty Bond. At all times the CITY shall be entitled to enforce any remedy available to the CITY at law or under the Design Assist Contract including, without limitation, and by way of example only, rights to perform work as Surety's expense, protect work, mitigate damages, or coordinate work with other consultants or contractors.

6. All abbreviations and definitions of terms used in this Warranty Bond shall have the meanings set forth in the Contract Documents, including, without means of limitation, the Design Assist Contract.

7. The foregoing Warranty Bond is in addition to any other guarantees and warranties of Contractor contained in the Contract Documents, and not in lieu of, any and all other liability imposed on Contractor under the Contract Documents and at law with respect to Contractor's duties, obligations, and performance under the Contract Documents. In the event of any conflict or inconsistency between the terms of this Warranty Bond and any guaranty, warranty or obligation of the Seller under the Contract Documents or at law, such inconsistency or conflict shall be resolved in favor of the higher level of obligation of the Contractor and Surety.

IN WITNESS WHEREOF, the undersigned obligated parties have executed this instrument.

Principal:

Signature:

Name and Title:

Address:

(Corp. Seal)

Bond No._____

Premium $_____

Surety:

Signature:

Name and Title:

Address:

(Corp. Seal)

Attorney in Fact: _____

Surety shall submit the following documents along with this Warranty Bond:

1. Verification that Surety is admitted to transact surety business in the State of California; and
2. Copy of Surety's Certificate of Authority, issued by the Insurance Commissioner of the State of California, along with a statement that said Certificate has not been surrendered, revoked, cancelled, annulled or suspended.

Approved: _____, CITY Attorney

END OF DOCUMENT – WARRANTY BOND

EXHIBIT H - COMPLETION TIMES AND LIQUIDATED DAMAGES

Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Project

A. Project Milestones

Following are scope descriptions for substantial completion of project milestones.

1. **Milestone 1:** Substantial Completion of Well 9 (Westbrook) in accordance with Article 8.13 and City has accepted a partial Certificate of substantial completion and punch list. Determination of Substantial Completion is solely at the discretion of the CITY.
2. **Milestone 2**: Substantial Completion of Well 18 (Solaire) in accordance with Article 8.13 and City has accepted a partial Certificate of substantial completion and punch list. Determination of Substantial Completion is solely at the discretion of the CITY.
3. **Milestone 3**: Final Completion in accordance with Article 8.14 and City has initiated the process of attaining a Notice of Completion. Determination of Final Completion is solely at the discretion of the CITY.

B. Times Allowed for Completion

In accordance with the provisions of Article 7-TIME AND PROGRESS OF WORK, the following table summarizes the scope of work milestones and the contracted completion time. Each milestone shall be completed within the number of consecutive calendar days from the date established in the Notice to Proceed for the commencement of Contract Time.

Table H-1: Times Allowed for Completion of Each Project Milestone

Contractual Completion Event	**Completion Time (Calendar Days)**
Milestone 1: Substantial Completion of Well 9 (Westbrook)	295
Milestone 2: Substantial Completion of Well 18 (Solaire)	295
Milestone 3: Final Completion	325

C. Damages for Delays

In accordance with the provisions of Article 7-TIME AND PROGRESS OF WORK for the period of time that any portion of the Work remains unfinished after the time fixed in above Table H-1: Times Allowed for Completion of Each Project Milestone, as modified by extensions of time granted by the Owner, it is understood and agreed by the Contractor and the Owner that the Contractor shall pay the Owner the liquidated damages listed below.

Table H-2: Daily Liquidated Damages for Non-Completion of Each Project Milestone

Contractual Completion Event	**Daily Liquidated Damages**
Milestone 1: Substantial Completion of Well 9 (Westbrook)	$500
Milestone 2: Substantial Completion of Well 18 (Solaire)	$500
Milestone 3: Final Completion	$500

D. Weather Days

In accordance with the provisions of Article 7-TIME AND PROGRESS OF WORK, an allowance of fifteen (15)ten (10) working days of weather or other caused Excusable Delays are included in the time allowed for completion. This allowance represents a reasonable assessment of anticipated lost working days based on historical weather patterns. These weather days shall be included in the Contractor's schedule as specified in Technical Specifications Section 01320-PROGRESS SCHEDULES.

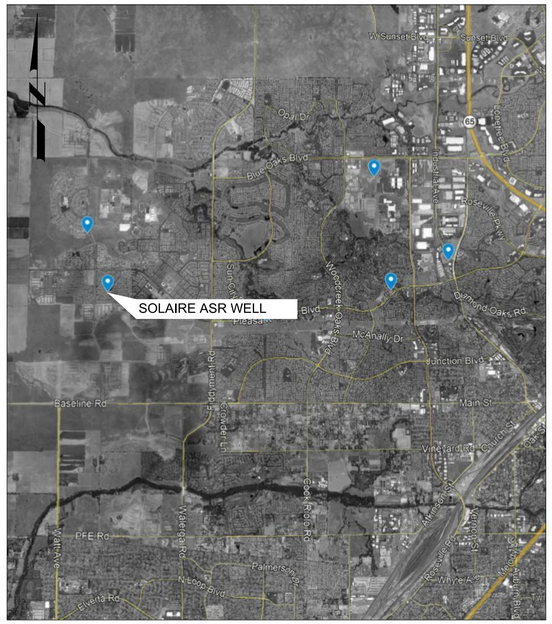
END OF EXHIBIT H

CITY OF ROSEVILLE

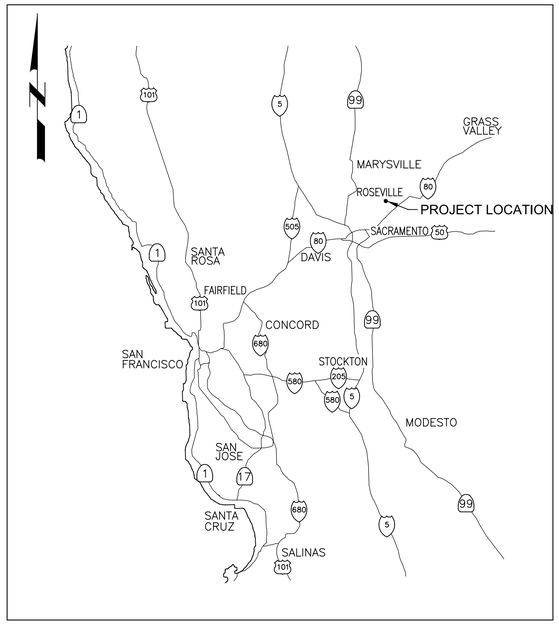
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
SOLAIRE ASR WELL

50% DESIGN SUBMITTAL
OCTOBER 2021

VOLUME 2 OF 3



VICINITY MAP



LOCATION MAP

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER THOMAS CLEVELAND
No. 72713
CIVIL
STATE OF CALIFORNIA

APPROVAL RECOMMENDED BY: _____ DATE: 10/1/2021

JANICE GAINEY, P.E.
SENIOR ENGINEER
DEPARTMENT OF ENVIRONMENTAL UTILITIES
CITY OF ROSEVILLE

APPROVED BY: _____ DATE: 10/1/2021

SEAN BIGLEY
ASSISTANT ENVIRONMENTAL UTILITIES DIRECTOR
ENVIRONMENTAL UTILITIES - WATER UTILITY & GOVERNMENT RELATIONS
CITY OF ROSEVILLE

SUBMITTED BY: _____ DATE: 10/1/2021

CHRISTOPHER CLEVELAND, P.E.
SENIOR PROJECT MANAGER / SENIOR VICE PRESIDENT
CAROLLO ENGINEERS, INC.

carollo®

JOB NO. 11843A.10
DRAWING NO. G01
SHEET NO. 1 OF XX

@	AT (MEASUREMENT)	
△	DEFLECTION ANGLE, CENTRAL ANGLE	
#	NUMBER (REBAR Ø)	
A		
AB	ANCHOR BOLT	
ABC	AGGREGATE BASE COURSE	
ABS	ACRYLONITRILE BUTADIENE STYRENE	
AC	ASPHALTIC CONCRETE	
ACB	AIR CIRCUIT BREAKER	
ACI	AMERICAN CONCRETE INSTITUTE	
ACP	ASBESTOS CEMENT PIPE	
ACU	AIR CONDITIONING UNIT	
AD	AREA DRAIN	
ADDL	ADDITIONAL	
ADJ	ADJACENT, ADJUST, ADJUSTABLE	
ADMIN	ADMINISTRATION	
ADR	ACCESS DOOR	
AED	AREA EQUIPMENT DRAIN	
AER	AERAT(ION)(OR)	
AFC	AFTERCOOLER	
AFF	ABOVE FINISHED FLOOR	
AFM	AIR FLOW MONITOR	
AHU	AIR HANDLING UNIT	
AIC	AIR COMPRESSOR	
AIL	AIR INTAKE LOUVER	
ALT	ALTERNATE	
AL	ALUMINUM	
ANCH	ANCHOR	
ANV	ANGLE VALVE	
APPROX	APPROXIMATE, APPROXIMATELY	
ARCH	ARCHITECTURAL	
ARV	AIR RELEASE VALVE	
ASSY	ASSEMBLY	
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	
AV	ACID VENT	
AVG	AVERAGE	
AVV	AIR AND VACUUM VALVE	
AW	ACID WASTE	
B		
BC	BEGIN CURVE, BRASS CAP, BACK OF CURB, BOLT CIRCLE	
BCKR	BACKER BOARD	
BCM	BATCHMETER	
BD	BOARD	
BDD	BACKDRAFT DAMPER	
BDR	BASIN DRAIN LINE	
BF	BLIND FLANGE	
BFG	BELOW FINISHED GRADE	
BFP	BELT FILTER PRESS	
BFV	BUTTERFLY VALVE	
BG	BREAK GLASS HAND SWITCH	
BKW	BACKWASH	
BLDG	BUILDING	
BLK	BLOCK	
BLKHD	BULKHEAD	
BLR	PROCESS BLOWER	
BM	BEAM, BENCH MARK	
BOTT	BOTTOM	
BOTTS	BOTTOM SLUDGE	
BPV	BACK PRESSURE VALVE	
BRG	BEARING	
BSP	BLACK STEEL PIPE	
BTU	BRITISH THERMAL UNITS	
BTWN	BETWEEN	
BV	BALL VALVE	
BWCCP	BAR-WRAPPED CONCRETE CYLINDER PIPE	
C		
C	CLOSE, CONDUIT CHANNEL (STRUCTURAL)	
CA	CONCRETE ANCHOR	
CAUSTIC	CAUSTIC SOLUTION (CONCENTRATED OR DILUTE)	
CB	CATCH BASIN	
CC	CENTER OF CURVATURE, CENTER TO CENTER	
CCB	CHLORINE CONTACT BASIN	
CD	CEILING DIFFUSER, CONDENSATE DRAIN	
CDL	CHEMICAL DRAIN LINE	
CDT	CONDUIT	
CEF	CEILING EXHAUST FAN	
CF	CUBIC FEET	
CFM	CUBIC FEET PER MINUTE	
CFS	CUBIC FEET PER SECOND	
CHEMD	CHEMICAL DRAIN	
CHF	CHEMICAL FEEDER	
CHKD PL	CHECKERED PLATE	
CI	CAST IRON	
CIP	CAST IRON PIPE	
CIRC	CIRCUMFERENTIAL/CIRCUMFERENCE	
CJ	CONSTRUCTION JOINT	
CKA	CHECK VALVE, ANGLE	
CKB	CHECK VALVE, BALL	
CKF	CHECK VALVE, FLAP	
CKS	CHECK VALVE, SWING	
CL	CENTER LINE	
CLK	CHAIN LINK	
CLD	CHLORINE LEAK DETECTOR	
CLL	CHLORINE LIQUID	
CLP	CHLORINE GAS (PRESSURE)	
CLR	CLEAR	
CLS	CHLORINE SOLUTION	
CLSM	CONTROLLED LOW STRENGTH MATERIAL	
CLV	CHLORINE GAS (VACUUM)	
CML	CEMENT MORTAR LINED	
CMLC	CEMENT MORTAR LINED AND COATED	
CMP	CORRUGATED METAL PIPE	
CMU	CONCRETE MASONRY UNIT	
CNV	CONVEYOR	
CO	CLEANOUT	
COL(S)	COLUMN(S)	
CONC	CONCRETE	
CONN	CONNECT, CONNECTION	
CONST	CONSTRUCTION	
CONT	CONTINUOUS OR CONTINUATION OR (D) (OUS)	
CORR	CORRUGATE(D), CORROSION	
CP	CONTROL POINT	
CPLG	COUPLING	
CPT	CARPET	
CPVC	CHLORINATED POLYVINYL CHLORIDE	
CS	CARBON STEEL, CIRCULATING SLUDGE	
CSP	CHEMICAL SUMP PUMP, CORRUGATED STEEL PIPE	
CT	CURRENT TRANSFORMER, CERAMIC TILE	
CTJ	CONTROL JOINT	
CTL	CONTROL	
CTR	CENTER, CENTERED	
CTSK	COUNTERSUNK	
CU	CUBIC	
CUP	COPPER PIPE	
CV	CHECK VALVE	
CW	COLD WATER	
CWV	COMBINATION WASTE AND VENT	
CY	CUBIC YARD	
D		
D	DEPTH, DIGITAL OR DISCRETE, DRAIN	
D/W	DRIVEWAY	
DBL	DOUBLE	
DDR	DESICCANT DRYER	
DEG or °	DEGREE	
DEMO	DEMOLISH, DEMOLITION	
DET	DETAIL	
DFL	DECANT/FILTRATE	
DG	DOOR GRILLE	
DIA or Ø	DIAMETER	
DIAG	DIAGONAL	
DIF	DIFFUSER	
DIG	DIGESTER	
DIM	DIMENSION	
DIP	DUCTILE IRON PIPE	
DISCH	DISCHARGE	
DIW	DEIONIZED WATER	
DL	DEAD LOAD, DRAIN LINE	
DLV	DOOR LOUVER	
DMP	DAMPER	
DMS	DIAPHRAGM SEAL	
DN	DOWN	
do	DITTO	
DO	DOOR OPENING	
DP	DEEP (OR DEPTH)	
DPV	DIAPHRAGM VALVE	
DR	DOOR, DRAIN	
DRT	DRIP TRAP	
DRV	DRAIN VALVE	
DS	DIGESTED SLUDGE, DOWN SPOUT	
DSW	DISTILLED WATER, DOOR SWITCH	
DUC	DUST COLLECTOR	
DUH	DUCT HEATER UNIT	
DW	DISTILLED WATER	
DWD	DEWATERING DRAIN	
DWG(S)	DRAWING(S)	
DWL(S)	DOWEL(S)	
E		
E	EAST	
EA	EACH	
EC	END OF CURVE	
ECC RED	ECCENTRIC REDUCER	
ECU	EVAPORATOR COOLING UNIT	
ED	EQUIPMENT DRAIN	
EF	EXHAUST FAN, EACH FACE	
EFF	EFFLUENT	
EG	EXHAUST GRILLE	
EIFS	EXTERIOR INSULATION AND FINISH SYSTEM	
EJ	EXPANSION JOINT	
EJR	INJECTOR/EDUCTOR	
EL	ELEVATION	
ELEC	ELECTRICAL	
ELL	ELBOW	
EMBED	EMBEDMENT	
EMH	ELECTRICAL MANHOLE	
EP	EDGE OF PAVEMENT	
EPS	EXPANDED POLYSTYRENE	
EPV	ECCENTRIC PLUG VALVE	
EQ	EQUAL	
EQUIP	EQUIPMENT	
ER	EXHAUST REGISTER	
ES	EACH SIDE	
ESEW	EMERGENCY SHOWER AND EYE WASH	
ESS	EMERGENCY HAND SWITCH	
ET	ELECTRICALLY HEAT TRACED	
EUH	ELECTRIC UNIT HEATER	
EVR	EVAPORATOR	
EW	EACH WAY	
EWC	ELECTRIC WATER COOLER	
EWEF	EACH WAY EACH FACE	
EWH	ELECTRIC WATER HEATER, EXHAUST	
EX	EXISTING	
EXIST	EXISTING	
EXP	EXPANSION, EXPANSION TANK	
EXPO	EXPOSED	
EXT	EXTERIOR	
F		
FACT	FACTORY	
FAD	FOUL AIR DUCT	
FB	FLAT BAR	
FBW	FILTER BACKWASH	
FC	FACE OF CURB, FLEXIBLE COUPLING	
FCA	FLANGE COUPLING ADAPTER	
FCO	FLOOR CLEANOUT	
FCU	FAN COIL UNIT	
FD	FIRE DAMPER, FLOOR DRAIN, FOUND	
FDC	FIRE DEPARTMENT CONNECTION	
FDL	FLOOR DRAIN LINE	
FDR	FEEDER	
FEFF	FINAL EFFLUENT	
FG	FLAP GATE	
FH	FIRE HYDRANT	
FILT	FILTRATE	
FIN	FINISH	
FIN FL	FINISHED FLOOR	
FIN GR	FINISHED GRADE	
FL	FLOOR, FLOW LINE	
FLA	FOUL AIR	
FLD	FILTER DRAIN	
FLE	FILTER EFFLUENT	
FLEX	FLEXIBLE	
FLG	FLANGE, OR FLANGED	
FLR	FILTER	
FM	FORCE MAIN	
FND	FOUNDATION	
FO	FUEL OIL	
FOB	FLAT ON BOTTOM	
FOT	FLAT ON TOP	
FPM	FEET PER MINUTE	
FPP	FLEXIBLE PLASTIC PIPE	
FRP	FIBERGLASS REINFORCED PLASTIC	
FRPP	FIBERGLASS REINFORCED PLASTIC PIPE	
FRS	FROTH SPRAY	
FS	FAR SIDE	
FSTN	FASTEN(ED)	
FT or '	FOOT, FEET	
FTG	FOOTING	
FUP	FUEL DISPENSER	
FV	FLAP VALVE	
FW	FLUSHING WATER	
FX	FIRE EXTINGUISHER	
FXC	FIRE EXTINGUISHER CABINET	
FXE	FIRE EXTINGUISHER - ELECTRICAL	
G		
G	GAS, GROUND, GUTTER	
GA	GAUGE or GAGE	
GAL	GALLONS	
GALV	GALVANIZE(D)	
GAV	GRAVITY VENTILATOR	
GB	GRADE BREAK	
GBT	GRAVITY BELT THICKENER	
GC	GROOVED COUPLING	
GEL	GRAVITY EXHAUST LOUVER	
GEN	GENERAL, GENERATOR	
GL	GLASS	
GLV	GLOBE VALVE	
GM	GAS METER	
GND	GROUND	
GPD	GALLONS PER DAY	
GPM	GALLONS PER MINUTE	
GR	GRADE	
GRTG	GRATING	
GRV	GRAVITY VENTILATOR	
GSP	GALVANIZED STEEL PIPE	
GV	GATE VALVE	
GYP	GYPSUM	
H		
H	EXPLOSION-PROOF, HIGH, HORIZONTAL	
H1E	HOOK ONE END	
H2E	HOOK TWO ENDS	
HAS	HEADED ANCHOR STUD	
HB	HOSE BIBB	
HDPE	HIGH DENSITY POLYEHTYLENE	
HDW	HARDWARE	
HDWL	HEADWALL	
HEF	HOOD EXHAUST FAN	
HGT	HEIGHT	
HH	HAND HOLE, ELECTRICAL PULL BOX	
HORIZ	HORIZONTAL	
HP	HEAT PUMP, HORSEPOWER, HIGH PRESSURE	
HPA	HIGH PRESSURE AIR	
HPT	HIGH POINT	
HPU	HEAT PUMP UNIT AIR	
HR	HANDRAIL, HOSE REEL, HOUR	
HSF	HOOD SUPPLY FAN	
HSS	HOLLOW STRUCTURAL SECTION (STEEL)	
HTX	HEAT EXCHANGER	
HV	HOSE VALVE	
HW	HOT WATER	
HWL	HIGH WATER LEVEL	
HWR	HOT WATER RETURN	
HWS	HOT WATER SUPPLY	
HxW	HEIGHT BY WIDTH	
HYD	HYDRANT	
I		
IA	INSTRUMENT AIR	
ID	INSIDE DIAMETER, INSIDE DIMENSION, IDENTIFICATION	
I.F.	INSIDE FACE	
IN or "	INCHES	
INCL	INCLUDE, INCLUDING	
INF	INFLUENT	
INJ	INJECTOR	
INSTR	INSTRUMENTATION	
INSUL	INSULAT(E)(ED)(ING)(ION)	
INT	INTERIOR	
INV	INVERT	
IP	IRON PIPE	
ISR	INTRINSICALLY SAFE RELAY	
J		
JST	JOIST	
JT	JOINT	
K		
KGV	KNIFE GATE VALVE	
L		
L	ANGLE (STRUCTURAL), LENGTH, LOUVER	
LAB	LABORATORY	
LAV	LAVATORY	
LB(S)	POUND(S)	
LDF	LIQUID DIESEL FUEL	
LDFR	LIQUID DIESEL FUEL RETURN	
LF	LINEAL FEET	
LG	LONG	
LH	LEFT HAND	
LHR	LEFT HAND REVERSE	
LHRA	LEFT HAND REVERSE ACTIVE	
LHRB	LEFT HAND REVERSE BEVEL	
LL	LIVE LOAD	
LLH	LONG LEG HORIZONTAL	
LLV	LONG LEG VERTICAL	
LP	LOW PRESSURE	
LPA	LOW PRESSURE AIR	
LPG	LIQUIFIED PROPANE GAS	
LPT	LOW POINT	
LR	LONG RADIUS	
LS	LAB SINK	
LT	LEFT	
LWL	LOW WATER LEVEL	
M		
M	MOTOR	
MAINT	MAINTENANCE	
MAN	MANUAL	
MASY	MASONRY	
MATL	MATERIAL	
MAU	MAKE-UP AIR UNIT	
MAX	MAXIMUM	
MB	MACHINE BOLT	
MC	MECHANICAL COUPLING	
MCJ	MASONRY CONTROL JOINT	
MD	MOTORIZED DAMPER	
MECH	MECHANICAL	
MET	METAL	
MFR	MANUFACTURER	
MG/L	MILLIGRAMS PER LITER	
MGD	MILLION GALLONS PER DAY	
MH	MANHOLE	
MIN	MINIMUM	
MISC	MISCELLANEOUS	
MIX	MIXER	
MJ	MECHANICAL JOINT	
MK	MARK	
ML	MIXED LIQUOR	
MO	MASONRY OPENING	
MOD	MODIFIED	
MOIST	MOISTURE	
MON	MONUMENT	
MOS	MOISTURE SEPARATOR	
MPM	METERING PUMP	
MS	MOP SINK	
MTD	MOUNTED	
N		
N	NORTH, NEUTRAL	
NA	NOT APPLICABLE	
NC	NORMALLY CLOSED	
NEV	VALVE, NEEDLE	
NG	NATURAL GRADE, NATURAL OR LP GAS	
NIC	NOT IN CONTRACT	
NO., #	NUMBER	
NOM	NOMINAL	
NPT	NATIONAL PIPE THREAD	
NPW	NON-POTABLE WATER	
NS	NEAR SIDE	
NTS	NOT TO SCALE	
O		
O	OPEN	
OBD	OPPOSED BLADE DAMPER	
OC	ON CENTER	
OD	OUTSIDE DIAMETER, OUTSIDE DIMENSION	
OED	OPEN EQUIPMENT DRAIN	
O.F.	OUTSIDE FACE	
OFL	OVERFLOW	
OPNG	OPENING	
OPP	OPPOSITE	
OPP HND	OPPOSITE HAND	
OZ	OUNCE	
P		
P	POLE	
PBL	POLYMER BLENDER	
PC	POINT OF CURVATURE	
PCC	PLANT CONTROL CENTER	
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE	
PCP	PROGRESSIVE CAVITY PUMP	
PD	POSITIVE DISPLACEMENT, PLANT DRAIN	
PD, PLD	PULSATION DAMPENER	
PDP	POSITIVE DISPLACEMENT PUMP	
PE	PLAIN END	
PERP	PERPENDICULAR	
PG	PRESSURE GAUGE	
PH	PHASE, PHYSICALLY HANDICAPPED	
PI	POINT OF INTERSECTION	
PIV	POST INDICATOR VALVE	
PL	PLATE, PROPERTY LINE	
PLAS	PLASTIC	
PLCS	PLACES	
PLS	POLYMER SOLUTION	
PLWD	PLYWOOD	
PMP	PUMP	
PNL(S)	PANEL(S)	
POL	POLYMER	
POLY	POLYETHYLENE	
POS	POSITION	
POW	POTABLE WATER	
PP	POWER POLE	
PPMV	PARTS PER MILLION (VOLUME)	
PRC	POINT OF REVERSE CURVATURE	
PREFAB	PREFABRICATED	
PRG	PRESSURE REGULATOR	
PRI	PRIMARY	
PROJ	PROJECTION	
PRR	PRESSURE OR VACUUM RELIEF VALVE	
PRV	PRESSURE REDUCING VALVE, PRESSURE REGULATION VALVE, PRESSURE RELIEF VALVE	
PS	PUMP STATION, PIPE SUPPORT	
PSF	POUNDS PER SQUARE FOOT	
PSG	PRESSURE GAUGE	
PSI	POUNDS PER SQUARE INCH	
PSIG	POUNDS PER SQUARE INCH GAUGE	
PT	POINT, POINT OF TANGENCY	
PV	PLUG VALVE	
PVC	POINT OF VERTICAL CURVATURE, POLYVINYL CHLORIDE	
PVDF	POLYVINYLIDENEFLUORIDE	
PVI	POINT OF VERTICAL INTERSECTION	
PVMT	PAVEMENT	
PVT	POINT OF VERTICAL TANGENCY	
PLW	PLANT WATER	
Q		
QTY	QUANTITY	
R		
R/W	RIGHT OF WAY	
RAD	RADIUS, RADIAL	
RAS	RETURN ACTIVATED SLUDGE	
RCP	REINFORCED CONCRETE PIPE	
RCCP	REINFORCED CONCRETE CYLINDER PIPE	
RD	ROOF DRAIN	
RDL	ROOF DRAIN LINE	
RDOF	ROOF DRAIN OVERFLOW	
RECIRC	RECIRCULATING	
RED	REDUCER, ROOF EQUIPMENT DRAIN	
REF	REFERENCE	
REG	REGULATOR, REGULATING	
REINF	REINFORCE(D)(ING)(MENT)	
REJ	RUBBER EXPANSION JOINT	
REQD	REQUIRED	
RER	REACTOR	
RES	RESERVOIR	
REV	REVISION, REVERSE	
RF	RETURN FAN	
RG	RETURN GRILLE RUBBER GASKET	
RH	RIGHT HAND	
RHR	RIGHT HAND REVERSE	
RHRA	RIGHT HAND REVERSE ACTIVE	
RHRB	RIGHT HAND REVERSE BEVEL	
RLS	REGISTERED LAND SURVEYOR	
RM	ROOM	
RO	ROUGH OPENING	
ROT	ROTAMETER	
RP	RADIUS POINT	
RPM	REVOLUTIONS PER MINUTE	
RPMP	REINFORCED PLASTIC MORTAR PIPE	
RR	RETURN REGISTER	
RSR	RISER	
RT	RIGHT	
RTF	ROTARY FEEDER	
RTU	ROOF TOP UNIT	
RUD	RUPTURE DISK	
RW	RECLAIMED WATER, REUSE WATER	
RWR	RECLAIMED WATER RETURN	
RWW	RAW WASTEWATER	
S		
S/W	SIDEWALK	
S	SOUTH, SWITCH, SLOPE	
SA	SAMPLE	
SC	SECONDARY CLARIFIER	
SCB	SCRUBBER	
SCD	SMOKE CONTROL DAMPER	
SCFM	STANDARD CUBIC FEET PER MINUTE	
SCH	SCHEDULE	
SCO	SURFACE CLEANOUT	
SCR	BAR SCREEN	
SCR	SILICON CONTROL RECTIFIER	
SD	SMOKE DETECTOR, SPLITTER DAMPER, STORM DRAIN	
SDL	SUMP DISCHARGE DRAIN LINE	
SDO	SLUDGE DRAWOFF	
SE	SECONDARY EFFLUENT	
SEC	SECONDARY, SECOND	
SECT	SECTION	
SED	SEDIMENTATION	
SEP	SEPTAGE	
SF	SUPPLY FAN	
SFW	SOFTENED WATER	
SG	SUPPLY GRILLE	
SGS	STORE FRONT GLAZING SYSTEM	
SHD	SHOWER DRAIN	
SHDR	SOLIDS HANDLING-RECYCLE	
SHR	SHOWER	
SHT	SHEET	
SIM	SIMILAR	
SK	SKIMMINGS	
SL	SLOPE, SLUDGE	
SLC	SLUDGE COLLECTOR DRIVE	
SLG	SLIDE GATE	
SLV	SLEEVE VALVE	
SMP	SAMPLER, SUMP PUMP	
SN	SUPERNATANT OR SUBNATANT	
SOL	SOLUTION	
SP	STATIC PRESSURE, SET POINT	
SPD	SUMP PUMP DRAIN	
SPDT	SINGLE POLE DOUBLE THROW	
SPEC(S)	SPECIFICATION(S)	
SPL	SPLITTER BOX	
SPR	SPARE	
SPS	SAMPLE SINK	
SPW	SAMPLE WATER	
SQ	SQUARE	
SQ FT	SQUARE FEET	
SQ IN(S)	SQUARE INCH(ES)	
SR	SHORT RADIUS, SUPPLY REGISTER	
SRL	SCRUBBER RECIRCULATION LIQUID (CAUSTIC)	
SS	SANITARY SEWER, SELECTOR SWITCH	
SSK	SERVICE SINK	
SSL	SECONDARY SLUDGE	
SST	STAINLESS STEEL	
ST	SLUDGE TRANSFER	
STA	STATION	
STB	STABILIZER	
STD(S)	STANDARDS(S)	
STIFF	STIFFENER	
STIR	STIRRUPS	
STL	STEEL	
STM	STEAM	
STP	STEEL PIPE	
STR	STRAINER	
STRUCT	STRUCTURAL	
SUG	SLUICE GATE	
SUPT	PIPE SUPPORT, SUPPORT	
SV	SERVICE VALVE, SHUTOFF VALVE, SOLENOID VALVE	
SW	SANITARY WASTE	
SWR	SEAL WATER	
SYM	SYMMETRICAL	
SYN	SYNTHETIC	
T		
T	TANGENT LENGTH, THERMOSTAT, TIMER	
T&B	TOP AND BOTTOM	
TAS	THREADED ANCHOR STUD	
TBM	TEMPORARY BENCHMARK	
TC	TOP OF CURB	
TCV	TEMPERATURE CONTROL VALVE	
TDH	TOTAL DYNAMIC HEAD	
TDR	TIME DELAY RELAY, TOWEL DISPENSER/RECEPTACLE	
TEL	TELEPHONE	
TH	TEST HOLE	
THK	THICKENER, THICKNESS, THICK	
TKS	THICKENED SLUDGE	
TLV	TELESCOPING VALVE	
TMH	TELEPHONE MANHOLE	
TMP	TEMPERATURE	
TNK	TANK	
T.O.	TOP OF	
TOC	TOP OF CONCRETE	
TOG	TOP OF GRATING	
TOM	TOP OF MASONRY	
TOS	TOP OF STEEL	
T.O.W.	TOP OF WALL	
TR	TRIAD (THREE CONDUCTOR SHIELDED CABLE), TIMING RELAY	
TRD	TREAD	
TS	THICKENER SUPERNATANT OR SUBNATANT	
TSD	THICKENED SLUDGE DECANT	
TSPL	TURBIDIMETER SAMPLE	
TSTAT	THERMOSTAT	
TTB	TELEPHONE TERMINAL BOARD	
TUR	TURBINE	
TV	TURNING VANES	
TWV	THREE-WAY VALVE	
TYP	TYPICAL	
U		
UC	UNDERCUT	
UG	UNDERGROUND	
UHMWPE	ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE	
UHMW	ULTRA HIGH MOLECULAR WEIGHT	
UNO	UNLESS NOTED OTHERWISE	
US	UTILITY SINK	
V		
V	VALVE	
VAR	VARIES	
VB	VALVE BOX	
VCP	VITRIFIED CLAY PIPE	
VEC	VINYL ESTER COATING	
VERT	VERTICAL	
VFR	VOLUMETRIC FEEDER	
VG	VACUUM GAUGE, VALLEY GUTTER	
VOL	VOLUME	
VRV	VACUUM REGULATING VALVE	
VTR	VENT THROUGH ROOF	
W		
W	WEST, WIDTH	
W/	WITH	
W/O	WITHOUT	
WAS	WASTE ACTIVATED SLUDGE	
WCO	WALL CLEANOUT	
WEF	WALL EXHAUST FAN	
WF	WALL FITTING, WASH FOUNTAIN	
WH	WATER HEATER	
WI	WEIGHT INDICATOR	
WL	WALL LOUVER, WATER LEVEL	
WM	WATER METER	
WOD	WASTE OIL DRAIN	
WP	WEATHERPROOF, WATERPROOF	
WPT	WORKING POINT	
WRG	WEIR GATE	
WRS	WATER SOFTENER	
WS	WATER SURFACE	
WSTP	WATERSTOP	
WT	WALK THROUGH, WEIGHT	
WTF	WATER TREATMENT FACILITY	
WTP	WATER TREATMENT PLANT	
WTR	WATER	
WV	WATER CONTROL VALVE	
WW	WASTEWATER	
WWF	WELDED WIRE FABRIC	
WWTF	WASTEWATER TREATMENT FACILITY	
WWTP	WASTEWATER TREATMENT PLANT	
Y		
Y	WYE	
YCO	YARD CLEANOUT	
YH	YARD HYDRANT	

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED MED
DRAWN HPG
CHECKED CTC
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER MICHAEL E. DUCHENE No. 63626 CIVIL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
GENERAL
SOLAIRE ASR WELL ABBREVIATIONS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. G02
SHEET NO. XX OF XX

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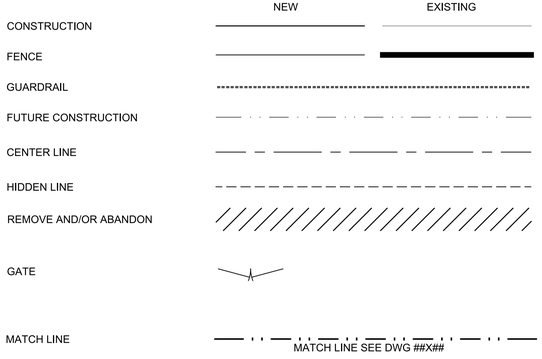
PROJECT NO. 11843A10_P2 FILE NAME: 11843A1018G002.dgn

GENERAL NOTES

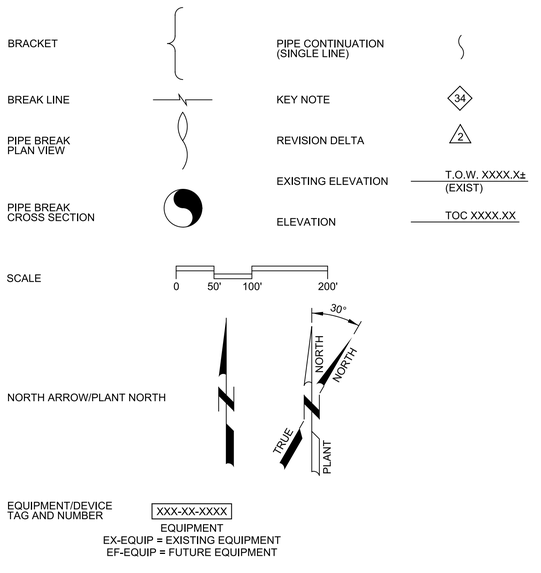
1. FOLLOWING NOTES ARE GENERAL AND APPLY TO ALL SHEETS OF THESE CONTRACT DOCUMENTS AS IF THEY WERE WRITTEN IN THEIR ENTIRETY ON EACH SHEET.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING CONDITIONS INCLUDING LOCATION AND DIMENSIONS OF ALL EXISTING CONSTRUCTION AND UTILITIES. CONTRACTOR SHALL NOTIFY ENGINEER IF THERE IS A CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND EXISTING CONSTRUCTION BEFORE PROCEEDING WITH WORK.
3. UNLESS DETAILED, SPECIFIED, OR OTHERWISE INDICATED ON THE DRAWINGS, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND GENERAL NOTES. TYPICAL DETAILS SHALL APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS ON DRAWINGS.
4. WHERE NO CONSTRUCTION DETAILS ARE SHOWN OR NOTED FOR ANY PART OF WORK. DETAILS SHALL BE IN THE SAME AS FOR OTHER SIMILIAR WORK.
5. CONTRACTOR SHALL COMPLY WITH LOCAL CONSTRUCTION STORM WATER DISCHARGE REGULATIONS AND REQUIREMENTS.
6. PRIOR TO EXCAVATION FOR NEW STRUCTURES, ELECTRICAL CONDUIT, FABRICATION OF NEW PIPING AND/OR OTHER PROPOSED UTILITIES, CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL EXISTING PIPING AND UTILITIES IN THE CONSTRUCTION AREA. THE CONTRACTOR SHALL TEMPORARILY RELOCATE CONFLICTING EXISTING UTILITIES AT TIE-IN/CONNECTION LOCATIONS AND REINSTALL THEM AS REQUIRED TO ELIMINATE THE CONFLICT AT NO ADDITIONAL COST TO THE OWNER.
7. ALL PIPELINES 12" AND LARGER SHALL HAVE A MINIMUM COVER OF 36" UNLESS THE COVER DEPTH IS SPECIFICALLY INDICATED ON THE DRAWINGS. PIPE SMALLER THAN 12" SHALL HAVE A MINIMUM COVER OF 30" UNLESS NOTED OTHERWISE. PIPES SHALL BE ROUTED AS SHOWN UNLESS MINOR REVISIONS ARE NECESSARY TO MISS EXISTING PIPES, STRUCTURES, ETC. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL FITTINGS AND ADAPTERS REQUIRED TO MAKE THE ROUTING CHANGES AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR SHALL INCLUDE COST FOR THIS IN THE BID.
8. EXISTING FACILITY AND UTILITY INFORMATION SHOWN ON THE DRAWINGS WAS OBTAINED FROM AVAILABLE RECORDS OR ELECTRONIC FILES. NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR FACILITIES AND UTILITIES NOT SHOWN OR NOT IN THE LOCATION SHOWN. THE CONTRACTOR SHALL FIELD VERIFY ALL LOCATIONS, SIZES, MATERIAL TYPES, AND ELEVATIONS SHOWN AROUND OR NEAR AREAS OF NEW CONSTRUCTION PRIOR TO START OF CONSTRUCTION.
9. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT FROM DAMAGE EXISTING FACILITIES AND UTILITIES SHOWN OR NOT SHOWN THAT ARE TO REMAIN IN PLACE. ALL FACILITIES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE EXPEDITIOUSLY REPAIRED OR RECONSTRUCTED TO THE ORIGINAL OR BETTER CONDITION AT THE CONTRACTOR'S EXPENSE WITHOUT ADDITIONAL COMPENSATION.
10. CONTRACTOR SHALL MAKE CONNECTIONS TO EXISTING PIPE, EQUIPMENT, ETC. AS REQUIRED AND SHALL PROVIDE ALL FITTINGS, ADAPTERS, AND APPURTENANCES REQUIRED TO MAKE THE CONNECTIONS. PROVIDE ALL SUPPORTS REQUIRED FOR A RIGIDLY SUPPORTED COMPLETE AND WORKING SYSTEM.
11. ADJUST ALL VALVE BOXES, VAULTS, PULL BOXES, AND MANHOLES TO FINISHED GRADE UNLESS OTHERWISE SHOWN OR DIRECTED. MANHOLES IN OPEN FIELDS SHALL BE SET TWELVE INCHES ABOVE FINISHED GRADE AND VAULTS SHALL BE SIX INCHES ABOVE FINISHED GRADE.
12. THE CONTRACTOR SHALL CONTACT THE PROPER UTILITY REPRESENTATIVE AS FOLLOWS FOR QUESTIONS OR COORDINATION OF CONSTRUCTION RELATED TO EXISTING UTILITIES.

    STATE/REGION/MUNICIPALITY SPECIFIC: 1-800-XXX-XXXX
13. CONTRACTOR SHALL VERIFY THAT PIPING SHOWN TO BE ABANDONED OR AS ABANDONED PREVIOUSLY IS NO LONGER IN SERVICE. LINES IN SERVICE SHALL BE MAINTAINED UNTIL NO LONGER REQUIRED BY THE PLANT.
14. ALL EXISTING PIPES THAT ARE TO BE ABANDONED IN PLACE OR REMOVED MAY NOT BE SHOWN. WHERE PIPING IS TO BE ABANDONED AND MUST REMAIN IN SERVICE UNTIL COMPLETION OF OTHER PHASES OF WORK, AND IT CONFLICTS WITH NEW PIPING, TEMPORARILY RELOCATE PIPING AS REQUIRED TO MAINTAIN SERVICE BY THE PLANT.
15. CONTRACTOR SHALL REROUTE THE EXISTING PIPING IF REQUIRED TO MISS THE PROPOSED STRUCTURES. THE EXISTING PIPE SHALL REMAIN IN SERVICE UNTIL NEW PIPING IS READY TO BE PLACED INTO SERVICE. DOWNTIME SHALL BE A MAXIMUM OF 2 HOURS, UNLESS SPECIFIED OR SHOWN OTHERWISE.
16. ALL SIDEWALKS TO BE 3'-0" WIDE UNLESS SHOWN OTHERWISE.
17. THE CONTRACTOR SHALL TAKE SPECIAL PRECAUTIONS IN THE VICINITY OF ANY OVERHEAD ELECTRIC LINES. CONTRACTOR SHALL ABIDE BY THE NATIONAL ELECTRIC CODE AND ANY REQUIREMENT BY THE OWNER OF THE ELECTRIC LINES.
18. PROVIDE ALL SHEETING/SHORING REQUIRED TO PROTECT EXISTING STRUCTURES, PIPES AND FACILITIES.
19. CONTRACTOR SHALL VERIFY LOCATION OF ALL ARCHITECTURAL, MECHANICAL, AND ELECTRICAL ITEMS BEFORE PLACING ANY STRUCTURAL STEEL OR CONCRETE. ALSO, STRUCTURAL DIMENSIONS AND OPENINGS CONTROLLED BY ARCHITECTURAL, MECHANICAL, OR ELECTRICAL EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
20. MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES, AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS, THAT ARE REQUIRED BY OTHER CONTRACT DRAWINGS, SHALL BE PROVIDED PRIOR TO CASTING CONCRETE.

LINE WORK



SYMBOLS



UNDERGROUND/ OVERHEAD WARNING (STATE/REGION SPECIFIC)

811

Know what's **below.**
Call before you dig.

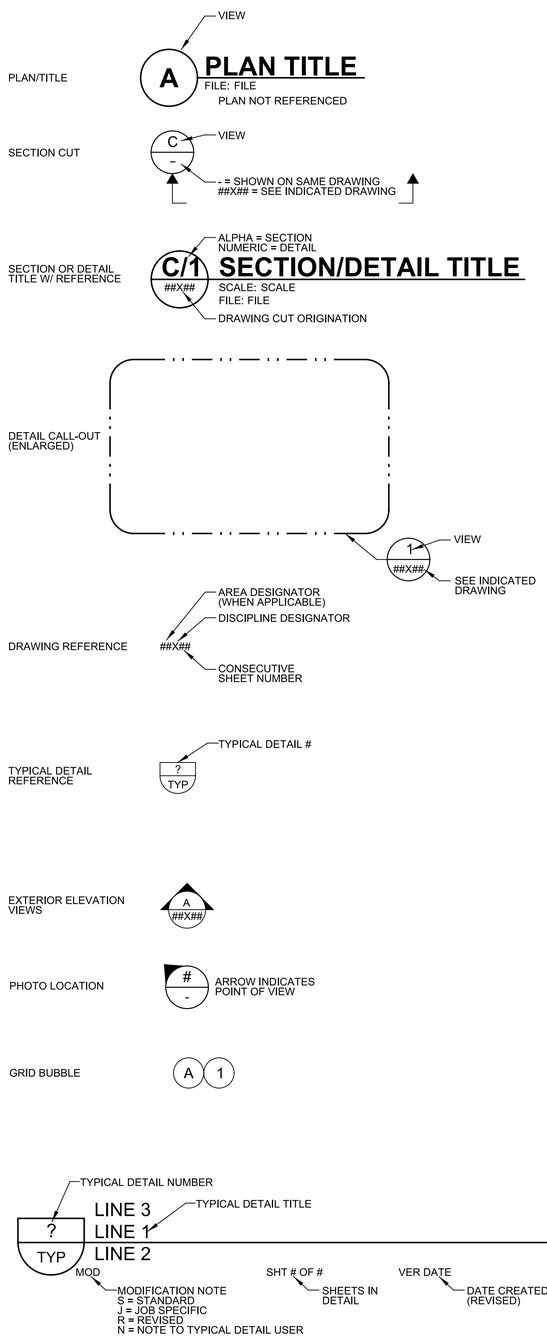
Avoid overhead power line contact. It's costly.

Call before you

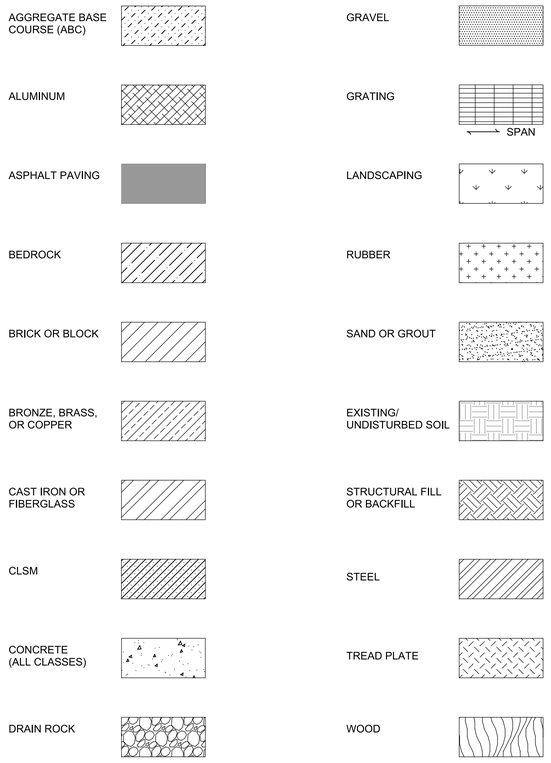
OVERHEAD

Replace with Regional Phone Number

DETAIL REFERENCES



HATCH PATTERNS



MISCELLANEOUS

REV	DATE	BY	DESCRIPTION

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DRAWN HPG
CHECKED CTC
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER
MICHAEL E. BUCKER
No. 63626
CIVIL
STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
GENERAL
SOLAIRE ASR WELL
GENERAL NOTES, SYMBOLS, AND LEGENDS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. G03
SHEET NO. XX OF ~~XX~~

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DRAWING INDEX:

	SHEET NO.	DRAWING NO.	DESCRIPTION
	GENERAL		
X	1	G01	COVER SHEET
X	2	G02	ABBREVIATIONS
X	3	G03	GENERAL NOTES, SYMBOLS AND LEGENDS
X	4	G04	DRAWING INDEX
X	5	G05	DESIGN CRITERIA
	6	G06	CALIFORNIA GREEN BUILDING STANDARDS CODE CHECKLIST 1
	7	G07	CALIFORNIA GREEN BUILDING STANDARDS CODE CHECKLIST 2
	8	G08	CALIFORNIA GREEN BUILDING STANDARDS CODE CHECKLIST 3
	9	G09	CALIFORNIA GREEN BUILDING STANDARDS CODE CHECKLIST 4
	CIVIL		
X	10	GC01	GENERAL CIVIL NOTES AND LEGEND
X	11	18C01	DEMOLITION SITE PLAN
X	12	18C02	PAVING, GRADING, AND SITE PLAN
X	13	18C03	YARD PIPING AND UTILITIES PLAN
	14	18C04	PIPE PROFILES
	15	18C05	DETAILS AND SECTIONS 1
	16	18C06	DETAILS AND SECTIONS 2
	17	18C07	DETAILS AND SECTIONS 3
	ARCHITECTURAL		
X	18	GA01	BUILDING CODE ANALYSIS AND SCHEDULES
	19	GA02	EGRESS PLAN
X	20	18A01	FLOOR PLAN
X	21	18A02	ROOF PLAN
X	22	18A03	NORTH AND EAST ELEVATIONS
X	23	18A04	SOUTH AND WEST ELEVATIONS
	24	18A05	INTERIOR ELEVATIONS
	STRUCTURAL		
	25	GS01	GENERAL STRUCTURAL NOTES AND LEGEND
X	26	18S01	FOUNDATION PLAN
X	27	18S02	ROOF PLAN
X	28	18S03	BUILDING SECTIONS AND DETAILS 1
	29	18S04	BUILDING SECTIONS AND DETAILS 2
	30	18S05	DETAILS AND SECTIONS 1
	31	18S06	DETAILS AND SECTIONS 2
	32	18S07	DETAILS AND SECTIONS 3
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X	33	GM01	GENERAL MECHANICAL NOTES AND LEGEND
X	34	GM02	GENERAL PLUMBING NOTES, ABBREVIATIONS, AND SYMBOLS
X	35	GM03	GENERAL HVAC NOTES, ABBREVIATIONS, AND SYMBOLS
	36	18GM04	PROCESS EQUIPMENT AND PIPE SCHEDULES
	37	18GM05	VALVE SCHEDULE
X	38	18M01	BUILDING PLAN
X	39	18M02	BUILDING SECTIONS AND DETAILS 1
X	40	18M03	BUILDING SECTIONS AND DETAILS 2
X	41	18M04	PLUMBING SCHEDULES
	42	18M05	PLUMBING PLAN
	43	18M06	PLUMBING ISOMETRICS
X	44	18M07	HVAC SCHEDULES
	45	18M08	HVAC PLAN
X	46	18M09	HVAC AIRFLOW SCHEMATIC
	47	18M10	WELLHEAD DETAILS
	48	18M11	CHEMICAL ROOM
	49	18M12	FIRE ALARM AND SPRINKLER PLAN
	50	18M13	DOWNHOLE CONTROL VALVE AND MECHANICAL DETAILS
	51	18M14	MONITORING WELL SECTIONS AND DETAILS
	52	18M15	DETAILS AND SECTIONS

	SHEET NO.	DRAWING NO.	DESCRIPTION
	ELECTRICAL		
X	53	GE01	ELECTRICAL LEGEND
X	54	GE02	ELECTRICAL ABBREVIATIONS
X	55	GE03	SCHEMATIC SYMBOLS
	56	18E01	SITE PLAN
	57	18E02	DUCT BANK SECTIONS
X	58	18E03	WD31-MCCX-35100 ELEVATION
X	59	18E04	WD31-MCCX-35100 ONE-LINE DIAGRAM
	60	18E05	DISCONNECT, MH/HH & LUMINAIRE SCHEDULES
	61	18E06	PANELBOARD SCHEDULES
X	62	18E07	CONTROL SCHEMATICS 1
X	63	18E08	CONTROL SCHEMATICS 2
	64	18E09	ASR WELL BUILDING POWER, CONTROL & SECURITY PLAN
	65	18E10	ASR WELL BUILDING LIGHTING & GROUNDING PLAN
	66	18E11	CONDUIT SCHEDULE 1
	67	18E12	CONDUIT SCHEDULE 2
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X	69	GI02	SYMBOLS AND ABBREVIATIONS 2
X	70	GI03	SYMBOLS AND ABBREVIATIONS 3
X	71	GI04	SYMBOLS AND ABBREVIATIONS 4
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X	73	GI06	SAMPLE LOOP DRAWING
X	74	GI07	CONTROL BLOCK DIAGRAM
	75	GI08	PLC CONTROL PANEL EXTERNAL ELEVATION
	76	GI09	PLC CONTROL PANEL INTERNAL ELEVATION
	77	GI10	PLC CONTROL PANEL POWER DISTRIBUTION AND CONTROL
X	78	18I01	P&ID - WELL PUMP AND VALVES P&ID 1
X	79	18I02	P&ID - WELL PUMP AND VALVES P&ID 2
X	80	18I03	P&ID - SODIUM HYPOCHLORITE FEED SYSTEM P&ID
X	81	18I04	P&ID - LIQUID FLUORIDE FEED SYSTEM P&ID
X	82	18I05	P&ID - WATER QUALITY 1
X	83	18I06	P&ID - PACKAGED/SKID MOUNTED WATER FILTERS P&ID
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	86		
	TYPICAL DETAILS		
	87	TA01	TYPICAL DETAILS - ARCHITECTURAL 1
	88	TA02	TYPICAL DETAILS - ARCHITECTURAL 2
	89	TA03	TYPICAL DETAILS - ARCHITECTURAL 3
	90	TC01	TYPICAL DETAILS - CIVIL 1
	91	TC02	TYPICAL DETAILS - CIVIL 2
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	93	TE01	TYPICAL DETAILS - ELECTRICAL 1
	94	TE02	TYPICAL DETAILS - ELECTRICAL 2
	95	TE03	TYPICAL DETAILS - ELECTRICAL 3
	96	TH01	TYPICAL DETAILS - HVAC 1
	97	TM01	TYPICAL DETAILS - MECHANICAL 1
	98	TM02	TYPICAL DETAILS - MECHANICAL 2
	99	TM03	TYPICAL DETAILS - MECHANICAL 3
	100	TN01	TYPICAL INSTRUMENTATION DETAILS 1
	101	TN02	TYPICAL INSTRUMENTATION DETAILS 2
	102	TP01	TYPICAL DETAILS - PLUMBING 1
	103	TS01	TYPICAL DETAILS - STRUCTURAL 1
	104	TS02	TYPICAL DETAILS - STRUCTURAL 2
	105	TS03	TYPICAL DETAILS - STRUCTURAL 3

X = INCLUDED IN THIS SUBMITTAL

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED MED
DRAWN HPG
CHECKED CTC
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER MICHAEL E. DUCKER No. 63626 CIVIL STATE OF CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
GENERAL
SOLAIRE ASR WELL
DRAWING INDEX

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. G04
SHEET NO. XX OF XX

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PROJECT NO. 11843A10_P2
LAST SAVED BY: hgarcia

DESIGN CRITERIA

DESCRIPTION	UNITS	SOLAIRE VALUE
EXISTING WELL		
CONDUCTOR CASING	INCH	42
WELL CASING	INCH	18
COLUMN PIPE DIA.	INCH	12
WELL DEPTH	FT (BGS)	575
SCREEN DEPTH	FT (BGS)	480-545
SOUNDING TUBE	FT (BGS)	270
GRAVEL FILL TUBE	FT (BGS)	440
WELL PUMP		
PUMP		
DESIGN FLOW	GPM	1,800
LINE PRESSURE AT POC	FT (PSI)	207.9 (90)
TDH	FT	450
HORSEPOWER	HP	300
STATIC WATER LEVEL	FT (BGS)	125
PUMPING WATER LEVEL	FT (BGS)	210.7
PUMP ELEVATION	FT (BGS)	300
PUMP DISCHARGE	INCH	12
ANNULUS RECHARGE INLET	INCH	10
GROUNDWATER QUALITY TEST RESULTS		9/10/2021
SPECIFIC CONDUCTANCE (EC)	UMHOS/CM	450
TURBIDITY	NTU	6.1
IRON, DISSOLVED	MG/L	0.04
IRON, DISSOLVED	MG/L	0.51
MANGANESE, DISSOLVED	MG/L	ND
MANGANESE, DISSOLVED	MG/L	ND
TOTAL HARDNESS AS CaC03	MG/L	92
CALCIUM	MG/L	21
MANGANESE	MG/L	12
PTOSSIUM	MG/L	2.6
SODIUM	MG/L	49
SILICA (SiO2)	MG/L	70
ARSENIC	UG/L	3.4
TREATMENT VESSELS		
FILTER VESSELS	MGD	0.36
NO. OF VESSELS	EACH	7
MATERIAL		WLD STL
SHIPPING DIA.	FT	6'-9"
SHIPPING HIEGHT	FT	10'-9"

DESCRIPTION	UNITS	SOLAIRE VALUE
BACKWASH WATER CHARACTERIZATION		
WASTE DISCHARGE DESIGN FLOW	GPM	396
MAX DAILY DISCHARGE	GPD	23,000
TOTAL SUSPENDED SOLIDS	MG/L	234
IRON	MG/L	60
MANGANESE	MG/L	0.2
ARESENIC	MG/L	0.4
CHROMIUM (6+)	MG/L	0.2
ESTIMATED GRAVITY SEWER CAPACITY, ASSUMING 6" DIA. LATERAL @ 2% SLOPE	GPM	450
BACKWASH TANK		
VOLUME	GAL	4,300
DIAMETER	FT	11'-11"
HIEGHT	FT	7'-1"
MATERIAL	FT	POLYETHYLENE
INLET SIZE	INCH	4"
SODIUM HYPOCHLORITE PUMP		
TYPE		PACKAGED SYSTEM
DUTY/STANDBY	EACH	1 DUTY/1 STBY DUPLEX
DESIGN FLOW RATE	GPM	1,800
FLOW	GPH	
TDH		
SOLUTION NaOCL		12.50%
TANK SIZE PER 15 DAY DAY STORAGE	GAL	
SODIUM HYPOCHLORITE TANK		
TYPE		DOUBLE WALL
DUTY/FUTURE		1 DUTY/ 1 FUTURE
MATERIAL		POLYETHYLENE (XLPE)
VOLUME	GAL	1,000
DIAMETER	FT	6'-5"
HIEGHT	FT	7'-1"
WATER SOFTENER		
FLOW	GPM	5
PRESSURE	PSI	30

DESCRIPTION	UNITS	SOLAIRE VALUE
SODIUM FLUORIDE - PACKAGED SYSTEM		
CONTAINMENT		SECONDARY
DESIGN PROCESS FLOW RATE	GPM	1,800
SATURATOIN TANK	GAL	55
TANK TYPE		POLYETHYLENE (LINEAR)
CAPACITY, SODIUM FLUORIDE	LBS	300
SOLUTION TANK	GAL	70
TANK TYPE		POLYETHYLENE (LINEAR)
PUMP TYPE		POSITIVE DISPLACEMENT
FEED RATE	MG/L	1.5
FLOW	GPH	1.35 - 6.2
PRESSURE	PSIG	100
NO. OF PUMPS		1 DUTY / 0 STANDBY

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED MED
DRAWN HPG
CHECKED RAH
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — MICHAEL E. DUCKETT — No. 63626 — CIVIL — STATE OF CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
GENERAL
SOLAIRE ASR WELL
DESIGN CRITERIA

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 — 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. G05
SHEET NO. XX OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1018G005.dgn

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Model: Layout1
LAST SAVED BY: hgarcia

Plot Date: 10/12/2021 2:56:44 PM
FILE NAME: 11843A1018GC001.dwg
PROJECT NO. 11843A10_P2
LAST SAVED BY: hgarcia

NOTES

GENERAL PIPELINE NOTES:

1. DIMENSIONS TO STRUCTURES, REFERENCED PIPING, PAVING, AND OTHER IMPROVEMENTS IS APPROXIMATE. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND CONDITIONS 14 DAYS IN ADVANCE OF THE CONSTRUCTION PROGRESS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR SHALL MAINTAIN A MINIMUM CLEARANCE OF 10 FEET HORIZONTAL AND 3 FEET VERTICAL BETWEEN THE SEWER LINES AND EXISTING WATER LINES.
3. REFER TO THE GEOTECHNICAL REPORT LOCATED IN THE APPENDIX OF THE SPECIFICATIONS FOR ADDITIONAL INFORMATION ON THE GEOTECHNICAL CONDITIONS AND BORING INFORMATION.
4. IN ALL LOCATIONS WHERE TRENCH PLATE IS USED FOR VEHICULAR OR PEDESTRIAN TRAFFIC, THE CONTRACTOR SHALL APPLY SKID RESISTANT COATING ON THE TRENCH PLATES AND COLD MIX ASPHALT CONCRETE AT THE EDGES. THE TRENCH PLATES SHALL BE NOTCHED INTO THE ASPHALT, CONCRETE, OR TRAVELED SURFACE TO PREVENT SLIPPAGE AND ROCKING UNDER TRAFFIC.
5. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL PROPERTIES ADJACENT TO THE WORK, THROUGHOUT THE CONSTRUCTION PERIOD.
6. ALL OPEN TRENCHES, WORK AREAS AND SHAFTS SHALL HAVE A SHORING SYSTEM IN ACCORDANCE WITH OSHA, STATE AND LOCAL REQUIREMENTS.
7. THE CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, COUNTY, AND LOCAL LAWS AND ORDINANCES RELATING TO THE SAFETY AND CHARACTER OF WORK, EQUIPMENT AND PERSONNEL. THIS INCLUDES BUT IS NOT LIMITED TO SHEETING, SHORING, BRACING, VENTILATION, CONFORMANCE WITH TRAFFIC CONTROL AND MAINTENANCE OF BARRICADES AND WARNING DEVICES.
8. LAYOUT DRAWINGS ARE REQUIRED FOR PIPING INSTALLED.
9. ALL RIPARIAN AREAS DISTURBED SHALL BE RESTORED PER THE _____ DRAWINGS.
10. ALL ROAD DITCHES, FENCE LINES, PASTURES AND SIMILAR AREAS SHALL BE RESTORED PER SPECIFICATION 02925.
11. ALL CROPPED AREAS DISTURBED SHALL HAVE THE TOPSOIL REPLACED AND THE ENTIRE AREA DISTURBED SHALL BE RIPPED 2 FT DEEP PER THE LAND OWNERS REQUIREMENTS.
12. CONTRACTOR SHALL TAKE ALL PRACTICAL PRECAUTIONS TO MINIMIZE DISTURBANCES TO STREAMS, VEGETATION, TREES AND CROP LANDS. WHEREVER PRACTICAL LEAVE EXISTING TREES AND VEGETATED AREAS UNDISTURBED.

UTILITY NOTES:

1. EXISTING UTILITIES IN THE PROJECT MAY BE IN A FRAGILE CONDITION. THE CONTRACTOR SHALL EXERCISE NECESSARY CAUTION WHEN WORKING NEAR EXISTING UTILITIES.
2. PLAN LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES ARE BASED ON RECORD DRAWINGS, POTHOLING AND SURVEY INFORMATION AND ARE CONSIDERED APPROXIMATE ONLY. WHERE NO ELEVATIONS ARE SHOWN, NO INFORMATION WAS AVAILABLE DURING THE DESIGN PERIOD.
3. SOME UTILITY SERVICES MAY NOT BE SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL TAKE NECESSARY MEASURES TO LOCATE AND PROTECT SERVICE DURING CONSTRUCTION.
4. CONTRACTOR SHALL CALL THE "LOCAL UTILITY LOCATOR" AT _____ PRIOR TO ANY EXCAVATION ACTIVITIES.
5. THE LOCATION, SIZE, AND MATERIALS OF EXISTING UNDERGROUND UTILITIES SHOWN ON THESE DRAWINGS ARE APPROXIMATE AND IS SHOWN FOR BIDDING PURPOSES. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT THE UTILITY OWNERS SO THAT THOSE UTILITIES MAY MARK THE LOCATION OF THEIR UTILITIES PRIOR TO ANY EXCAVATION ACTIVITIES. THE CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE AND PROTECT EXISTING UTILITIES.

EARTHWORK NOTES:

1. CLEAR THE CONSTRUCTION AREA OF NATURAL OBSTRUCTIONS EXISTING FOUNDATIONS, BUILDINGS, FENCES, LUMBER, WALLS, STUMPS, BRUSH, WEEDS, RUBBISH, TREES, BOULDERS, AND ANY OTHER ITEMS WHICH INTERFERES WITH CONSTRUCTION OPERATIONS OR ARE DESIGNATED FOR REMOVAL.
2. GRUB OUT AND DISPOSE OF TREE TRUNKS AND ROOT MATERIAL BELOW THE GROUND SURFACE REMAINING AFTER CLEARING.
3. DISPOSE OF THE UNACCEPTABLE BACKFILL MATERIAL FROM THE CLEARING AND GRUBBING OPERATIONS AT NO ADDITIONAL COST TO THE OWNER.
4. STRIP AND STOCKPILE THE TOPSOIL. THE DEPTH OF STRIPPING SHALL BE ESTIMATED TO BE 12-INCHES BUT WILL BE DETERMINED IN THE FIELD AS SOIL CONDITIONS DICTATE.
5. REPLACE STOCKPILED SOIL AND RESTORE SITE AS SPECIFIED.
6. ROCK AND AGGREGATE STORAGE AREAS SHALL BE RESTORED BY EXCAVATING ANY SOILS CONTAINING ROCK OR AGGREGATE AND BACKFILLING WITH TOPSOIL. SOIL REMOVED MAY BE USED FOR TRENCH BACKFILL ABOVE THE PIPE ZONE AND 3 FEET BELOW FINISHED GRADE.

LINE WORK

NEW STRUCTURES OR EDGE OF PAVEMENT
EXISTING STRUCTURES (SCREENED)
NEW PIPING (TRIPLE LINES)
NEW PIPING (SINGLE LINE)
EXISTING PIPING (TRIPLE LINES) (SCREENED)
EXISTING PIPING (SINGLE LINE)(SCREENED)
HIDDEN LINE OR TRAIL EDGE
CENTER, MONUMENT, OR SURVEY LINE
GUARDRAIL
EXISTING CONTOURS (SCREENED) — 310
NEW CONTOURS — 310
NEW FENCE
EXISTING FENCE (SCREENED)
REMOVE OR ABANDONED (CROSS HATCHING: FENCE SHOWN AS EXAMPLE)
POWER POLE & LINE — PP
CABLE TV (UNDERGROUND) — CTV
FIBER OPTIC — FO
FUEL — F
NATURAL GAS — G
UNDERGROUND ELECTRIC — UGE
SANITARY SEWER — SS
FORCEMAIN SANITARY SEWER — FM
STORM DRAIN — SD
TELEPHONE — TEL
WATER — W
PROPERTY LINE OR RIGHT OF WAY
SLOPE
NEW ROAD
EXISTING ROAD (SCREENED)
FUTURE ROAD, WATER EDGE OR RIDGE
CURB & GUTTER
CURB
SWALE
FLOWLINE
SHORING
RAILROAD TRACKS
LIMITS OF CONSTRUCTION — LOC
SILT FENCE — SF
EASEMENT
EXISTING EASEMENT
CITY LIMITS
EXISTING GRADE (PROFILE)
PROPOSED GRADE (PROFILE)
MATCH LINE — MATCH LINE STA XXX SEE DWG XXX

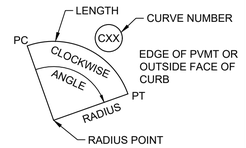
COORDINATES / ELEVATION

COORDINATES — XX — N=1600000 E=1000000 — N=XXXXXX.XX E=XXXXXX.XX
CONTROL POINT — XX
SPOT ELEVATION — FG XX.XX / TC XX.XX (REFER TO ABBREVIATIONS FOR DESIGNATION)
EXISTING SPOT ELEVATION — X 1325.00
SLOPE CALLOUT — 2:1 — 2 / 1 — 2.0% — S=0.0020

ROADWAY / PIPE CURVES

ROADWAY / PIPE CURVE

(SEE TABLE ON EACH PAVING AND GRADING OR CIVIL PIPING DWG WITH ROADWAY / PIPE CURVES.)



HATCH PATTERNS

AGGREGATE BASE COURSE (ABC)
ASPHALT PAVING
OR
(WITH AERIAL)
BEDROCK
CLSM
CONCRETE (ALL CLASSES)
DRAIN ROCK
GRAVEL
GRATING — SPAN
LANDSCAPING
RIPRAP
EXISTING/ UNDISTURBED SOIL
STRUCTURAL FILL OR BACKFILL
STEEL
STAGING AREA
TREAD PLATE

SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	EXISTING CONTROL POINT		LIGHT
	EXISTING MONUMENT		UTILITY POLE
XX	CONTROL POINT		UTILITY POLE GUY WIRE
B-XX	SOIL BORING LOCATIONS	PP	POWER POLE
PH	POTHOLE		FIRE HYDRANT
PHXX	POTHOLE NUMBER	CO	CLEANOUT
	FLOW/SLOPE DIRECTION		AIR RELEASE VALVE
	MANHOLE (PLAN)		BLOW OFF VALVE
	MANHOLE (PROFILE)		HOSE BIBB / YARD HYDRANT
			SERVICE CONNECTION
	CATCH BASIN		BURIED VALVE
E	ELECTRICAL MANHOLE AND PULL BOX		FLANGE
M	METER BOX		BALL VALVE
P	PULL BOX		BUTTERFLY VALVE
T	TELEPHONE PEDESTAL		CHECK VALVE
CTV	CABLE TV		GATE VALVE
	POWER TOWER		PLUG VALVE
	GATE		PIPE CAP OR CONNECTION
	GUARD POST		REDUCER
	HEADWALL		
	ROCK WALL		
	SHRUB/HEDGE		
	TREE		
	SIGN/SIGN POST		

NOTE: ALL SYMBOLS SHOWN AS NEW. EXISTING SYMBOLS ARE SCREENED.

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DESIGNED MED
DRAWN HPG
CHECKED RAH
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — MICHAEL E. DUCKER — No. 63626 — CIVIL — STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
CIVIL
SOLAIRE ASR WELL
GENERAL CIVIL NOTES AND LEGEND

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 — 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 09GC01
SHEET NO. XX OF XX

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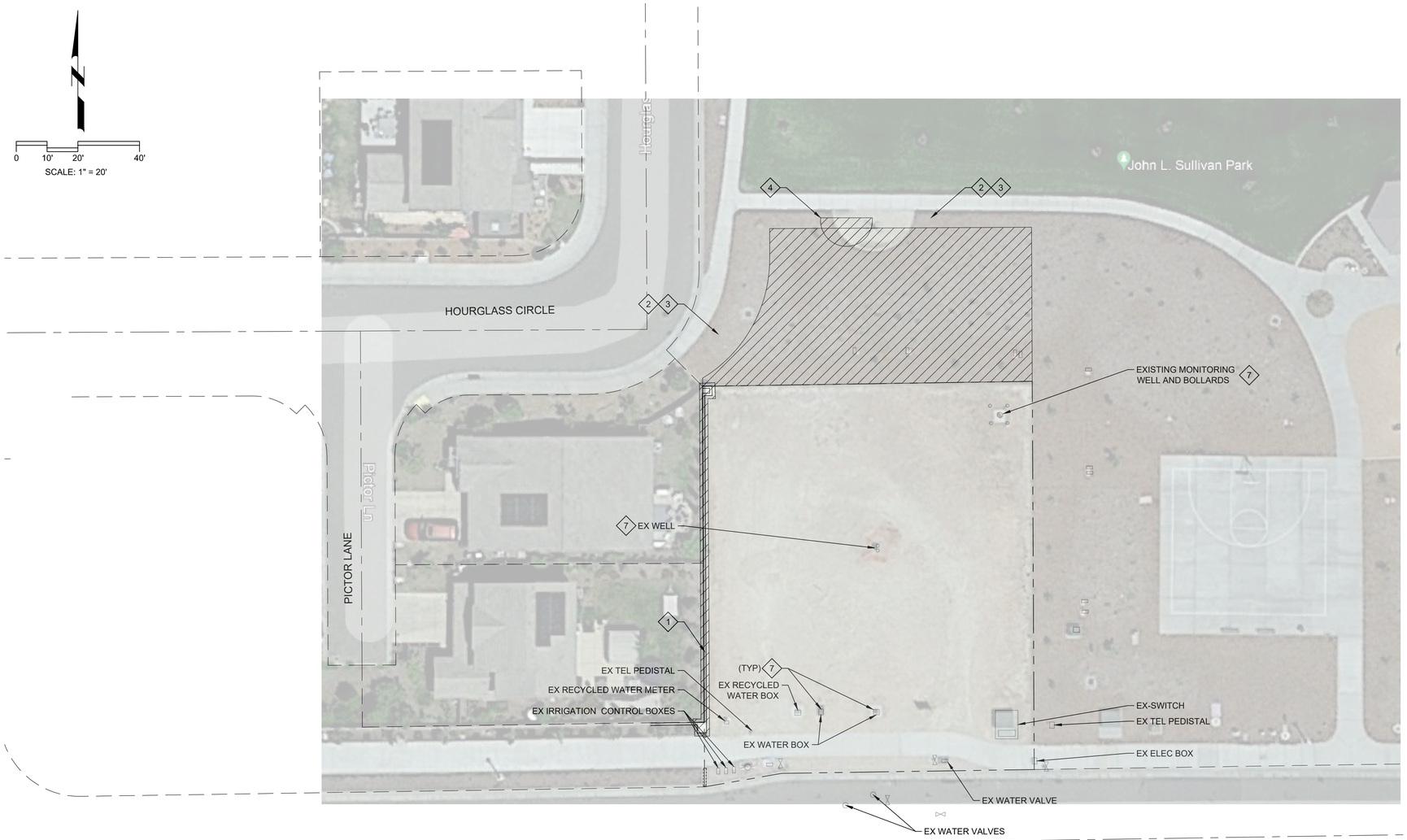
PROJECT NO. 11843A10_P2
LAST SAVED BY: hgarcia



KEY NOTES:

1. DEMOLISH EXISTING STUCCO COVERED WOOD FENCE.
2. CONTRACTOR SHALL CUT, CAP, REPAIR, AND RELOCATE EXISTING IRRIGATION SYSTEM A REQUIRED SO THAT SYSTEM REMAINS IN SERVICE.
3. THE CONTRACTOR MAY CHOOSE TO REMOVE AND REPLACE THE LANDSCAPING AND IRRIGATION SYSTEM IN THIS AREA.
4. DEMOLISH EXISTING CONCRETE MOW STRIP, TYPICAL.
5. PROTECT EXISTING LATERALS AND UTILITIES, TYPICAL ALL.

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DESIGNED MED
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REGISTERED PROFESSIONAL ENGINEER MITCHAEL E. DUCKETT No. 63626 CIVIL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE

AQUIFER STORAGE AND RECOVERY WELLS PROJECT

CIVIL

SOLAIRE ASR WELL DEMOLITION SITE PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 18C01
SHEET NO. XX OF XX

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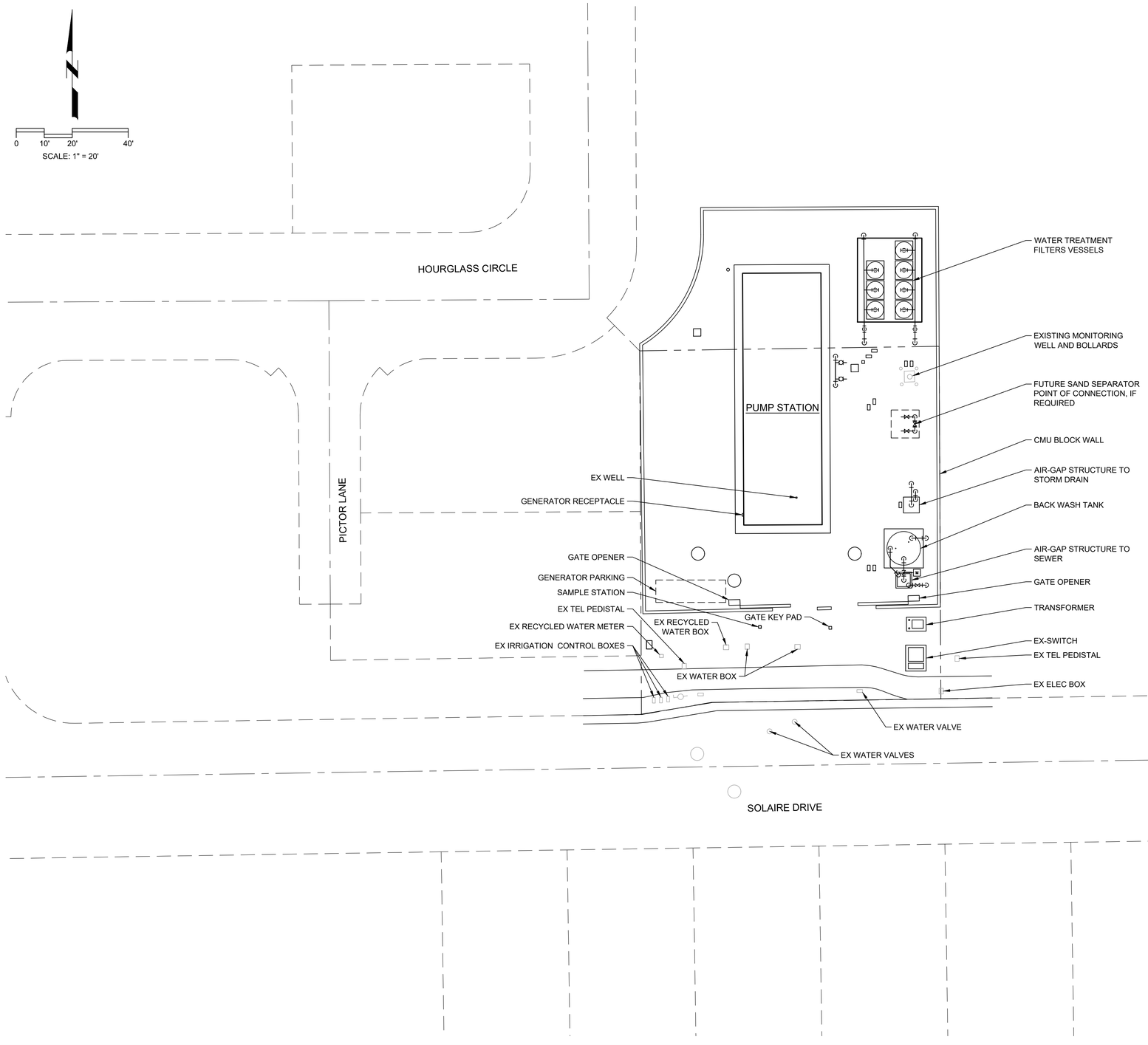
PROJECT NO. 11843A10_P2
LAST SAVED BY: hgarcia



GENERAL NOTES:

1. THE PLANS HAVE BEEN PREPARED IN PART BASED ON AVAILABLE RECORD INFORMATION. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING THE WORK.
2. SURFACE RESTORATION REQUIRED AT TRENCHES AND EXCAVATION IS NOT SHOWN ON THESE PLANS.
3. CONTRACTOR SHALL MAINTAIN IRRIGATION SERVICED TO EXISTING LANDSCAPING AT ALL TIMES DURING CONSTRUCTION/

LEGEND:

- CONCRETE
- 4" ASPHALT PAVEMENT OVER 12" COMPACTED CLASS 2 AGGREGATE BASE
- LANDSCAPED AREA
- 12" THICK COMPACTED CLASS 2 AGGREGATE BASE OVER STABILIZATION FABRIC

REV	DATE	BY	DESCRIPTION
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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER MICHAEL E. DUCKER No. 63626 CIVIL STATE OF CALIFORNIA

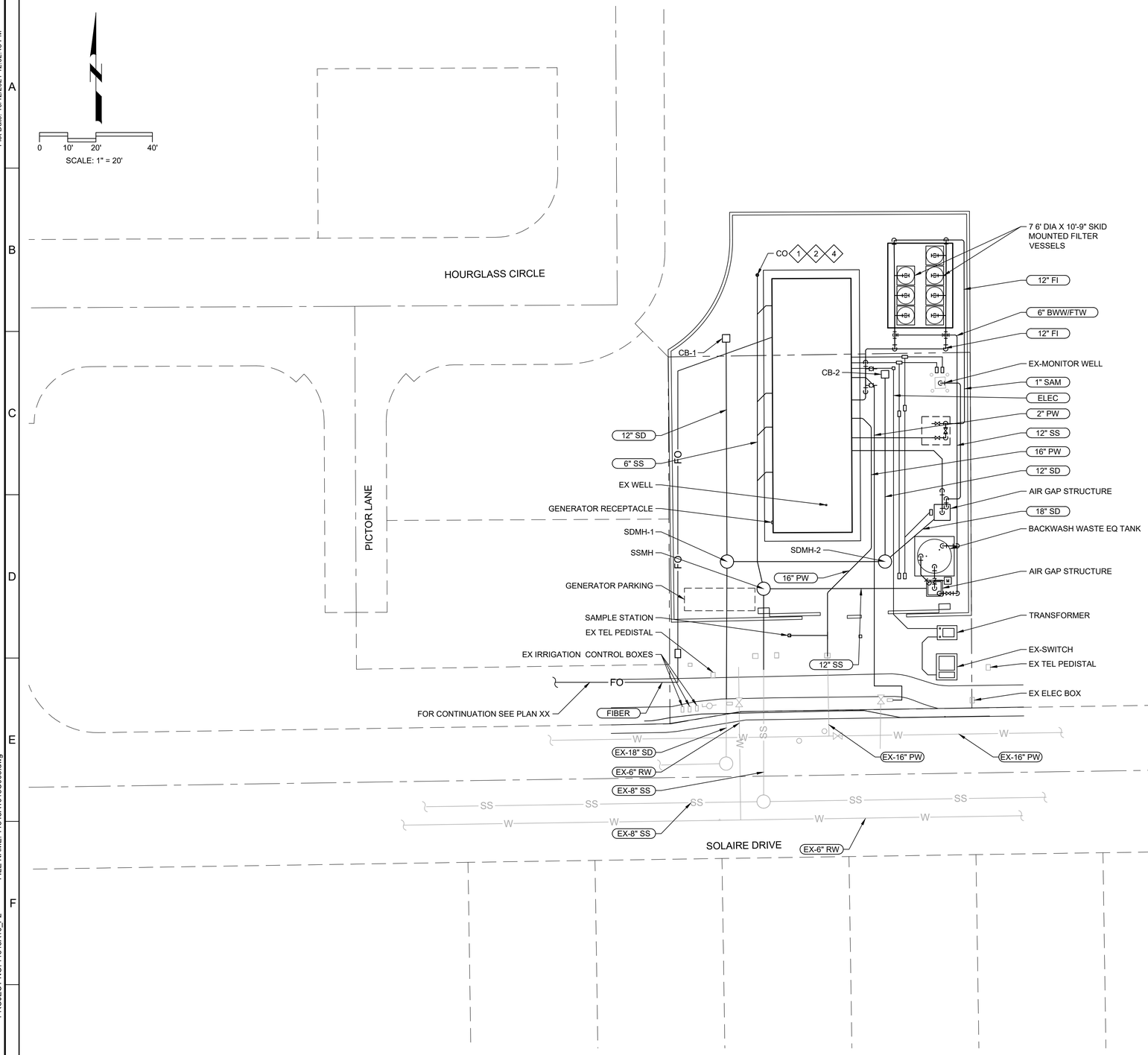
carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
CIVIL
SOLAIRE ASR WELL
PAVING, GRADING AND SITE PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 18C02
SHEET NO. XX OF XX



GENERAL NOTES:

1. SEE GENERAL NOTES ON SHEET G-003.
2. REFER TO DEMOLITION DRAWING GC-001 FOR EXISTING PIPES TO BE DEMOLISHED OR ABANDONED.
3. REFER TO PIPE PROFILES FOR INVERT ELEVATIONS NOT CALLED OUT ON THE PLANS. MAINTAIN MINIMUM 36" COVER WHERE ANY INVERT ELEVATION IS NOT IDENTIFIED.
4. PIPE TRENCHING AND SURFACE RESTORATION SHALL BE PER THE CITY OF ROSEVILLE STANDARD DETAIL XX/XX.
5. THE CONTRACTOR SHALL RESTORE ALL LANDSCAPING AND IRRIGATION COMPONENTS PER THE CITY OF ROSEVILLE STANDARDS WHERE DISTURBED AS A RESULT OF THIS WORK.
6. REFER TO THE PIPE SCHEDULE IN SPECIFICATION SECTION 15052 FOR PIPE MATERIALS.
7. THESE PLANS HAVE BEEN PREPARED IN PART. BASED ON AVAILABLE RECORD INFORMATION. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING OF THE WORK.
8. SURFACE RESTORATION REQUIRED AT TRENCHES AND EXCAVATION IS NOT SHOWN ON THESE PLANS.
9. CONTRACTOR SHALL MAINTAIN IRRIGATION SERVICED TO EXISTING LANDSCAPING AT ALL TIMES DURING CONSTRUCTION.
10. EXISTING INVERT ELEVATIONS ARE BASE ON AVAILABLE RECORD INFORMATION. CONTRACTOR SHALL FIELD VERIFY INVERT ELEVATIONS PRIOR TO BEGINNING THE WORK.

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED MED
DRAWN HPG
CHECKED RAH
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER MITCHAEL E. DUCKETT No. 63626 CIVIL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
CIVIL
SOLAIRE ASR WELL
YARD PIPING AND UTILITIES PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 18C03
SHEET NO. XX OF XX

Plot Date: 10/12/2021 12:02:43 PM
FILE NAME: 11843A1018C003.dwg
PROJECT NO. 11843A10_P2
LAST SAVED BY: hgarcia

2019 CALIFORNIA ENERGY CONSERVATION CODE

BUILDING ENVELOPE REQUIREMENTS - PLACER COUNTY, CLIMATE ZONE 11

ENVELOPE COMPONENT		U - VALUE REQUIRED	U - VALUE PROVIDED
ROOFS		U - 0.034	U - 0.034
WALLS ABOVE GRADE, MASS LIGHT		U - 0.170 ci	U - 0.170 ci
SLAB ON GRADE FLOORS		U - 0.071	U - 0.071
ROOF - STEEP SLOPE	AGED SOLAR REFLECTANCE	U - 0.20	U - 0.20
	THERMAL EMITTANCE	U - 0.75	U - 0.75
AIR BARRIER		R	R
DOORS - SWINGING		U - 0.70	U - 0.70
DOORS - NONSWINGING		U - 1.45	U - 1.45
FIXED FENESTRATION		U - 0.36	U - 0.36
OPERABLE FENESTRATION		U - 0.46	U - 0.46
SKYLIGHTS - PLASTIC DOME		U - 0.88	U - 0.88

TABLE 140.3-B, CHAPTER 5, 2019 CALIFORNIA ENERGY CODE, TITLE 24

2019 CALIFORNIA BUILDING CODE, TITLE 24, PART 2, VOL.1 & 2

ROOM NO.	ROOM NAME	OCCUPANCY	CONSTRUCTION TYPE	BASIC ALLOW STORIES/HEIGHT	ACTUAL SQ FT	BASIC ALLOWABLE AREA	ALLOWABLE FLOOR AREA PER OCCUP	OCCUPANCY LOAD	EXITS REQUIRED/ PROVIDED	SPRINKLERED	OCCUPANCY SEPARATION	ACCESSIBILITY	COMMENTS:
ASR WELL - DRAWING 18A01													
101	PUMP ROOM	F-1	V- B	2 STORIES/55 FT	1,174	15,500	300	4	1/1	NR	NR	* NR	-
102	RESTROOM	B	V- B	3 STORIES/55 FT	66	15,500	100	1	1/1	NR	NR	* NR	-
103	CHEMICAL ROOM	H-4	V- B	3 STORIES/55 FT	501	23,000	300	2	2/2	R	2-HR	* NR	-
104	ELECTRICAL ROOM	F-1	V- B	2 STORIES/55 FT	460	15,500	300	2	2/2	NR	NR	* NR	-
	BUILDING ACTUAL	F-1	V- B	1 STORY / ±20'-8"	2,201	15,500							

* MACHINERY SPACES VISITED ONLY BY SERVICE PERSONNEL FOR MAINTENANCE, REPAIR OR OCCASIONAL MONITORING OF EQUIPMENT SHALL NOT BE REQUIRED TO COMPLY WITH ADA ACCESSIBILITY (2019 CALIFORNIA TITLE 24).

DOOR & HARDWARE SCHEDULE

DOOR NO.	DOOR WIDTH	DOOR HEIGHT	DOOR THICK	DOOR MAT'L	DOOR FINISH	DOOR STYLE	FRAME WIDTH	FRAME HEIGHT	FRAME DEPTH	FRAME TYPE	FRAME MAT'L	FRAME FINISH	DETAILS HEAD (AJ105 TYP)	DETAILS JAMB (AJ107 TYP)	DETAILS SILL (AJ109 TYP)	HW GROUP	UL LABEL	CARD READER	REMARKS
ASR WELL - DRAWING 18A01																			
101-1	8'-0"	10'-0"	3/4"	STEEL	FACT FIN	C	-	-	-	-	STEEL	FACT FIN	AJ123/TYP	AJ123/TYP	AJ123/TYP	-	NR	-	-
101-2	8'-0"	10'-0"	3/4"	STEEL	FACT FIN	C	-	-	-	-	STEEL	FACT FIN	AJ123/TYP	AJ123/TYP	AJ123/TYP	-	NR	-	-
101-3	PR 3'-2"	7'-2"	1 3/4"	STEEL	COATING	F	6'-8"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	E	HW 1	NR	NR	-
102-1	3'-0"	7'-2"	1 3/4"	STEEL	COATING	F	3'-4"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	B	HW 3	NR	NR	-
103-1	3'-0"	7'-2"	1 3/4"	STEEL	COATING	F	3'-4"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	B	HW 4	2-HR	NR	-
103-2	8'-0"	10'-0"	3/4"	STEEL	FACT FIN	C	-	-	-	-	STEEL	FACT FIN	AJ123/TYP	AJ123/TYP	AJ123/TYP	-	NR	-	-
103-3	3'-0"	7'-2"	1 3/4"	STEEL	COATING	F	3'-4"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	E	HW 2	NR	NR	-
104-1	3'-0"	7'-2"	1 3/4"	STEEL	COATING	F	3'-4"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	B	HW 5	NR	NR	-
104-2	PR 3'-2"	7'-2"	1 3/4"	STEEL	COATING	F	6'-8"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	E	HW 1	NR	NR	-

ROOM FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR MAT'L	FLOOR FINISH	BASE MAT'L	NORTH WALL MAT'L	NORTH WALL FINISH	EAST WALL MAT'L	EAST WALL FINISH	SOUTH WALL MAT'L	SOUTH WALL FINISH	WEST WALL MAT'L	WEST WALL FINISH	CEILING MAT'L	CEILING HEIGHT	CEILING FINISH	CEILING SEPARATION
ASR WELL - DRAWING 18A01																
101	PUMP ROOM	CONC	SEALER	PAMP	CMU/PAMP	FACT FIN	CMU/PAMP	FACT FIN	CMU/PAMP	FACT FIN	CMU/PAMP	FACT FIN	WDECK	VARIES	COATING	NR
102	RESTROOM	CONC	SEALER	WFRP	CMU/WFRP	EXPO/FACT FIN	CMU/WFRP	EXPO/FACT FIN	CMU/WFRP	EXPO/FACT FIN	CMU/WFRP	EXPO/FACT FIN	GYP	± 9'-0"	PAINTED	NR
103	CHEMICAL ROOM	CONC	SEALER	CMU	CMU	EXPO	CMU	EXPO	CMU	EXPO	CMU	EXPO	GYP	± 9'-0"	PAINTED	2-HR
104	ELECTRICAL ROOM	CONC	SEALER	RESILIENT	CMU/MCIG	PAINTED	CMU/MCIG	PAINTED	CMU/MCIG	PAINTED	CMU/MCIG	PAINTED	WDECK	VARIES	COATING	NR

CODE ANALYSIS ABBREVIATION LIST:

B	BUSINESS GROUP (2019, TITLE 24)
ci	CONTINUOUS INSULATION
CMU	INTEGRALLY COLORED CONCRETE MASONRY UNIT, REFERENCE SPECIFICATION SECTION 04220
CONC	CONCRETE
EXPO	EXPOSED MATERIAL
F-1	FACTORY INDUSTRIAL GROUP, MODERATE HAZARD OCCUPANCY (2019, TITLE 24)
FACT FIN	FACTORY FINISH
GYP	GYPSUM WALL BOARD, REFERENCE SPECIFICATION SECTION 09250
HW	HARDWARE GROUP, REFERENCE SPECIFICATION SECTION 08710
MAT'L	MATERIAL
MCIG	7/8" METAL FURRING HAT CHANNELS WITH RIGID INSULATION, AND GYPSUM WALL BOARD PAINTED. SYSTEM SHALL EXTEND TO THE UNDERSIDE OF WOOD DECK. REFERENCE SPECIFICATIONS SECTION 07212
NR	NOT REQUIRED
PAMP	PERFORATED ACOUSTICAL METAL PANELS. SYSTEM SHALL EXTEND TO THE UNDERSIDE OF WOOD DECK. REFERENCE SPECIFICATION SECTION 09523
PR	PAIR
R	REQUIRED
SEALER	FLOOR COATING, REFERENCE SPECIFICATION SECTION 09960
U-FACTOR	THERMAL TRANSMITTANCE, IS THE COEFFICIENT OF HEAT TRANSMISSION (AIR TO AIR) THROUGH A BUILDING COMPONENT OR ASSEMBLY, EQUAL TO THE TIME RATE OF HEAT FLOW PER UNIT AREA AND UNIT TEMPERATURE DIFFERENCE BETWEEN THE WARM SIDE AND COLD SIDE AIR FILMS (2019, TITLE 24)
WDECK	WOOD DECK PER STRUCTURAL DESIGN
WFRP	STANDARD FRP WALL SYSTEM, SMOOTH FINISH, LIGHT GRAY S490N AS MANUFACTURED BY MARLITE OR EQUAL. FRP SHALL BE INSTALLED AT THE PERIMETER (INTERIOR FACE) OF THE FOUR RESTROOM WALLS, THE FRP WALL SYSTEM SHALL BE 4'H FROM FINISH FLOOR.

REV	DATE	BY	DESCRIPTION

50% DESIGN SUBMITTAL
NOT FOR CONSTRUCTION

DESIGNED BMR
DRAWN BMR
CHECKED MEH
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — CHRISTOPHER THOMAS CLEVELAND — No. 72713 — CIVIL — STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ARCHITECTURAL
SOLAIRE ASR WELL
BUILDING CODE ANALYSIS, AND SCHEDULES

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 18GA01
SHEET NO. OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1018GA01.dgn

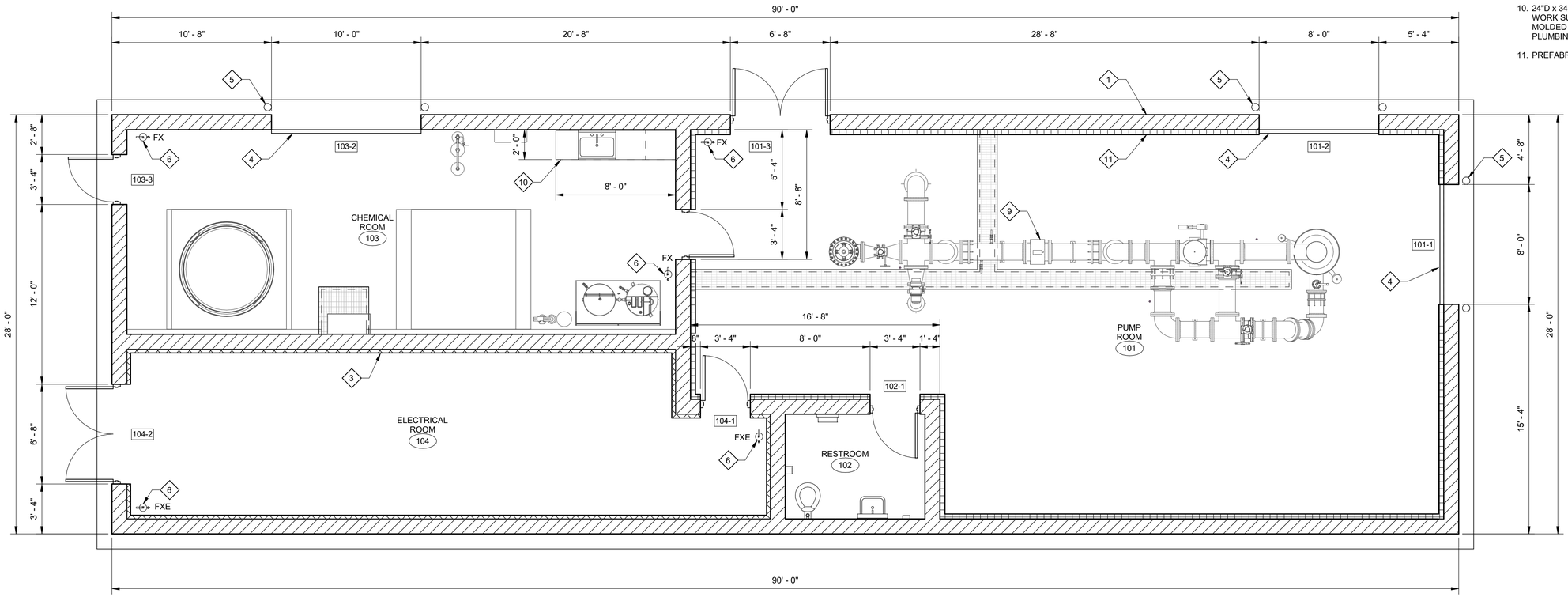
Plot Date: 08-OCT-2021 3:25:27 PM
User: svcPW
PlotScale: 1:1
DesignScript: Carollo_Std_Pen_v0905.pen
ColorTable: gshade.ctb
Model: Layout1
LAST SAVED BY: FValdezGalvan

GENERAL NOTES:

1. EXTERIOR FACE OF ALL CONCRETE MASONRY UNITS SHALL BE FINISHED WITH WATER REPELLANT, REFERENCE SPECIFICATION SECTION 07190.
2. FOR DOOR SCHEDULES AND ROOF FINISHES SEE SHEET 00A01.
3. FOR EXTERIOR ENTRANCE PADS SEE CIVIL DRAWINGS.
4. FOR RESTROOM ACCESSORY MOUNTING SEE TYPICAL DETAIL AN400/TYP.

(#) KEY NOTES:

1. 12" INTEGRALLY COLORED SMOOTH-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER
2. 12" INTEGRALLY COLORED SPLIT-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER
3. HAT CHANNEL FURRING STRIPS WITH RIGID INSULATION R-11.4 ci MINIMUM, AND GYPSUM WALL BOARD PAINTED. SYSTEM SHALL EXTEND TO THE UNDERSIDE OF METAL DECK
4. OVERHEAD COILING DOOR
5. GUARD POST AT EACH SIDE OF COILING DOOR, C160/TYP
6. FIRE EXTINGUISHER, TYPE AS INDICATED, AN400/TYP
7. FOR EQUIPMENT PADS AND GRATING, SEE STRUCTURAL DRAWINGS
8. FOR EQUIPMENT REQUIREMENTS, SEE ELECTRICAL DRAWINGS
9. FOR EQUIPMENT REQUIREMENTS, SEE MECHANICAL DRAWINGS
10. 24"D x 34"H METAL LABORATORY BASE CABINETS, MOLDED EPOXY WORK SURFACE WITH 4" BACK SPLASH, AND UNDERMOUNTED MOLDED EPOXY SINK WITH HOT AND COLD WATER SUPPLY PER PLUMBING
11. PREFABRICATED ACOUSTICAL METAL PANELS



B ROOF PLAN

SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED BMR
DRAWN FVG
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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER THOMAS CLEVELAND No. 72713 CIVIL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ARCHITECTURAL
SOLAIRE ASR WELL
FLOOR PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 18A01
SHEET NO. OF XX

PLOT DATE: 10/12/2021 1:37:15 PM

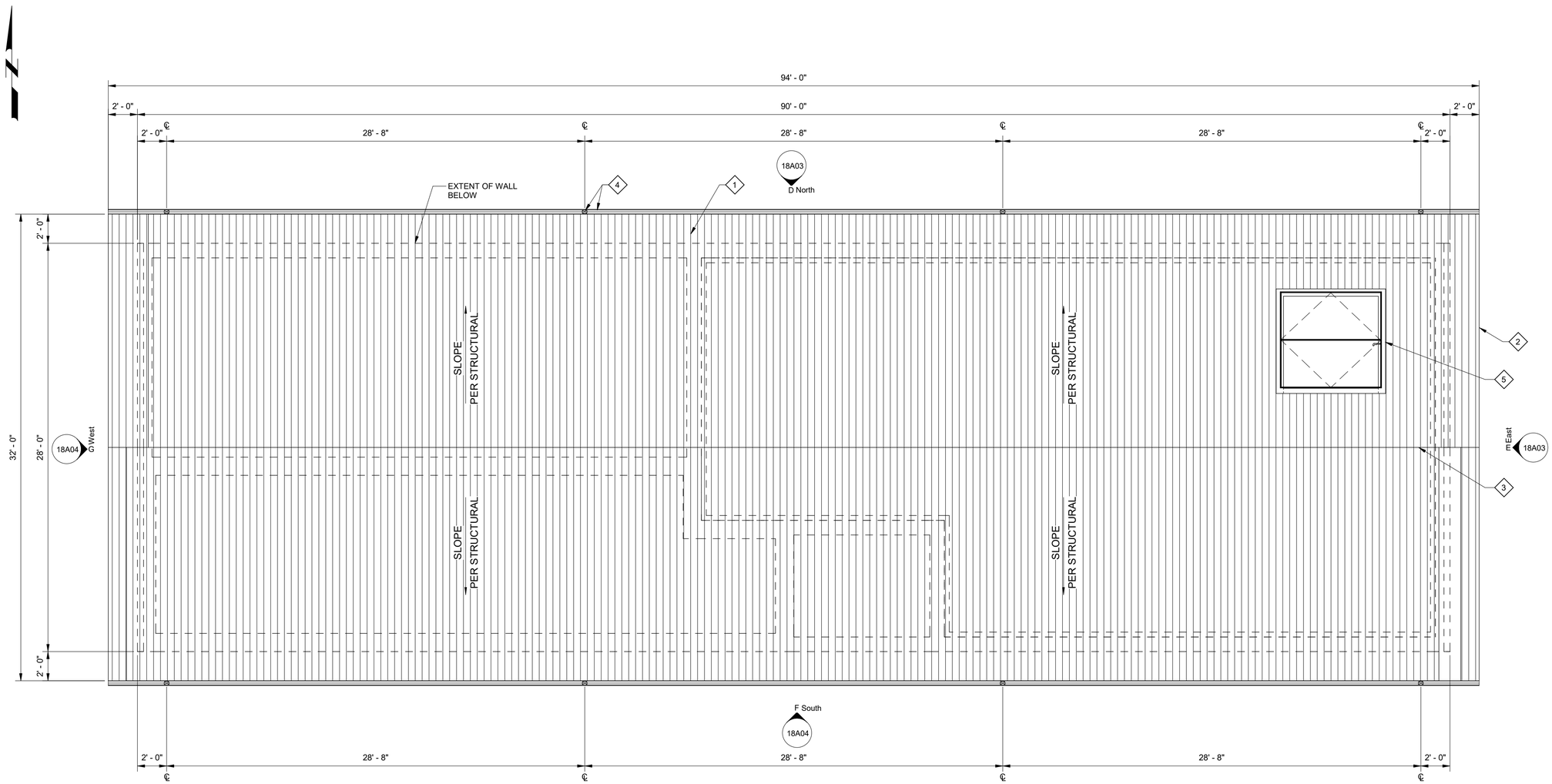
FILE NAME: R:\d1096957\11843A1018A0801.rvt

GENERAL NOTES:

1. ROOF HIGH POINTS (HP) AND LOW POINTS (LP) SHALL BE COORDINATED WITH STRUCTURAL DRAWINGS FOR METAL DECK SLOPING.

KEY NOTES:

1. STANDING SEAM METAL ROOF SYSTEM
2. ALUMINUM FASCIA
3. ROOF RIDGE
4. FOR GUTTER AND DOWNSPOUT INFORMATION, SEE AG227/TYP
5. 7'-0" x 7'-0" ROOF HATCH



C ROOF PLAN

SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
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DRAWN FVG
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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER THOMAS CLEVELAND No. 72713 CIVIL STATE OF CALIFORNIA

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CITY OF ROSEVILLE

AQUIFER STORAGE AND RECOVERY WELLS PROJECT

ARCHITECTURAL

SOLAIRE ASR WELL ROOF PLAN

VERIFY SCALES
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0 1"
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JOB NO. 11843A.10
DRAWING NO. 18A02
SHEET NO. OF XX

PLOT DATE: 10/12/2021 1:37:15 PM

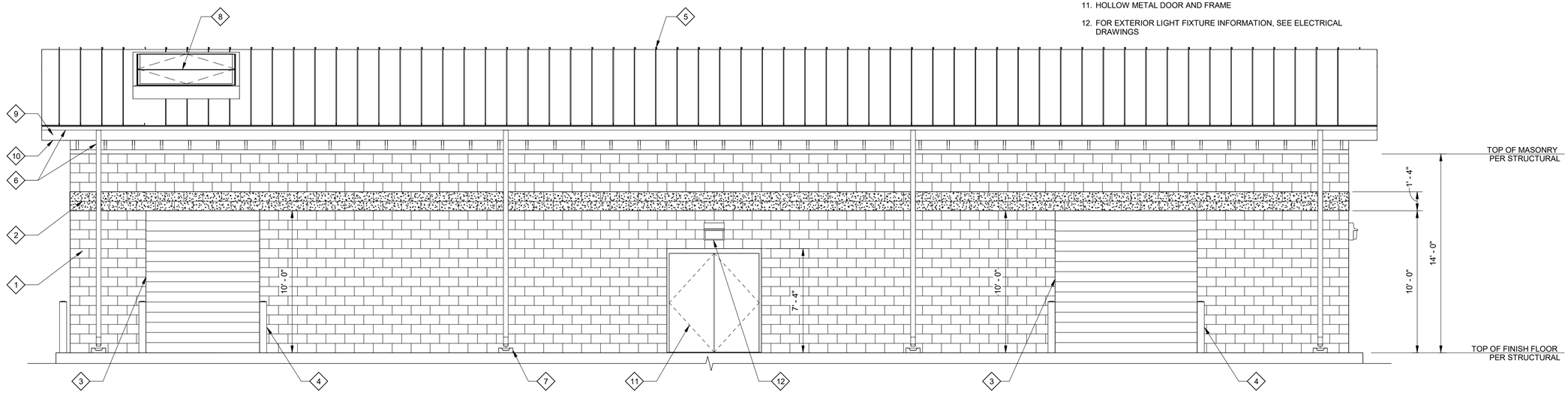
FILE NAME: R:\d1096957\11843A1018A0801.rvt

KEY NOTES:

1. 12" INTEGRALLY COLORED SMOOTH-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER
2. 12" INTEGRALLY COLORED SPLIT-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER
3. OVERHEAD COILING DOOR
4. GUARD POST AT EACH SIDE OF COILING DOOR, C160/TYP
5. STANDING SEAM METAL ROOF SYSTEM
6. FOR GUTTER AND DOWNSPOUT INFORMATION, SEE AG227/TYP
7. FOR CONCRETE SPLASH BLOCK INFORMATION, SEE AG229/TYP
8. 7'-0" x 7'-0" ROOF HATCH
9. ALUMINUM FASCIA
10. ALUMINUM SOFFIT
11. HOLLOW METAL DOOR AND FRAME
12. FOR EXTERIOR LIGHT FIXTURE INFORMATION, SEE ELECTRICAL DRAWINGS

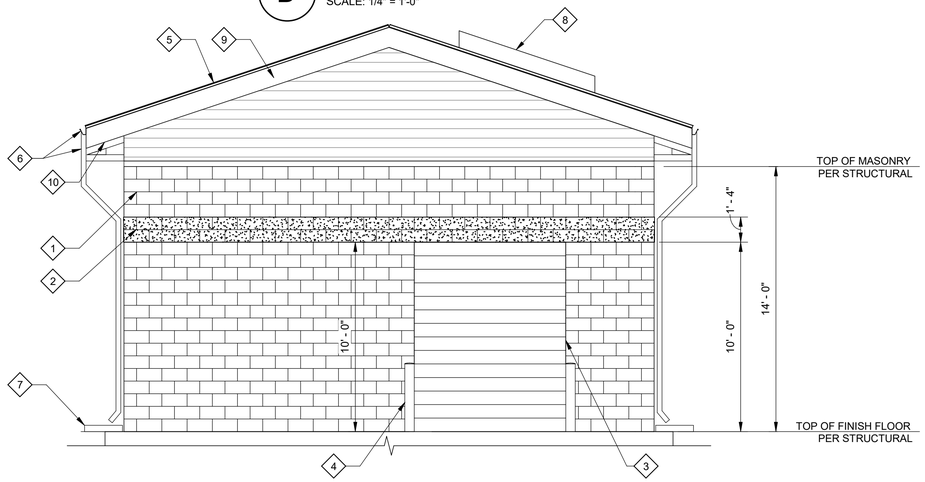
GENERAL NOTES:

1. EXTERIOR FACE OF ALL CONCRETE MASONRY UNITS SHALL BE FINISHED WITH WATER REPELLANT, REFERENCE SPECIFICATION SECTION 07190.
2. FOR DOOR SCHEDULES AND ROOF FINISHES, SEE SHEET 00A01.
3. FOR EXTERIOR ENTRANCE PADS, SEE CIVIL DRAWINGS.
4. ROOF HIGH POINTS (HP) AND LOW POINTS (LP) SHALL BE COORDINATED WITH STRUCTURAL DRAWINGS FOR METAL DECK SLOPING.



D NORTH ELEVATION

SCALE: 1/4" = 1'-0"



E EAST ELEVATION

SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED BMR
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CHECKED MEH
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER THOMAS CLEVELAND
No. 72713
CIVIL
STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ARCHITECTURAL
SOLAIRE ASR WELL
NORTH AND EAST ELEVATIONS

VERIFY SCALES
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0 1"
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JOB NO. 11843A.10
DRAWING NO. 18A03
SHEET NO. OF XX

PLOT DATE: 10/12/2021 1:37:16 PM

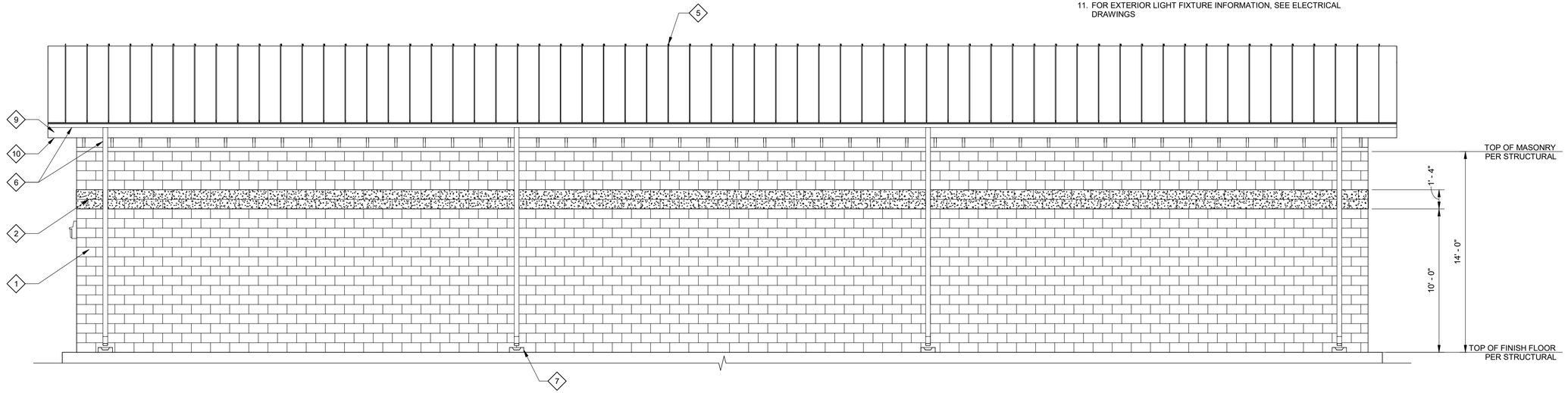
FILE NAME: R:\d1096957\11843A1018A0801.rvt

KEY NOTES:

1. 12" INTEGRALLY COLORED SMOOTH-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER
2. 12" INTEGRALLY COLORED SPLIT-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER
3. OVERHEAD COILING DOOR
4. GUARD POST AT EACH SIDE OF COILING DOOR, C160/TYP
5. STANDING SEAM METAL ROOF SYSTEM
6. FOR GUTTER AND DOWNSPOUT INFORMATION, SEE AG227/TYP
7. FOR CONCRETE SPLASH BLOCK INFORMATION, SEE AG229/TYP
8. ALUMINUM FASCIA
9. ALUMINUM SOFFIT
10. HOLLOW METAL DOOR AND FRAME
11. FOR EXTERIOR LIGHT FIXTURE INFORMATION, SEE ELECTRICAL DRAWINGS

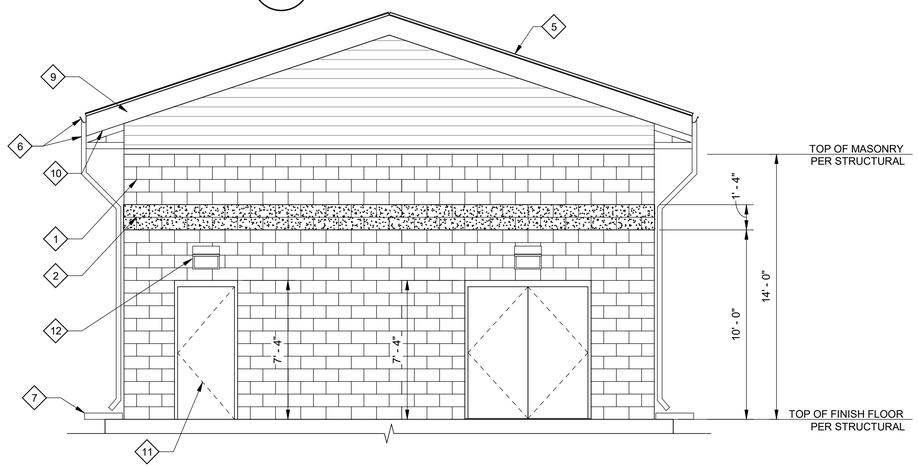
GENERAL NOTES:

1. EXTERIOR FACE OF ALL CONCRETE MASONRY UNITS SHALL BE FINISHED WITH WATER REPELLANT, REFERENCE SPECIFICATION SECTION 07190.
2. FOR DOOR SCHEDULES AND ROOF FINISHES, SEE SHEET 00A01.
3. FOR EXTERIOR ENTRANCE PADS, SEE CIVIL DRAWINGS.
4. ROOF HIGH POINTS (HP) AND LOW POINTS (LP) SHALL BE COORDINATED WITH STRUCTURAL DRAWINGS FOR METAL DECK SLOPING.



F SOUTH ELEVATION

SCALE: 1/4" = 1'-0"



G WEST ELEVATION

SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED BMR
DRAWN FVG
CHECKED MEH
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER THOMAS CLEVELAND
No. 72713
CIVIL
STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE

AQUIFER STORAGE AND RECOVERY WELLS PROJECT

ARCHITECTURAL

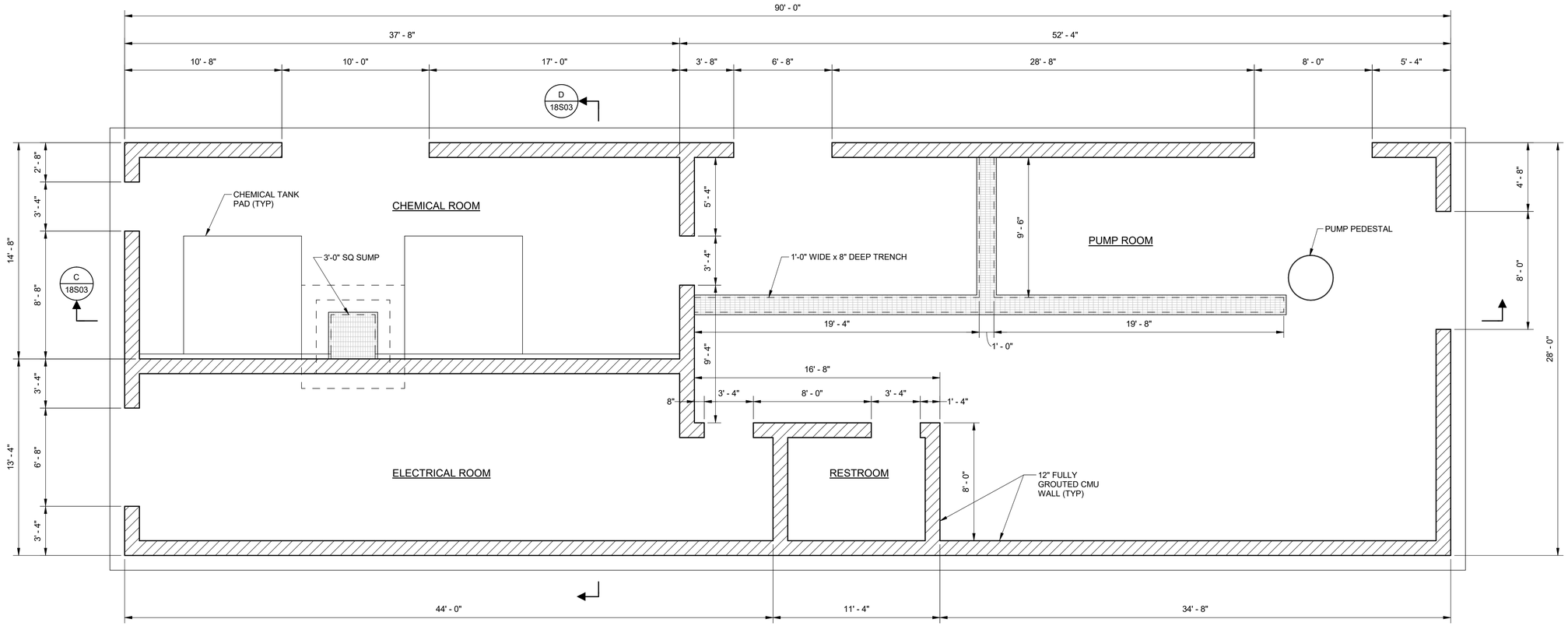
SOLAIRE ASR WELL
SOUTH AND WEST ELEVATIONS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 18A04
SHEET NO. OF XX

PLOT DATE: 10/12/2021 1:37:17 PM

FILE NAME: R:\d1096957\11843A1018A0801.rvt



A PLAN

SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED MJH
DRAWN RYW
CHECKED Checker
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER
MICHAEL E. DADIK
No. S5368
STRUCTURAL
STATE OF CALIFORNIA

carollo®

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
STRUCTURAL
SOLAIRE ASR WELL
FOUNDATION PLAN

VERIFY SCALES
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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

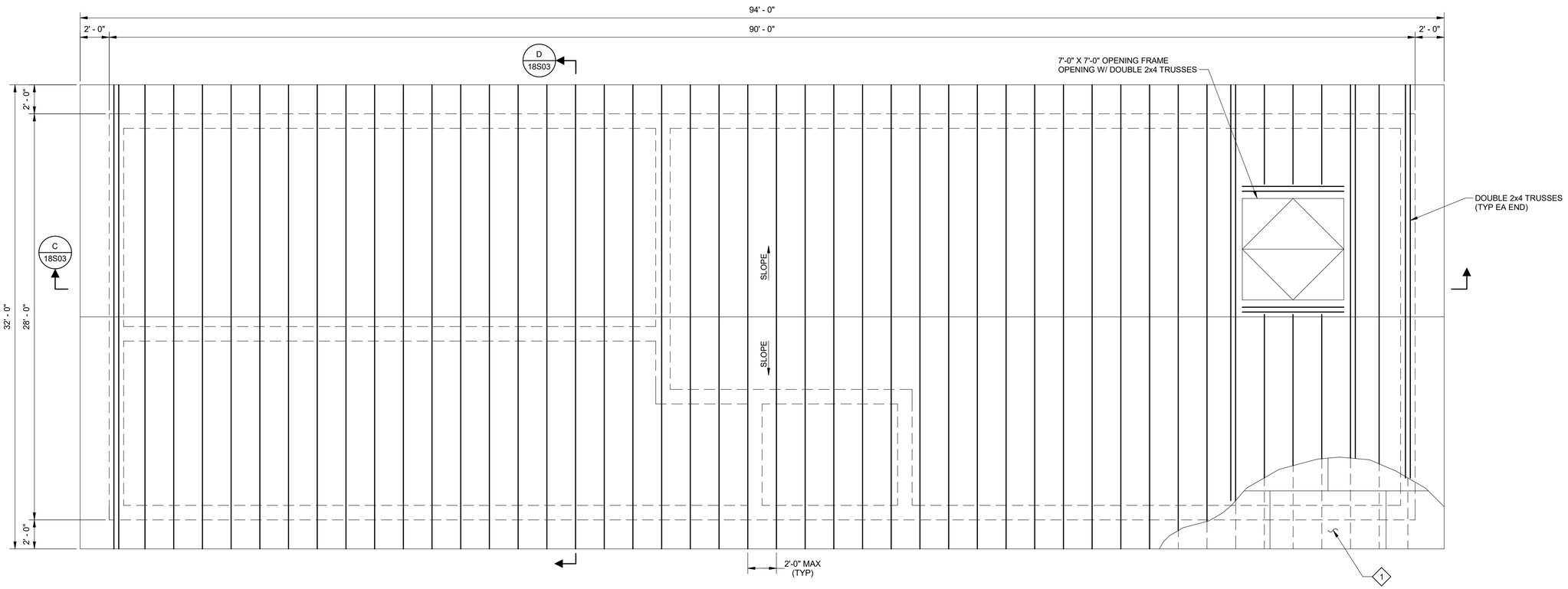
JOB NO. 11843A.10
DRAWING NO. 18S01
SHEET NO. OF XX

PLOT DATE: 10/12/2021 1:22:04 PM

FILE NAME: R:\d1096963\11843A1018S801.rvt

KEY NOTES:

1. 15/32 PLWD AP4 RATED STRUCT 1 W/ 10d NAILS @ 6" EDGE SPACING AND 12" FIELD SPACING.



B PLAN
SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED MJH
DRAWN RYW
CHECKED Checker
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER
MICHAEL E. DADIK
No. S5368
STRUCTURAL
STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

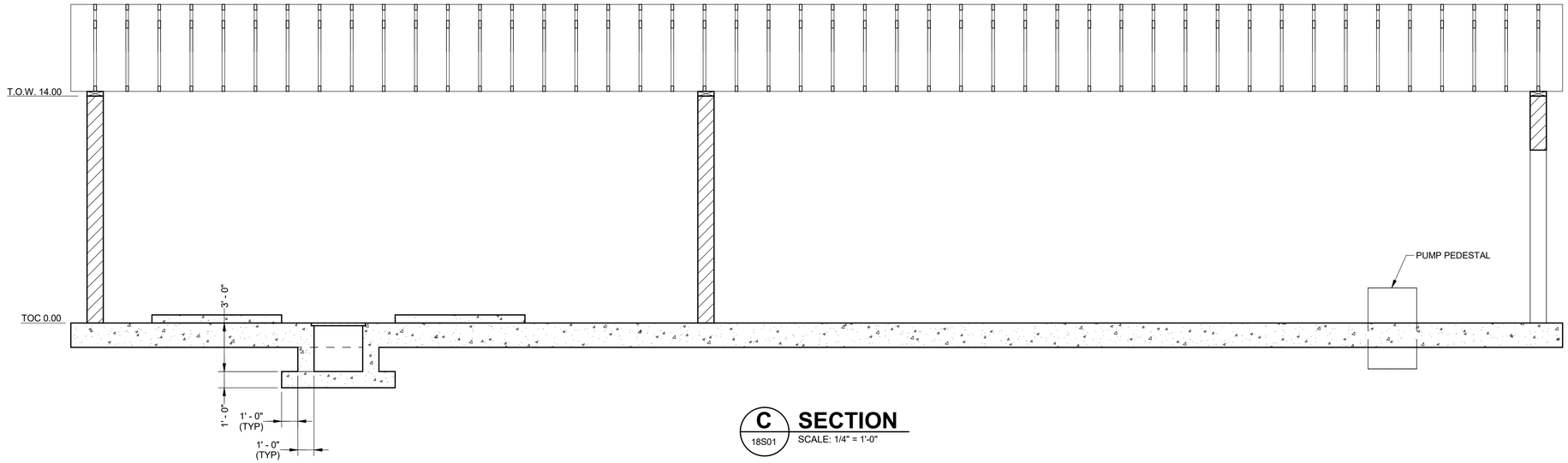
CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
STRUCTURAL
SOLAIRE ASR WELL
ROOF PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

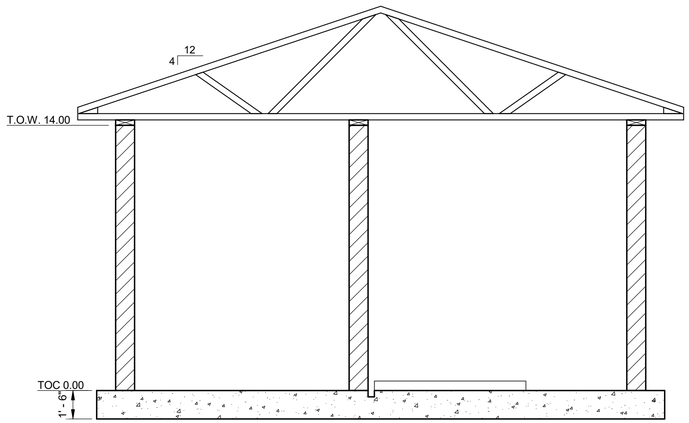
JOB NO. 11843A.10
DRAWING NO. 18S02
SHEET NO. OF XX

PLOT DATE: 10/12/2021 1:23:36 PM

FILE NAME: R:\d1096963\11843A1018S801.rvt



C 18S01 **SECTION**
SCALE: 1/4" = 1'-0"



D 18S01 **SECTION**
SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — MICHAEL E. DADIK — No. S5368 — STRUCTURAL — STATE OF CALIFORNIA

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CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
STRUCTURAL
SOLAIRE ASR WELL
SECTIONS AND DETAILS 2

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
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JOB NO. 11843A.10
DRAWING NO. 18S03
SHEET NO. OF XX

PLOT DATE: 10/12/2021 1:22:05 PM

FILE NAME: R:\d1096963\11843A1018S801.rvt

PIPING SYMBOLS

DOUBLE LINE	SINGLE LINE	DESCRIPTION
		WELDED JOINT
		GROOVED END JOINT
		FLANGED JOINT
		HUB & SPIGOT JOINT (RUBBER GASKET)
		PUSH-ON JOINT (RESTRAINED)
		ADAPTER SIDE GROOVED END ADAPTER FLANGE
		FLANGED COUPLING ADAPTER
		FLANGED COUPLING ADAPTER WITH THRUST TIES
		FLEXIBLE COUPLING
		FLEXIBLE COUPLING WITH THRUST TIES
		METAL BELLOWS EXP JOINT
		ELASTOMER BELLOWS EXP JOINT
		FLEXIBLE COUPLING ADAPTER
		DISMANTLING JOINT
		EXPANSION COMPENSATOR
		ELBOW UP
		ELBOW DOWN
		TEE UP
		TEE DOWN
		LATERAL UP
		LATERAL DOWN
		CONCENTRIC REDUCER
		ECCENTRIC REDUCER (FOT. FOB)
		UNION
		CAP
		ANCHOR
		ELBOW, 90 DEGREE
		CROSS
		TEE
		ELBOW, 45 DEGREE
		ELBOW, 22.5 DEGREE
		ELBOW, 11.25 DEGREE
		LATERAL

SINGLE LINE	DESCRIPTION
	GATE VALVE
K	KNIFE GATE VALVE
	BUTTERFLY VALVE
V	CHARACTERIZED BALL CONTROL VALVE
	BALL VALVE
	GLOBE VALVE
	3-WAY GLOBE TYPE MIXING VALVE
	FOUR WAY VALVE
	PINCH VALVE
	DIAPHRAGM VALVE
	PLUG VALVE
	LUBRICATED PLUG VALVE
	ECCENTRIC PLUG VALVE
	CONCENTRIC PLUG VALVE
	SWING CHECK VALVE
	WAFER CHECK VALVE
	BALL CHECK VALVE
	DUAL CHECK VALVE
	CHECK BACKFLOW PREVENTER
	HOSE VALVE
	MUD VALVE (PLAN VIEW)
	NEEDLE VALVE
	CONE VALVE
	PRESSURE RELIEF PRESSURE-REDUCING REGULATOR
	TELESCOPING VALVE
	THREE WAY VALVE AIR OPERATED
M	THREE WAY VALVE MOTOR OPERATED
S	THREE WAY VALVE SOLENOID OPERATED
	VACUUM VALVE
	BACKPRESSURE REGULATOR SELF-CONTAINED
	BACKPRESSURE REGULATOR W/ EXTERNAL PRESSURE TAP
	PRESSURE-REDUCING REGULATOR: SELF-CONTAINED
	PRESSURE-REDUCING REGULATOR W/EXTERNAL PRESSURE TAP

MECHANICAL SYMBOLS

SINGLE LINE	DESCRIPTION
	AIR OR CHEMICAL DIFFUSER
	QUICK DISCONNECT HIGH PRESSURE AIR OR FLUSHING
	BATCHMETER
	AIR VENT
	BASKET STRAINER
	BLOWER
	CALIBRATION COLUMN
	COMPRESSOR/TURBINE
	COMPRESSOR: RECIPROCATING
	DIAPHRAGM SEAL
	DRAIN
	EJECTOR OR EDUCTOR
M	ELECTRIC MOTOR
	EQUIPMENT DRAIN
	EXPANSION JOINT, FLEXIBLE VIBRATION JOINT
	FAN: EXHAUST/SUPPLY
	FILTER
	FIRE HYDRANT
	FLAME ARRESTER
	FLAME ARRESTER WITH THERMALLY OPERATED VALVE
	FLOOR DRAIN
	FLOW SWITCH
	GAUGE: PRESSURE
	GAUGE: DIFFERENTIAL PRESSURE
	WEIR
	MIXER
	OIL OR MOISTURE TRAP
	PRIMARY LEVEL ELEMENT: BUBBLER
	PRIMARY LEVEL ELEMENT: ELECTRODE
	PRIMARY LEVEL ELEMENT: FLOAT SWITCH
	PRIMARY LEVEL ELEMENT: FLUID
	PRIMARY LEVEL ELEMENT: INVERTED COLUMN

SINGLE LINE	DESCRIPTION
	PRIMARY LEVEL ELEMENT: RADAR
	PRIMARY LEVEL ELEMENT: ULTRASONIC
	PRIMARY FLOW ELEMENT: FLUME
X	PRIMARY FLOW ELEMENT: X = C - CORIOLIS X = M - MAGNETIC X = P - PROPELLER X = PT - PITOT TUBE X = R - ROTAMETER X = T - TURBINE X = TH - THERMAL X = U - ULTRASONIC X = D - DENSITY
	PRIMARY FLOW ELEMENT: ORIFICE PLATE
	PRIMARY FLOW ELEMENT: VENTURI TUBE
	PRIMARY FLOW ELEMENT: WEIR
	PULSATION DAMPENER
	PUMP: CENTRIFUGAL
	PUMP: DIAPHRAGM
	PUMP: METERING
	PUMP: PLUNGER
	PUMP: PERISTALTIC TUBE METERING
	PUMP: PROGRESSIVE CAVITY
	PUMP: RECIPROCATING
	PUMP: ROTARY
	PUMP: SCREW
	PUMP: SUBMERSIBLE
	PUMP: VERTICAL LIFT
	PIPE REDUCER: CONCENTRIC
	PIPE REDUCER: ECCENTRIC (FOT, FOB)
	ROTARY CHEMICAL FEEDER
	RUPTURE DISK
	SAMPLE PORT
	SIGHT GLASS
	SLIDE GATE
	SLUICE GATE
	STRAINER: WYE TYPE

SINGLE LINE	DESCRIPTION
	STRAINER: WYE TYPE WITH BLOWOFF
	THERMOMETER
	VALVE: ANGLE
	VALVE: AIR RELIEF
	PIPE MATERIAL CHANGE

IDENTIFICATION SYMBOLS

CHEMICAL INJECTION POINT — CHEMICAL / DWG NO.

PIPE DESIGNATOR — PIPE SIZE, FLOW STREAM, X" XXX

CONTINUATION TAG — UNIQUE IDENTIFIER, CONTINUATION FROM DWG NO., CONTINUATION TO DWG NO., A, B, C

EQUIPMENT / VALVE TAG — XXX-XX-XXXX

KEY TAG — X

LINE SYMBOLS

PIPE ABOVE OR BELOW GROUND

PIPE UNDERNEATH SLAB OR STRUCTURE

FUTURE

EXISTING

DEMO

PROCESS LINE SYMBOLS

PRIMARY PROCESS FLOW IN PIPE

SECONDARY PROCESS FLOW IN PIPE

PRIMARY PROCESS FLOW IN CHANNEL

SECONDARY PROCESS FLOW IN CHANNEL

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

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REGISTERED PROFESSIONAL ENGINEER — MICHAEL E. DUCKER — No. 63626 — CIVIL — STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
MECHANICAL
GENERAL MECHANICAL NOTES AND LEGEND

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. GM01
SHEET NO. OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1000GM001.dgn

Plot Date: 07-OCT-2021 4:52:37 PM
User: svcPW
DesignScript: Carollo_Std_Pen_v0905.pen
ColorTable: gshade.ctb
Model: Layout1
PlotScale: 1:1
LAST SAVED BY: obarranco

ABBREVIATIONS

A	@	AT
	AD	AREA DRAIN
	AFF	ABOVE FINISHED FLOOR
B	BFP	BACKFLOW PREVENTER
	BLDG	BUILDING
	BOP	BOTTOM OF PIPE
	BWV	BACKWATER VALVE
C	CL	CENTERLINE
	CA	COMPRESSED AIR
	CI	CAST IRON
	CO	CLEANOUT
	CONT	CONTINUOUS, CONTINUE
	CU FT	CUBIC FEET
	CV	CHECK VALVE
	CW	COLD WATER
D	D	DRAIN
	DCO	DOUBLE CLEANOUT
	DI	DUCTILE IRON
	DN	DOWN
	DWG	DRAWING
E	E	EMERGENCY WATER
	ECO	EXTERIOR CLEANOUT
	EL	ELEVATION
	ES	EMERGENCY SHOWER
	ESEW	EMERGENCY SHOWER / EYEWASH STATION
	ETP	ELECTRONIC TRAP PRIMER
	EWC	ELECTRIC WATER COOLER
	EWH	ELECTRIC WATER HEATER
	EWU	EYE WASH UNIT
F	FAS	FLOW ALARM SWITCH
	FCO	FLOOR CLEANOUT
	FD	FLOOR DRAIN
	FE	FIRE EXTINGUISHER
	FHV&C	FIRE HOSE VALVE AND CABINET
	FS	FLOW SWITCH
	FV	FIRE VALVE
	F/BS	FACE/BODY SPRAY
G	G	GAS
	GPM	GALLONS PER MINUTE
H	HB	HOSE BIBB
	HD	HUB DRAIN
	HEV	HOSE END VALVE
	HP	HANDICAPPED (ADA ACCESSIBLE)
	HW	HOT WATER
	HWR	HOT WATER RETURN
	HWS	HOT WATER SUPPLY
I	INV	INVERT
	IOS	INSTALLED BY OTHER SECTION
	IPS	IRON PIPE SIZE
K	KS	KITCHEN SINK
	KU	KITCHEN UNIT
L	LAB	LABORATORY
	LAV	LAVATORY
	LBV	LOCKABLE BALL VALVE
	LSV	LOCK SHIELD VALVE
M	MAX	MAXIMUM
	MIN	MINIMUM
	MR	MOP RECEPTOR
N	ND	NUMBER
	NPW	NON-POTABLE WATER
O	OED	OPEN END OR OPEN EQUIPMENT DRAIN
P	P	PROTECTED WATER
	PD	PUMP DISCHARGE
	PG	PRESSURE GAUGE
	PH	POST HYDRANT
	PHW	PROTECTED HOT WATER
	PRW	PRESSURE WATER
	PRH	HIGH PRESSURE
	PSI	POUNDS PER SQUARE INCH
	PSL	LOW PRESSURE
	P&T	PRESSURE & TEMPERATURE
	PVC	POLYVINYL CHLORIDE
	PW	POTABLE WATER
R	RD	ROOF DRAIN
	RM	ROOM
	RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
S	S	SOIL
	SA	SHOCK ABSORBER
	SF	SQUARE FOOT
	SH	SHOWER
	SHT	SHEET
	SP	SPRINKLER
	SQ	SQUARE
	SS	SANITARY SEWER
	SK	SINK
	SSK	SAMPLE
T	T&P	TEMPERATURE & PRESSURE RELIEF
	TD	TANK DRAIN
	THK	THICK(NESS)
	TP	TRAP PRIMER
	TW	TEPID WATER
	TWH	TANKLESS WATER HEATER
	TYP	TYPICAL
U	UNO	UNLESS NOTED OTHERWISE
	UR	URINAL
V	V	VENT
	VAC	VACUUM
	VB	VACUUM BREAKER
	VE	VACUUM EXHAUST
	VTR	VENT THROUGH ROOF
W	W	WASTE
	W/	WITH
	WC	WATER CLOSET
	WCO	WALL CLEANOUT
	WF	WASH FOUNTAIN
	WH	WALL HYDRANT
	WHA	WATER HAMMER ARRESTOR
	WHS	WASH HOSE STATION
	WT	(SANITARY) WASTE
	W&T	WASTE & TRAP
	W&V	WASTE & VENT

PLUMBING LINE SYMBOLS

- NEW COLD WATER (POTABLE)
- EXISTING COLD WATER (POTABLE)
- NEW HOT WATER (POTABLE)
- EXISTING HOT WATER (POTABLE)
- NON-POTABLE WATER
- NEW SANITARY SEWER
- EXISTING SANITARY SEWER
- SOIL OR WATER (DRAINAGE) (D)
- TEMPERED WATER (POTABLE)
- VENT

PLUMBING SYMBOLS

- CO — CLEANOUT
- FLOOR CLEANOUT
- WCO — WALL CLEANOUT
- YCO — DOUBLE YARD CLEANOUT
- FLOOR DRAIN
- HUB DRAIN
- HOSE BIBB OR WALL HYDRANT
- HOSE RACK
- WATER PROOF SLEEVE
- DN OR DROP
  "DN" DENOTES PIPE WHICH PENETRATE THE FLOOR BELOW.
  "DROP" DENOTES PIPES WHICH DO NOT.
- UP OR RISE
  "UP" DENOTES PIPE WHICH PENETRATE THE FLOOR ABOVE.
  "RISE" DENOTES PIPES WHICH DO NOT.

NOTE: THE TERMS "DN" "DROP" "UP" & "RISE" ARE USED TO INDICATE THE VERTICAL DIRECTION IN WHICH A PIPE LINE CONTINUES FROM THE IMAGINARY PLANE OF VIEW. THE TERMS HAVE NO RELEVANCE TO THE DIRECTION OF FLOW WITHIN THE PIPE LINE.

- P-TRAP
- TEE
- TEE UP
- TEE DOWN
- LOCKABLE BALL VALVE
- CHECK VALVE
- GATE VALVE
- COLD BYPASS VALVE
- OR — BALL VALVE
- GLOBE VALVE
- BUTTERFLY VALVE
- PLUG VALVE
- FLOW CONTROL
- PRESSURE REGULATOR VALVE
- UNION
- BOTTOM CONNECTION
- TOP CONNECTION
- REDUCED PRESSURE BACKFLOW PREVENTER
- TEMPERATURE GAUGE
- RE-CIRCULATION PUMP

NOTE: THIS IS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS. NOT ALL ITEMS SHOWN HERE APPEAR ON THE CONTRACT DRAWINGS.

SCHEDULES

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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — CHAD GREEN — No. 37915 — MECHANICAL — STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
MECHANICAL
GENERAL PLUMBING NOTES, ABBREVIATIONS, AND SYMBOLS

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DRAWING NO. GM02
SHEET NO. OF XX

Plot Date: 07-OCT-2021 4:52:30 PM
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ColorTable: gshade.ctb
Model: Layout1
LAST SAVED BY: obarranco

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1000GM002.dgn

NOTES

1. SIZES OF EQUIPMENT PADS INDICATED ON THE DRAWINGS ARE APPROXIMATE. EXACT DIMENSIONS SHALL BE DETERMINED BY THE CONTRACTOR FOR THE EQUIPMENT FURNISHED. ALL FLOOR MOUNTED EQUIPMENT SHALL BE SET ON CONCRETE PADS CONFORMING TO DETAILS SHOWN ON THE TYPICAL STRUCTURAL DRAWINGS.
2. DIELECTRIC COUPLINGS, FLANGES OR UNIONS SHALL BE INSTALLED AT ALL CONNECTIONS OF COPPER PIPE TO OTHER TYPES OF METALLIC PIPING.
3. HVAC PIPING AND DUCTWORK DRAWINGS DO NOT SHOW ALL DRAINS, VENTS, OFFSETS AND FITTINGS ETC. REQUIRED FOR THE COMPLETE SYSTEM. SMALL PIPING IS SHOWN APPROXIMATELY TO SCALE BUT NOT EVERY FITTING AND OFFSET IS SHOWN. THE CONTRACTOR SHALL FURNISH, INSTALL AND TEST ALL HVAC SYSTEMS TO PROVIDE THE COMPLETE SYSTEM.
4. UNLESS OTHERWISE SHOWN ON THE DRAWINGS ALL FLOOR SLAB AND WALL PENETRATIONS SHALL BE AS SHOWN ON THE TYPICAL DETAILS.
5. NOT ALL AND ONLY CERTAIN TYPES OF SUPPORTS ARE SHOWN ON THE HVAC DRAWINGS. UNLESS OTHERWISE DETAILED ON THE DRAWINGS ALL PIPE AND DUCT SUPPORTS SHALL BE DESIGNED, FURNISHED AND INSTALLED BY THE CONTRACTOR AS SPECIFIED.
6. THIS IS A GENERAL LIST OF SYMBOLS. NOT ALL ITEMS SHOWN HERE APPEAR ON CONTRACT DRAWINGS.
7. TYPICAL DETAILS SHALL BE USED FOR ALL PERMANENT WORK EVEN THOUGH THEY ARE NOT CALLED OUT AT ALL LOCATIONS WHERE THEY APPLY.
8. COORDINATE FINAL LOUVER SIZE AND LOCATION WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS.
9. PROVIDE TURNING VANES IN ALL ELBOWS. (SHOWN OR NOT)

ABBREVIATIONS

A	@	AT
	AC	AIR CONDITIONING
	AFF	ABOVE FINISHED FLOOR
	AFS	AIR FLOW SWITCH
	AHU	AIR HANDLING UNIT
B	BD	BALANCING DAMPER
	BDD	BACKDRAFT DAMPER
	BLR	BOILER
	BOD	BOTTOM OF DUCT
C	CH	CHILLER
	CO	CARBON MONOXIDE DETECTOR
	CT	COOLING TOWER
	CS	CURRENT SENSOR
	CU	CONDENSING UNIT
D	DG	DOOR GRILLE
	DP	DIFFERENTIAL PRESSURE
E	EA	EXHAUST AIR
	ECU	EVAPORATIVE COOLING UNIT
	EF	EXHAUST FAN
	EUH	ELECTRIC UNIT HEATER
F	FA	FOUL AIR
	FCU	FAN COIL UNIT
	FD	FIRE DAMPER
G	GUH	GAS UNIT HEATER
H	HP	HEAT PUMP
M	MAU	MAKEUP AIR UNIT
	MD	MOTORIZED DAMPER
N	NC	NORMALLY CLOSED
	NO	NORMALLY OPEN
O	OA	OUTSIDE AIR
	OCF	ODOR CONTROL FAN
P	PPU	POSITIVE PRESSURIZATION UNIT
R	RA	RETURN AIR
	RR	RETURN REGISTER OR GRILLE
S	SA	SUPPLY AIR
	SD	SMOKE DAMPER OR SMOKE DETECTOR
	SF	SUPPLY FAN
	SFD	SMOKE & FIRE DAMPER COMBINATION
	SR	SUPPLY REGISTER, GRILLE OR DIFFUSER
V	VAV	VARIABLE AIR VOLUME
W	WUH	WATER UNIT HEATER

DUCTWORK SYMBOLS

FEATURE	SYMBOL
DIRECTION OF FLOW	
DUCT SIZE- FIRST NUMBER IS SIDE SHOWN	12x20
ROUND DUCT	12 DIA OR 12"Ø
DUCT SECTION, POSITIVE PRESS FIRST NUMBER IS TOP	20x12
DUCT SECTION, NEGATIVE PRESS FIRST NUMBER IS TOP	20x12
SIDE MOUNT DEVICE	
ELEVATION CHANGE (R) RISE, (D) DROP	R
ACCESS DOOR	AD / AD
BOTTOM MOUNT DEVICE REGISTER, GRILLE, DIFFUSER OR DUCT TAKEOFF	
FLEXIBLE CONNECTION	
FLEXIBLE DUCT	OR
DUCT INSULATION (INSIDE) OR (OUTSIDE) SIZE VARIES	XX" INSULATION (INSIDE) / XX" INSULATION (OUTSIDE)
TURNING VANES	
RECTANGULAR TO RECTANGULAR TRANSITION	20x12 16x8
RECTANGULAR TO ROUND TRANSITION	20x12 16 DIA
POSITIVE PRESSURE DUCT - ELBOW TURNED UP (USE ONE DIAGONAL FOR NEGATIVE PRESSURE)	
POSITIVE PRESSURE DUCT - ELBOW TURNED DOWN (USE ONE DIAGONAL FOR NEGATIVE PRESSURE)	
SMOKE DETECTOR CONFIRM ORIENTATION OF INSTALLATION	
DAMPERS	
BACKDRAFT	
BALANCING	
FIRE W/ ACCESS DOOR	FD
MOTORIZED	M
SMOKE CONFIRM ORIENTATION OF INSTALLATION	
COMBINATION SMOKE AND FIRE CONFIRM ORIENTATION OF INSTALLATION	

EQUIPMENT SYMBOLS

FEATURE	SYMBOL
A/C OR HEAT PUMP COMPRESSOR	
CENTRIFUGAL FAN	
CONTROL PANEL	
COOLING COIL	C / C
CURRENT SENSOR	CS
DIRECT EXPANSION COIL	D / X
DUCT SMOKE DETECTOR	
ELECTRIC HEATER	
FILTER	
AIR FLOW SWITCH	AFS
GAS HEATER	
HUMIDISTAT	H
INLINE/AXIAL FAN	
MOTOR OPERATED VALVE	M
PRESSURE DIFFERENTIAL SWITCH	PD
ROOF/SIDEWALL FAN	
ROOF VENT OR ROOF FAN	
SOLENOID VALVE	S
THERMOSTAT 60" ABOVE FINISH FLOOR	T
UNIT HEATER (HORIZONTAL TYPE)	
UNIT HEATER (VERTICAL TYPE)	

NOTE: THIS IS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS. NOT ALL ITEMS SHOWN HERE APPEAR ON THE CONTRACT DRAWINGS.

REGISTERS, GRILLES & LOUVERS SYMBOLS

FEATURE	SYMBOL
LOUVER/BRICK VENT - FIXED	
LOUVER/BRICK VENT - OPERABLE	
TRANSFER GRILLE	
TO SPACE	
FROM SPACE	
SUPPLY DIFFUSER OR GRILLE ARROWS INDICATE FLOW DIRECTION	
RETURN DIFFUSER OR GRILLE ARROWS INDICATE FLOW DIRECTION	
EXHAUST DIFFUSER OR GRILLE ARROWS INDICATE FLOW DIRECTION	

LEGEND FOR REGISTERS & GRILLES

TYPE OF REGISTER OR GRILLE (AS DESCRIBED IN SPECIFICATIONS) — SR-1(B)/12x12 — BOOT (IF REQ'D) — NECK SIZE — 400/4 — CFM — FLOW PATTERN; SIDEWALL-ADJUSTABLE; C-CORNER

	SUPPLY	RETURN	EXHAUST
DUCT UP THRU ROOF OR FLOOR			
DUCT UP			
DUCT DOWN			

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CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
MECHANICAL
GENERAL HVAC NOTES, ABBREVIATIONS, AND SYMBOLS

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DRAWING NO. GM03
SHEET NO. OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1000GM003.dgn

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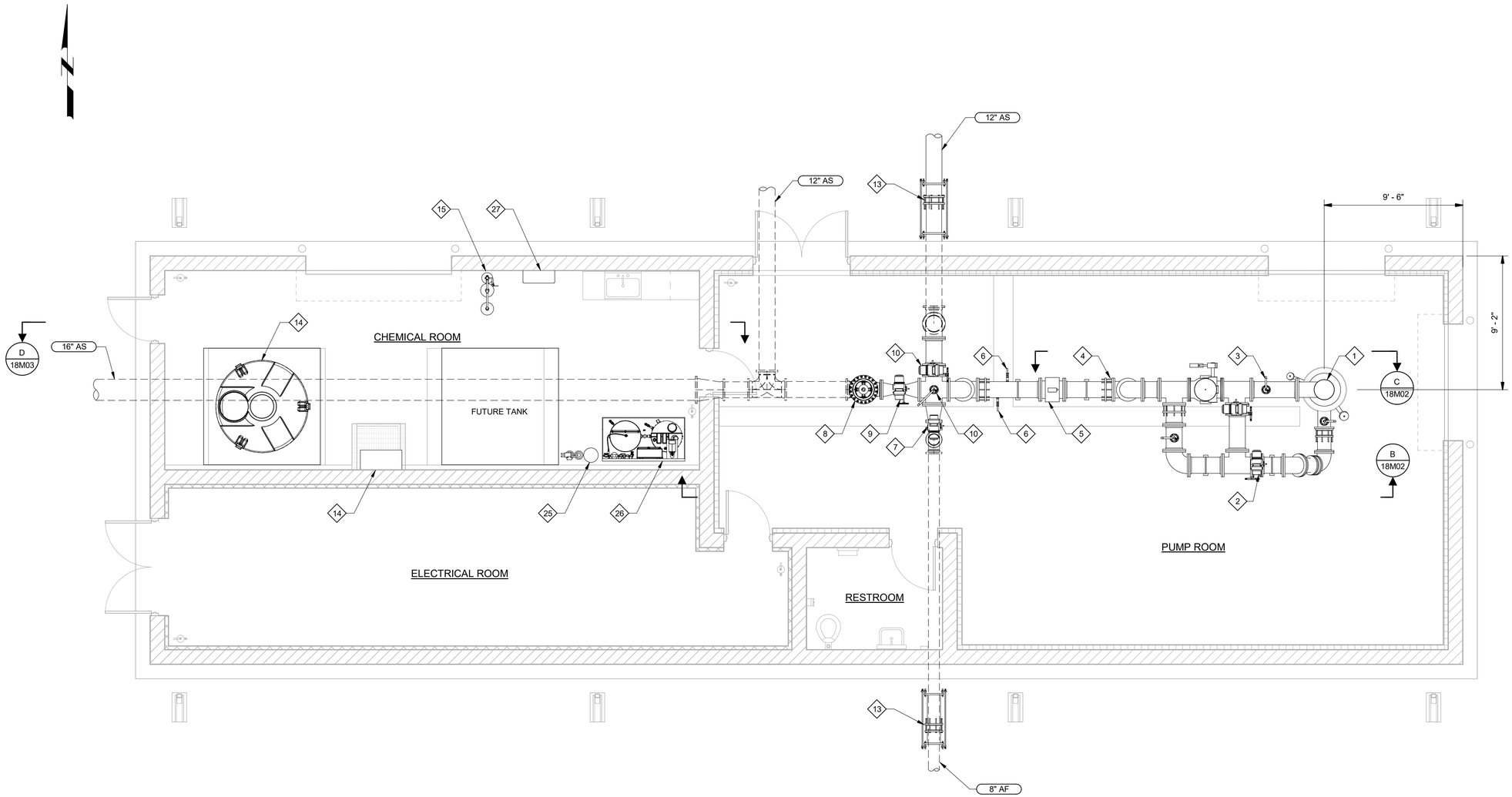

A **PLAN**
SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. SEE CIVIL FOR PIPING CONTINUATIONS
2. NOT ALL REQUIRED PIPE SUPPORTS ARE SHOWN.
3. ALL PIPE SUPPORTS WITHIN THE CHEMICAL ROOM SHALL BE FRP, UNLESS OTHERWISE NOTED. WALL PIPE SUPPORTS PER P660/TYP, FLOOR PIPE SUPPORTS PER P618/TYP, AND VERTICAL PIPE SUPPORTS PER P615/TYP.
4. ALL PIPE SUPPORTS USED FOR CHEMICAL SERVICE TO USE CUSHION STRIPS BY ANVIL #AS 3792 OR EQUAL.
5. ALL BALL VALVES USED FOR SODIUM HYPOCHLORITE SERVICE SHALL BE VENTED BALL TYPE.

KEY NOTES:

1. ASR WELL PUMP
2. WELL ANNULUS RECHARGE VALVE
3. 2" AIR RELEASE VALVE (TYP)
4. RESTRAINED FLANGE COUPLING ADAPTER (TYP)
5. BI-DIRECTIONAL FLOW METER
6. 1" SPARE NIPPLE AND FULL-PORT BALL VALVE
7. AQUIFER FLUSH VALVE
8. PRESSURE REDUCING VALVE
9. MODULATING RECHARGE CONTROL VALVE
10. RECOVERY VALVE
11. SODIUM HYPOCLORITE INJECTION
12. FLUORIDE INJECTION
13. RESTRAINED FLEXIBLE COUPLING PER P110/TYP
14. 1,000 GALLON DOUBLE CONTAINED SODIUM HYPOCHLORITE TANK
15. EMERGENCY SHOWER & EYEWASH STATION PER M270/TYP
16. 3" TANK VENT ROUTED THROUGH WALL PER P302/TYP, TERMINATE AT A 45 DEGREE ANGLE WITH BIRD SCREEN
17. LEVEL INSTRUMENT
18. SODIUM HYPOCHLORITE DUAL PUMP SKID
19. 2" VENTED BALL VALVE
20. WALL PENETRATION PER P302/TYP
21. 3" BALL VALVE WITH STEM EXTENSION
22. 2" QUICK DISCONNECT HOSE COUPLING WITH CAP, VENTED BALL VALVE, AND BALL CHECK VALVE
23. 3" OVERFLOW
24. FLEXIBLE FITTING PER TANK MANUFACTURER
25. WATER SOFTENER WITH BRINE TANK
26. PACKAGED FLUORIDE DOSING SKID
27. INSTANT WATER HEATER
28. UTILITY SINK

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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER STEPHEN BELZER M 40713 MECHANICAL STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER MICHAEL E. DUCKER No. 63626 CIVIL STATE OF CALIFORNIA

ASR SYSTEMS

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MECHANICAL
SOLAIRE ASR WELL BUILDING PLAN

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DRAWING NO. 18M01
SHEET NO. OF XX

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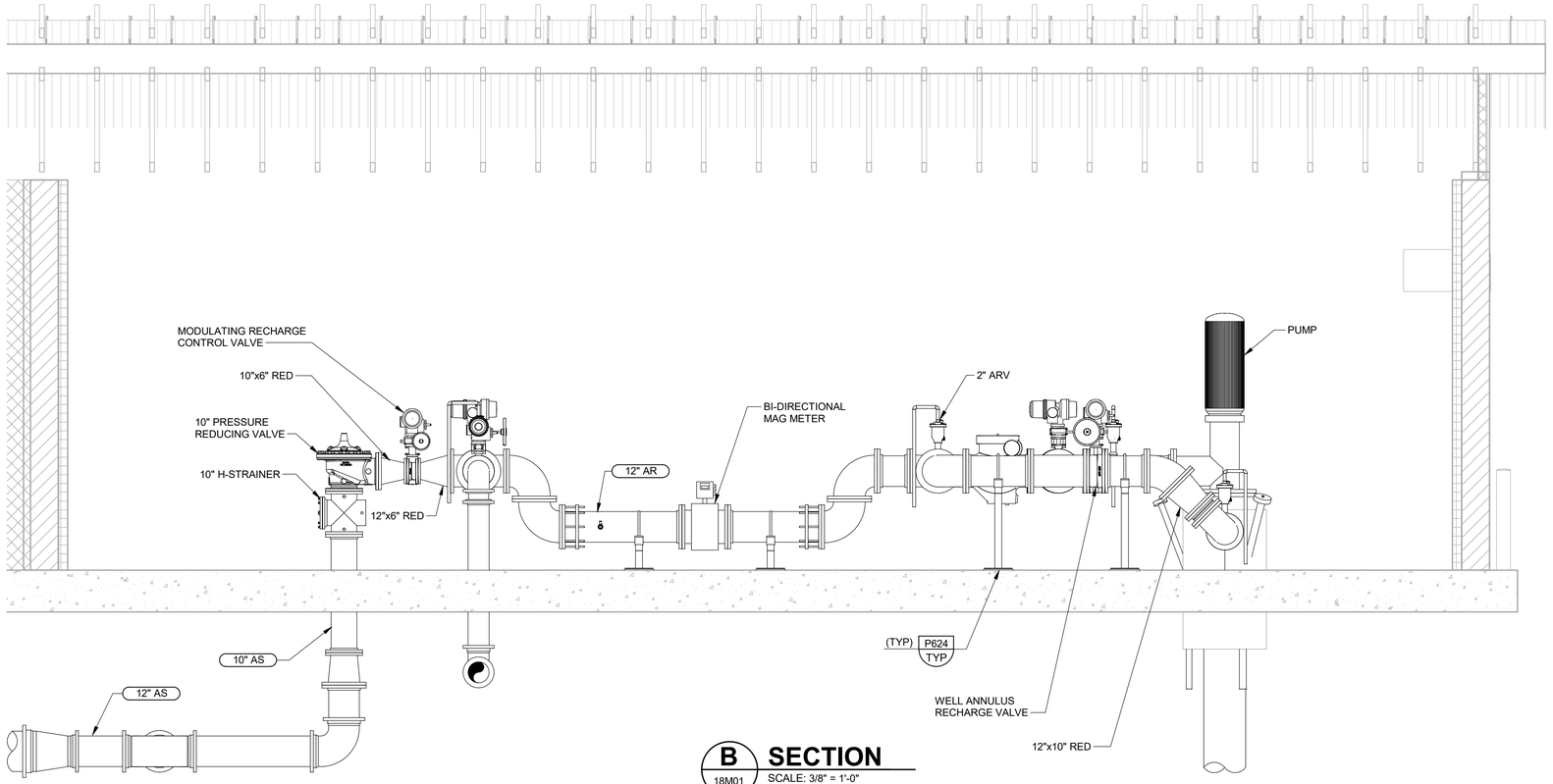
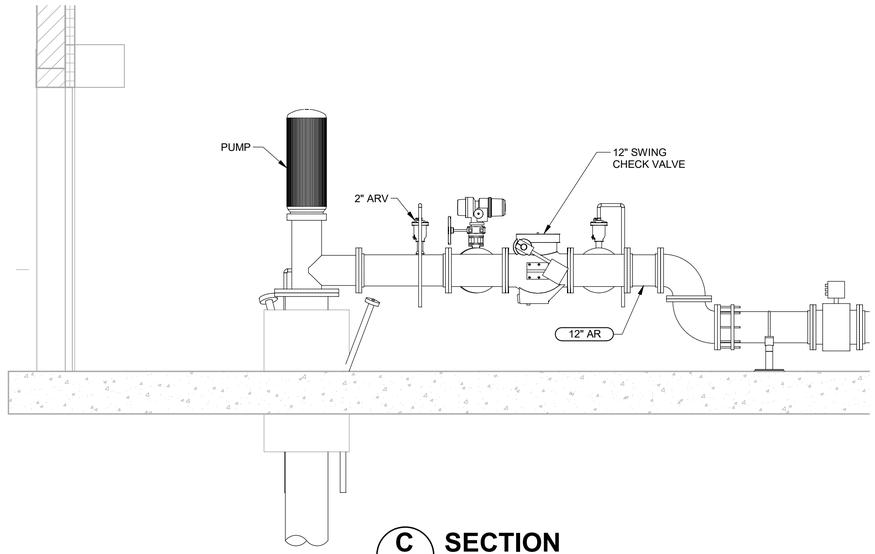


B 18M01 **SECTION**
SCALE: 3/8" = 1'-0"



C 18M01 **SECTION**
SCALE: 3/8" = 1'-0"

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REGISTERED PROFESSIONAL ENGINEER MICHAEL E. DUCKER No. 63626 CIVIL STATE OF CALIFORNIA

ASR SYSTEMS

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MECHANICAL
SOLAIRE ASR WELL
SECTION AND DETAILS 1

VERIFY SCALES
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JOB NO. 11843A.10
DRAWING NO. 18M02
SHEET NO. OF XX

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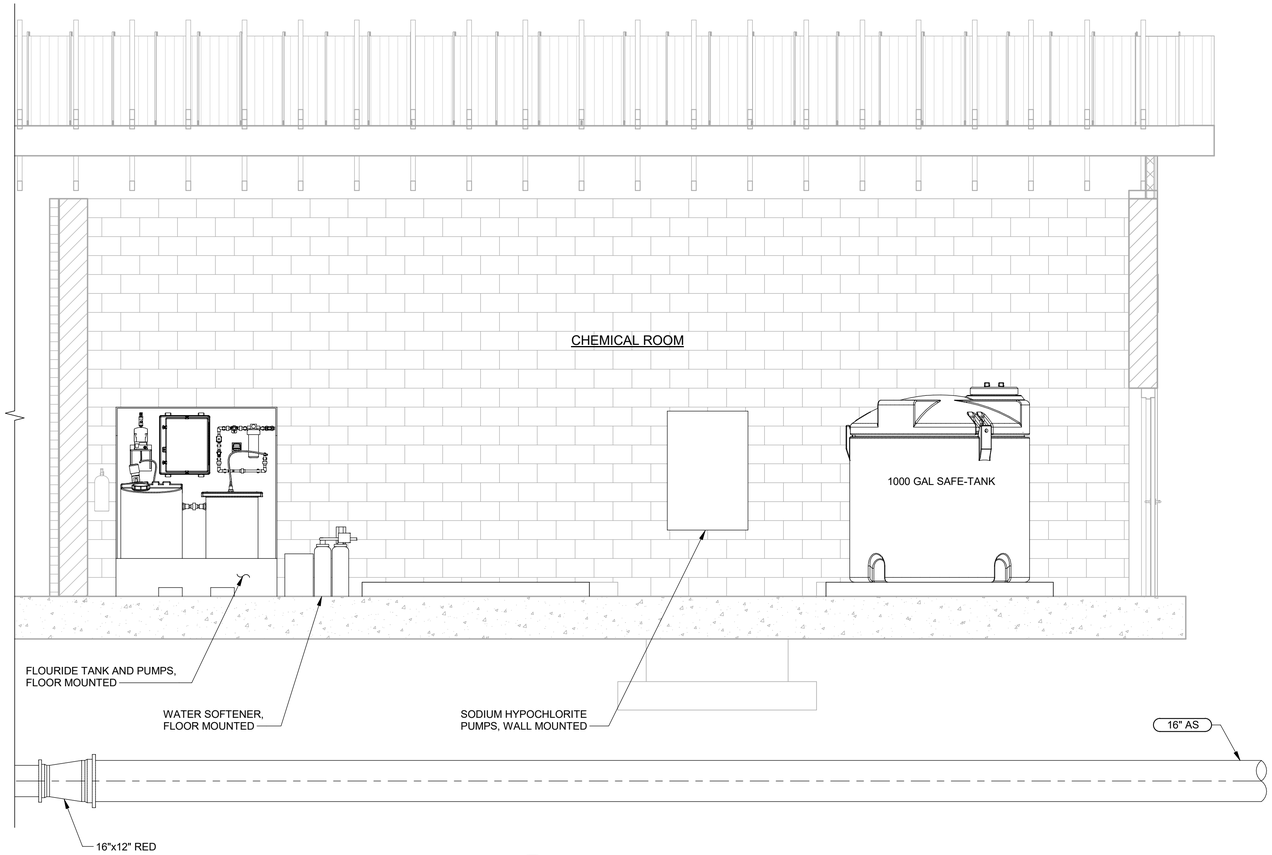

D SECTION

18M01

SCALE: 3/8" = 1'-0"

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REGISTERED PROFESSIONAL ENGINEER
MICHAEL E. DUCKER
No. 63626
CIVIL
STATE OF CALIFORNIA

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CITY OF ROSEVILLE CALIFORNIA

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AQUIFER STORAGE AND RECOVERY WELLS PROJECT

MECHANICAL

SOLAIRE ASR WELL
SECTION AND DETAILS 2

VERIFY SCALES
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DRAWING NO. 18M03
SHEET NO. OF XX

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WATER HEATER SCHEDULE									
EQUIPMENT TAG	**AREA SERVED**	**FLOW CAPACITY (GPM)**	**TEMP. RISE (°F)**	**ELEMENT (kW)**	**MCA (Amps)**	**VOLTAGE**	**PHASE**	**BASIS OF DESIGN**	**NOTES**
WD05-HXGR-35401	RESTROOM	.3	56	4.1	20	208	1	EEMAX EX4208T	-
WD37-HXGR-35401	CHEMICAL ROOM	23	21	72	87	480	3	HAWS 9327	1

NOTES:

1 PROVIDE NEMA TYPE 4X CONTROL PANEL.

PLUMBING ROUGH IN SCHEDULE					
TAG NO.	PW (IN.)	HW (IN.)	D/SS (IN.)	VENT (IN.)	FIXTURE DESCRIPTION
WC	1-1/4"	N/A	4"	2"	WATER CLOSET (ADA ACCESSIBLE)
LAV	1/2"	1/2"	1-1/4"	1-1/2"	LAVATORY (ADA ACCESSIBLE)
ALP	1-1/4"	N/A	N/A	N/A	TANKLESS WATER HEATER (HB&ESEW)
TWH	3/4"	N/A	N/A	N/A	TANKLESS WATER HEATER (SINK)

WATER HAMMER ARRESTOR SCHEDULE		
SMITH MODEL *	PDI SYMBOL **	FIXTURE UNIT RATING
5005	A	1-11
5010	B	12-32
5020	C	33-60
5030	D	61-113
5040	E	114-154
5050	F	155-330

* SMITH OR EQUAL
** PLUMBING DRAINAGE INSTITUTE
"STANDARD PDI WH-201"

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SOLAIRE ASR WELL
PLUMBING SCHEDULES

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JOB NO. 11843A.10
DRAWING NO. 18M04
SHEET NO. OF ~~XX~~

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PlotScale: 1:1
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ColorTable: gshade.ctb
Model: Layout1
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AIR CONDITIONING / HEAT PUMP SCHEDULE

EQUIPMENT TAG	AREA SERVED	AIRFLOW (CFM)	ESP (IN. W.C.)	COOLING DATA				FILTER DATA		ELECTRICAL DATA			BASIS OF DESIGN	NOTES
				OA DB/WB (°F)	EAT DB/WB (°F)	LAT DB/WB (°F)	TOTAL / SENSIBLE CAPACITY (MBH)	EFFICIENCY	THICKNESS (IN.)	VOLTAGE	PHASE	MCA (AMPS)		
WD37-HVAC-35101	ELECTRICAL ROOM	2400	1	102/70	90/67	54/53	101/95	MERV 13	2	460	3	22	TRANE THC120F4	1, 2, 3, 4, 5, 6, 7, 8

NOTES:

1 SIDE SUPPLY DISCHARGE CONNECTION.
2 SIDE RETURN CONNECTION
3 PROVIDE 120 VOLT CONTROL VOLTAGE.
4 THERMOSTAT PROVIDED BY AC UNIT MANUFACTURER.
5 CONTROL SYSTEM SPECIFIED IN SECTION 15936 - INSTRUMENTATION AND CONTROL DEVICES FOR HVAC.
6 INCLUDE SERVICE OPTION WITH SUPPLY-AIR SMOKE DETECTOR TO BE WIRED IN FIELD TO SHUT DOWN UPON DETECTION OF SMOKE.
7 GRADE MOUNTED SINGLE PACKAGE UNIT.
8 PROVIDE WITH DRY BULB ECONOMIZER.

FAN SCHEDULE

EQUIPMENT TAG	AREA SERVED	FAN TYPE	AIR FLOW (CFM)	ESP (IN. W.C.)	FAN RPM	NOISE (SONES)	MOTOR				DRIVE TYPE	BASIS OF DESIGN	NOTES
							HP	RPM	V/PH/HZ	ENCLOSURE			
WD05-FANx-35303	RESTROOM	TYPE 5	140	0.7	1050	4.5	0.128	1050	115/60/1	ODP	DIRECT	GREENHECK SP-B150	5
WD37-FANX-35301	PUMP ROOM	TYPE 4	701	0.35	1160	12.2	1/4	1160	460/60/3	TEFC	DIRECT	GREENHECK AER-E20C-603-B3	1, 2, 3, 4, 7
WD37-FANX-35302	CHEMICAL ROOM	TYPE 4	701	0.35	1160	12.2	1/4	1160	460/60/3	TEFC	DIRECT	GREENHECK AER-E20C-603-B3	1, 2, 3, 6, 7

NOTES:

1 PROVIDE BIRD SCREEN.
2 PROVIDE BACKDRAFT DAMPER BDD-3, COUNTERBALANCED FOR MINIMUM PRESSURE LOSS.
3 PROVIDE DISCONNECT SWITCH AT FAN, NEMA TYPE 4X.
4 PROVIDE THERMOSTAT AS SPECIFIED IN SECTION 15936.
5 FAN SHALL BE INTERLOCKED WITH LIGHT SWITCH.
6 PROVIDE HI-PRO POLYESTER COATING.
7 PROVIDE ACOUSTICAL LOUVER L-3 AS SPECIFIED IN SECTION 10910.

ELECTRIC UNIT HEATER SCHEDULE

EQUIPMENT TAG	AREA SERVED	HEATING CAPACITY (kW)	AIRFLOW (CFM)	MCA (Amps)	VOLTAGE	PHASE	BASIS OF DESIGN	NOTES
WD37-HEAT-35201	PUMP ROOM	3	700	5	480	3	TRAID 234-U11N-0030U	1, 2, 3, 4
WD37-HEAT-35202	PUMP ROOM	3	700	5	480	3	TRAID 234-U11N-0030U	1, 2, 3, 4
WD37-HEAT-35203	CHEMICAL ROOM	5	700	8	480	3	TRAID 234-U11N-0050U	1, 2, 3, 4
WD37-HEAT-35204	ELECTRICAL ROOM	3	700	5	480	3	TRAID 234-U11N-0030U	1, 2, 3, 4

NOTES:

1 THERMOSTAT PROVIDED BY HEATER MANUFACTURER.
2 WALL MOUNTED.
3 120-VOLT CONTROL VOLTAGE.
4 SIDE AIR DISCHARGE.

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AQUIFER STORAGE AND RECOVERY WELLS PROJECT
MECHANICAL
SOLAIRE ASR WELL
HVAC SCHEDULES

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0 1"
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JOB NO. 11843A.10
DRAWING NO. 18M07
SHEET NO.
OF XX

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ColorTable: gshade.ctb
Model: Layout1
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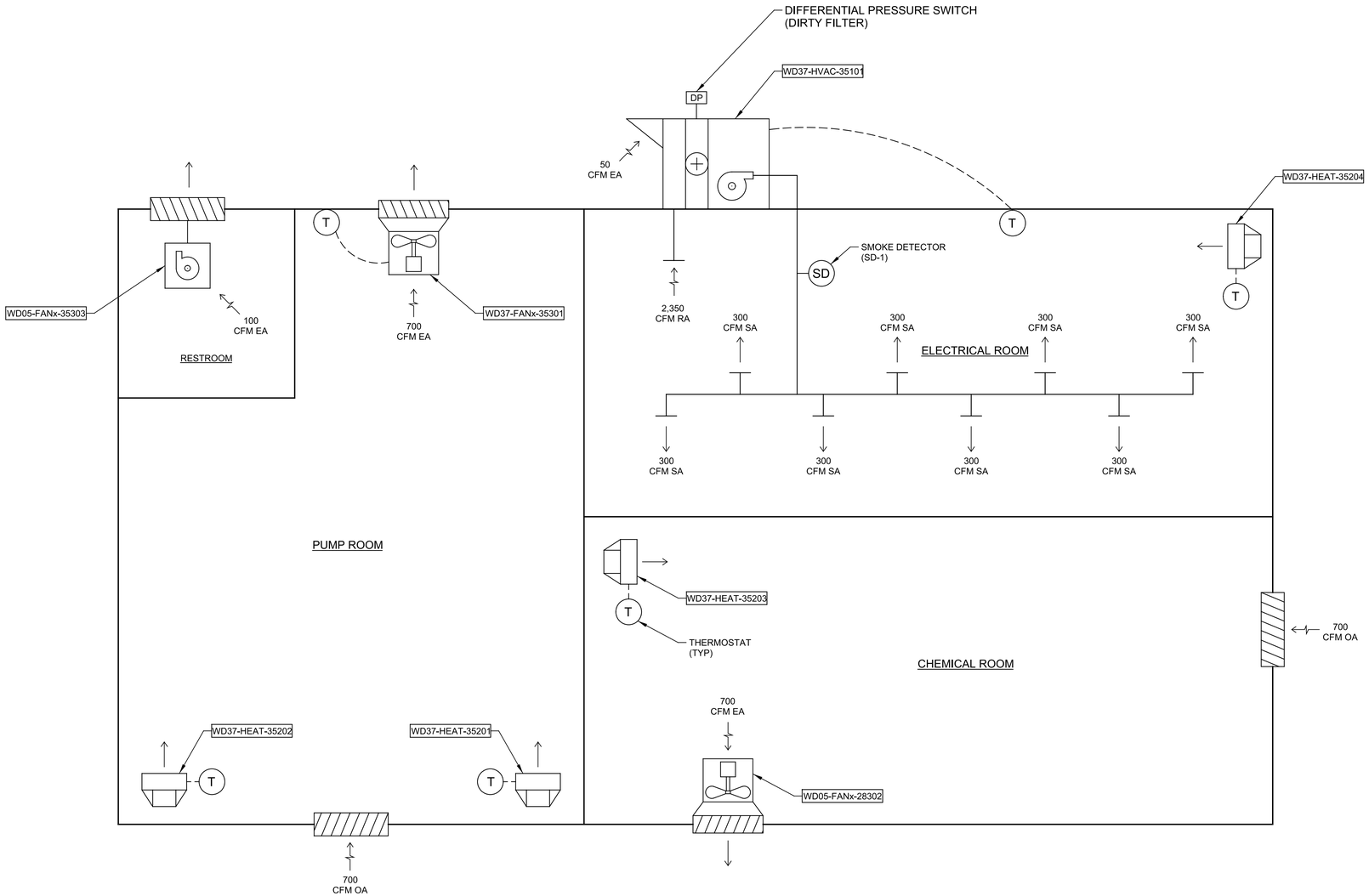

REV	DATE	BY	DESCRIPTION
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DESIGNED WS
DRAWN OB
CHECKED CG
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER
CRAIG GREEN
No. 37915
MECHANICAL
STATE OF CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
HVAC
SOLAIRE ASR WELL
HVAC AIRFLOW SCHEMATIC

VERIFY SCALES
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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 18M09
SHEET NO. OF 9X

ELECTRICAL PLAN SYMBOLS

IDENTIFICATION SYMBOLS

EQUIP # — EQUIPMENT AND INSTRUMENT IDENTIFICATION

EQUIPMENT/INSTRUMENT LOCATOR

LUMINAIRE IDENTIFICATION
a = CIRCUIT DESIGNATION
b = DEVICE SWITCHED FROM
c = MOUNTING HEIGHT IN FEET TO BOTTOM OF FIXTURE
X = LUMINAIRE TYPE, REFER TO THE LUMINAIRE SCHEDULE

XXXX — CONDUIT IDENTIFICATION
XXXX = CONDUIT NUMBER,
REFER TO CONDUIT SCHEDULE
UNLESS OTHERWISE NOTED, GROUPED CONDUITS ARE LABELED LEFT TO RIGHT OR TOP TO BOTTOM.

INDICATES KEYNOTE X
(PERTAINS ONLY TO SHEET WHERE NOTE IS FOUND)

DISCONNECT SWITCH
A = TYPE, REFER TO DISCONNECT SCHEDULE

LUMINAIRES

LINEAR FIXTURE

2' X 2' LAY-IN TROFFER

2' X 4' LAY-IN TROFFER

LUMINAIRE POLE MOUNTED

GO/NO-GO PANEL - STROBE AND HORN
R = RED LIGHT
G = GREEN LIGHT
H = HORN

GO/NO-GO PANEL - SOLID

GO/NO-GO PANEL - STROBE

LUMINAIRE, EMERGENCY BATTERY-POWERED

LUMINAIRE, EMERGENCY/EXIT BATTERY-POWERED

LUMINAIRE, EMERGENCY BATTERY-POWERED REMOTE

LUMINAIRE, SURFACE OR PENDANT MOUNTED

LUMINAIRE, WALL MOUNTED

LUMINAIRE, FLOOD/SPOT

LUMINAIRE, EXIT ONE OR TWO FACES AS INDICATED. ARROW POINTS IN DIRECTION OF EGRESS.

SWITCHES/RECEPTACLES

SINGLE POLE SWITCH
a = CIRCUIT DESIGNATION
b = DEVICE SWITCHED DESIGNATION
c = TYPE
2 = DOUBLE POLE SWITCH
3 = THREE-WAY SWITCH
3P = THREE POSITION SWITCH
4 = FOUR-WAY SWITCH
K = KEY OPERATED SWITCH
F = SWITCH AND FUSESTAT HOLDER
P = SWITCH AND PILOT LIGHT
T = THERMOSTAT
D = DIMMER SWITCH
L = LOW VOLTAGE LIGHT SWITCH
M = MANUAL MOTOR STARTER
N = NETWORKED SINGLE OR MULTIPLE SWITCH LOCATIONS

REFER TO ABBREVIATIONS LEGEND FOR ALL OTHER DESIGNATIONS.

OCCUPANCY SENSOR
X = REFERENCE LIGHTING CONTROL COMPONENT SCHEDULE
a = CIRCUIT DESIGNATION
b = DEVICE SWITCHED DESIGNATION
c = MOUNTING HEIGHT IN FEET TO BOTTOM OF SENSOR

PE — PHOTOCELL

SWITCH AND SINGLE RECEPTACLE
a = CIRCUIT DESIGNATION
b = DEVICE TYPE DESIGNATION

DUPLEX RECEPTACLE

QUADRUPLEX RECEPTACLE

IN FLOOR DUPLEX RECEPTACLE

IN FLOOR QUADRUPLEX RECEPTACLE

DUPLEX RECEPTACLE w/SPLIT WIRE

APPLIANCE RECEPTACLE

SPECIAL PURPOSE RECEPTACLE

WELDING RECEPTACLE
a = CIRCUIT DESIGNATION
b = DISCONNECT TYPE

TWIST LOCK RECEPTACLE
a = AMP RATING

TELEPHONE OUTLET
a = CIRCUIT DESIGNATION
b = MOUNTING HEIGHT

DATA COMMUNICATIONS OUTLET
a = CIRCUIT DESIGNATION
b = MOUNTING HEIGHT

FIRE ALARM

SMOKE DETECTOR
a = TYPE
I = IONIZATION
P = PHOTOELECTRIC
d = DUCT DETECTOR

FACP — FIRE ALARM CONTROL PANEL

F — FIRE ALARM PULL STATION

FIRE ALARM HORN/STROBE COMBINATION

FIRE ALARM STROBE

FIRE SPRINKLER
F = FLOW SWITCH
T = TAMPER SWITCH

RACEWAY

EXPOSED CONDUIT

BREAK AND CONTINUATION IN CONDUIT RUN

EXPOSED CONDUIT HIDDEN BEHIND WALLS, FLOORS OR OTHER STRUCTURES

UNDERGROUND CONDUIT, DIRECT BURIED OR IN DUCT BANK

CONDUIT IN SLAB

CONDUIT VERTICAL CHANGE IN DIRECTION

CONDUIT CAP

J — JUNCTION BOX

CONDUIT SEAL

CONDUIT TEE

DUCT BANK
APPROXIMATE DIMENSIONS SHOWN ON DUCT BANK SECTIONS

CONDUIT SIZE AND CONDUCTORS

INDIVIDUAL CONDUCTORS

W"C-(3-X (Ø), 1-Y (N) & 1-Z (G))

W"C (WHERE INDICATED): W = CONDUIT TRADE SIZE

3-X (Ø):
3 = QUANTITY
X = SIZE OF CONDUCTORS
(Ø) = DESIGNATES PHASE CONDUCTORS

1-Y (N)(WHERE INDICATED):
1 = QUANTITY
Y = SIZE OF CONDUCTORS
(N) = DESIGNATES NEUTRAL CONDUCTORS

1-Z (G)(WHERE INDICATED):
1 = QUANTITY
Z = SIZE OF CONDUCTORS
(G) = DESIGNATES GROUND CONDUCTORS

U{3-X (Ø) & 1-X (G)}
U = NUMBER OF PARALLEL RUNS

MULTI CONDUCTOR CABLES

K/2/C#16S
K (WHERE INDICATED) = NUMBER OF PAIRS
2/C#16S = TWO CONDUCTOR, 16 GAUGE, TWISTED SHIELDED PAIR

K/3/C#16S
K (WHERE INDICATED) = NUMBER OF TRIPLETS
3/C#16S = THREE CONDUCTOR, 16 GAUGE, TWISTED SHIELDED TRIPLETS

N/CX
N = NUMBER OF CONDUCTORS IN THE CABLE
X = SIZE OF CONDUCTORS

FIBER OPTIC CABLES

FO/N
N = NUMBER OF INDIVIDUAL FIBERS

GROUNDING

UNDERGROUND GROUND CABLE
#4/0 SDBC UNLESS OTHERWISE NOTED

GROUND ROD

GROUND ROD AND GROUND WELL

ELECTRICAL ONE-LINE SYMBOLS

MEDIUM VOLTAGE

52 — CIRCUIT BREAKER, MEDIUM VOLTAGE
a = CIRCUIT BREAKER NUMBER
b = FRAME SIZE

ANSI RELAY DEVICE
a = ANSI DEVICE FUNCTION
b = QUANTITY

MEDIUM VOLTAGE DISCONNECT SWITCH NON-FUSED CUT OUT

MEDIUM VOLTAGE DISCONNECTING FUSE SINGLE FUSE CUT OUT

MEDIUM VOLTAGE DISCONNECTING FUSE DOUBLE FUSE CUT OUT

MEDIUM VOLTAGE SINGLE FUSE

MEDIUM VOLTAGE DOUBLE FUSE

MEDIUM VOLTAGE LIVE FRONT TERMINATOR

MEDIUM VOLTAGE ELBOW

MEDIUM VOLTAGE TEE

MEDIUM VOLTAGE CONTACTOR

MEDIUM VOLTAGE STARTER

MOV-ELBOW ARRESTER

LOW VOLTAGE

LOW VOLTAGE CIRCUIT BREAKER
a = TYPE
MCP = MOTOR CIRCUIT PROTECTOR
TM = THERMAL MAGNETIC
SS = SOLID STATE
b = FRAME SIZE (MANUFACTURER TO DETERMINE FRAME SIZE UNLESS INDICATED)
c = NUMBER OF POLES
d = TRIP SETTING (AT = AMP TRIP) (AC = MCP CONTINUOUS RATING)
e = DESIGNATION
f = INTERRUPTING RATING

LOW VOLTAGE CIRCUIT BREAKER AUXILIARY OPERATOR
* = S = SHUNT TRIP
= G = GROUND FAULT INTERRUPTER
= V = SOLENOID KEY RELEASE

DISCONNECT SWITCH
A = TYPE, REFER TO DISCONNECT SCHEDULE

FUSED DISCONNECT SWITCH
B = TYPE, REFER TO DISCONNECT SCHEDULE
b = FUSE RATING

FUSE

COMBINATION STARTER WITH CONTROL POWER TRANSFORMER
a = CIRCUIT BREAKER DISCONNECT, TYPE AS NOTED
b = STARTER TYPE REFER TO THE SPECIFICATIONS FOR STARTER DEFINITIONS.
c = NEMA STARTER SIZE
d = OVERLOAD

MOTOR STARTER/DRIVES:
a = DEVICE TYPE
VFD-6 = 6-PULSE VFD
VFD-18 = 18-PULSE VFD
RVSS = REDUCED VOLTAGE SOLID STATE STARTER
RVAT = REDUCED VOLTAGE AUTO TRANSFORMER
a/B = DEVICE WITH BYPASS STARTER. REFER TO THE SPECIFICATIONS

b = INPUT OPTIONS
LL = LINE REACTOR
PHF = PASSIVE HARMONIC FILTER

c = OUTPUT OPTIONS
LR = LOAD REACTOR
DV/DT = Dv/dt FILTER
SWF = SINE WAVE FILTER

EQUIPMENT ENCLOSURE

MISCELLANEOUS

HP — MOTOR
HP = HORSEPOWER RATING
FULL LOAD AMPS AS NOTED

PACKAGED EQUIPMENT
LOAD RATING AS INDICATED
a = RATED LOAD
b = UNIT(HP, KW, KVA) AS INDICATED

TRANSFORMER
a = DEVICE I.D.
b = KVA RATING
c = NUMBER OF PHASES
d = PRIMARY VOLTAGE
e = SECONDARY VOLTAGE
f,g = CONNECTION TYPE SYMBOL
h = IMPEDANCE

GROUNDED WYE CONNECTION

DELTA CONNECTION

G — ENGINE-GENERATOR RATINGS AS INDICATED ON THE DRAWINGS
a = KVA/KW
b = VOLTAGE/CONNECTION
c = PHASE
d = WIRE
e = PF

CURRENT TRANSFORMER WITH SHORTING TERMINAL BLOCK
a = QUANTITY
b = RATIO

POTENTIAL TRANSFORMER
a = QUANTITY
b = RATIO
c,d = CONNECTION TYPE SYMBOL

SSM — SOLID STATE MULTIFUNCTION METER

ATP — AMPERE TEST POINT

VTP — VOLTAGE TEST POINT

UTILITY METER

LIGHTNING ARRESTER

SPD — SURGE PROTECTIVE DEVICE

DRAWOUT CONNECTION

GROUND

CAPACITOR

BATTERY

K — KIRK KEY INTERLOCK

LOAD BANK

REV	DATE	BY	DESCRIPTION
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DESIGNED CAC
DRAWN ASH
CHECKED
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — CHRISTOPHER ALAN CARLANTO — No. 20740 — ELECTRICAL — STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ELECTRICAL
SOLAIRE ASR WELL
ELECTRICAL LEGEND

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JOB NO. 11843A.10
DRAWING NO. GE01
SHEET NO. OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1018GE01.dgn

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ABBREVIATIONS

A	AMP
ABS	ABSOLUTE
AC	ALTERNATING CURRENT
ACK	ACKNOWLEDGE
ACTR	ACTUATOR
AF	AMP FRAME
AFC	AUTOMATIC FREQUENCY CONTROL
AIC	AMP INTERRUPTING CAPACITY
AM	AMMETER
ANN	ANNUNCIATOR
ANT	ANTENNA
APU	AUXILIARY POWER UNIT
ARM	ARMORED CABLE
AS	AMMETER SWITCH
ASYM	ASYMMETRICAL
AT	AMP TRIP
ATO	AUTOMATIC THROW OVER
ATP	AMMETER TEST POINT
ATS	AUTOMATIC TRANSFER SWITCH
AUTO XFMR	AUTOMATIC TRANSFORMER
AUX	AUXILIARY
AWG	AMERICAN WIRE GAGE
B	BELL
BAT	BATTERY
BFG	BELOW FINISHED GRADE
BHP	BRAKE HORSEPOWER
BKR	BREAKER
BRF	BELOW RAISED FLOOR
C	CONDUIT / CONTINUOUS LOAD
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CCW	COUNTER CLOCKWISE
CKT	CIRCUIT
COAX	COAXIAL CABLE
COM	COMMON
COMM	COMMUNICATION
CPT	CONTROL POWER TRANSFORMER
CR	CONTROLLED RECEPTACLE
CS	CONTROL SWITCH
CT	CURRENT TRANSFORMER
CV	CONTROL VALVE
CW	CLOCKWISE / COOL WHITE
DC	DIRECT CURRENT
DCS	DISTRIBUTED CONTROL SYSTEM
DCU - X	DISTRIBUTED CONTROL UNIT NO. X
DEMO	DEMOLITION
DISC	DISCONNECT SWITCH
DM	DEMAND METER
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DS	DOOR SWITCH
E/G	EMERGENCY GENERATOR
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
ENG	ENGINE
ENT	ELECTRICAL NON-METALLIC TUBING
EP	EXPLOSION PROOF
ETM	ELAPSED TIME METER
F	SUB-FED
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FDR	FEEDER
FLA	FULL LOAD AMPS
FLX	FLEXIBLE CONDUIT
FO	FIBER OPTIC
FRC	FIBERGLASS RIGID CONDUIT
FREQ	FREQUENCY
FU	FUSE
FU	SW FUSED SWITCH
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
FWD	FORWARD
G	GROUND / EQUIPMENT GROUND / GROUND FAULT
GEN	GENERATOR
GRC	GALVANIZED STEEL RIGID CONDUIT
GFCI	GROUND FAULT CIRCUIT INTERRUPTER (RECEPTACLE)
GFI	GROUND FAULT INTERRUPTER (BREAKER)
GFR	GROUND FAULT RELAY
H	HOT-LEG
HF	HIGH FREQUENCY
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HR	HOUR
HSTAT	HUMIDISTAT
HV	HIGH VOLTAGE
HVAC	HEATING/VENTILATION/AIR CONDITIONING
HZ	HERTZ
I	INSTANTANEOUS / INTERMITTENT LOAD
IC	INTERRUPTING CAPACITY
IJB	INSTRUMENT JUNCTION BOX
IMC	INTERMEDIATE METAL CONDUIT
INST	INSTANTANEOUS
INT	INTERLOCK
INTERCOM	INTERCOMMUNICATION
J	JUNCTION BOX
K	KEY INTERLOCK
KA	KILOAMP
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KVAR	KILOVAR (REACTANCE)
KW	KILOWATT
KWD	KILOWATT DEMAND
KWH	KILOWATT HOUR
L	LONG-TIME
L-B	LINE-BUS
L-G	LINE-GROUND
LA	LIGHTNING ARRESTOR
LBL	LABEL
LC	LIGHTING CONTACT OR
LCP- X	LOCAL CONTROL PANEL NO. X
LL	LEAD-LAG LOAD REACTOR
LP	LIGHT POLE
LP - X	LIGHTING PANEL NO. X
LTG	LIGHTING
LV	LOW VOLTAGE
LVL	LEVEL
M-X	MOTOR CONTROLLER NO. X
MA	MILLIAMPERE
MCA	MOTOR CIRCUIT AMPS
MCC - X	MOTOR CONTROL CENTER NO. X
MCP	MOTOR CIRCUIT PROTECTOR
MH	MANHOLE / MOUNTING HEIGHT
MLO	MAIN LUGS ONLY
MOD	MOTOR OPERATED DAMPER
MOV	METAL OXIDE VARISTOR
MPR	MOTOR PROTECTION RELAY
MS-X	MOTOR STARTER NO. X
MSP	MOTOR STARTING PANEL
MTO	MANUAL THROW OVER
MTR-X	MOTOR NO. X
MTS	MANUAL TRANSFER SWITCH
MV	MEGAVOLT
MVA	MEGAVOLT-AMPERES
MVS	MEDIUM VOLTAGE SWITCH
MW	MEGAWATT
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NFC	NONMETALLIC FLEXIBLE CONDUIT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NP	NAMEPLATE
O	OPEN OR OPENED
OH	OVERHEAD
OL	OVERLOAD RELAY
P	POLE
PA	PUBLIC ADDRESS
PB	PUSHBUTTON / PULL BOX
PCS	PVC COATED GALVANIZED STEEL CONDUIT
PCM	PROCESS CONTROL MODULE
PE	PHOTOCELL
PF	POWER FACTOR
PFCC	POWER FACTOR CORRECTION CAPACITOR
PFR	PHASE FAILURE RELAY
PH	PHASE
PNL	PANEL
PPX	POWER PANEL NO. X
PRI	PRIMARY
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE RIGID PLASTIC CONDUIT
PWR	POWER
RAC	RIGID ALUMINUM CONDUIT
RECPT	RECEPTACLE
REV	REVERSE
RF	RADIO FREQUENCY
RMS	ROOT MEAN SQUARED
RVAT	REDUCED VOLTAGE AUTO TRANSFORMER
RVNR	REDUCED VOLTAGE NON-REVERSING
RVSS	REDUCED VOLTAGE SOLID STATE
S	SHIELD / SHORT-TIME
SA	SURGE ARRESTER
SC	SHORT CIRCUIT
SDBC	SOFT DRAWN BARE COPPER
SFL	SUB FEED LUGS
SLT	SEALTIGHT LIQUIDTIGHT FLEXIBLE CONDUIT
SM	SURFACE MOUNTED
SP	SINGLE POLE
SPD	SURGE PROTECTIVE DEVICE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SPKR	SPEAKER
SS	SOLID STATE
STB	SHORTING TERMINAL BLOCK
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SYM	SYMMETRICAL
TACH	TACHOMETER
TB - X	TERMINAL BLOCK - UNIT X
TC	THERMOCOUPLE / TIME CLOCK / TRAY CABLE
TD	TEMPERATURE DETECTOR RELAY
TE	TOTALLY ENCLOSED
TEFC	TOTALLY ENCLOSED FAN COOLED
TENV	TOTALLY ENCLOSED NON-VENTILATED
TERM	TERMINAL
TJB	TERMINAL JUNCTION BOX
TM	THERMAL MAGNETIC
TP	TWISTED PAIR
TS	TEMPERATURE SWITCH
TS1W	TWO SPEED CONSEQUENT POLE, ONE WINDING
TS2W	TWO SPEED SEPARATE WINDING
TSTAT	THERMOSTAT
UHF	ULTRA HIGH FREQUENCY
UNG	UNGROUNDED
UPS	UNINTERRUPTIBLE POWER SUPPLY
UVR	UNDER VOLTAGE RELAY
V	VOLT
VA	VOLT AMPERE
VAR	VARMETER
VCP	VENDOR CONTROL PANEL
VFD	VARIABLE FREQUENCY DRIVE
VHF	VERY HIGH FREQUENCY
VM	VOLTMETER
VP	VAPORPROOF
VR	VOLTAGE REGULATOR
VS	VOLTAGE SWITCH
VT	VOLTAGE TRANSFORMER
VTP	VOLTAGE TEST POINT
W	WATT / WEST
WT	WATER TIGHT
WP	WEATHER PROOF
XFMR	TRANSFORMER

NOTES:

1. REFER TO SPECIFICATIONS AND OTHER DRAWINGS FOR ADDITIONAL ABBREVIATIONS.

POWER DEVICE FUNCTION NUMBERS

1	MASTER ELEMENT
2	TIME-DELAY STARTING OR CLOSING RELAY
3	CHECKING OR INTERLOCKING RELAY
4	MASTER CONTACTOR
5	STOPPING DEVICE
6	STARTING CIRCUIT BREAKER
7	ANODE CIRCUIT BREAKER
8	CONTROL POWER DISCONNECTING DEVICE
9	REVERSING DEVICE
10	UNIT SEQUENCE SWITCH
11	MULTIFUNCTION DEVICE
12	OVER-SPEED DEVICE
13	SYNCHRONOUS-SPEED DEVICE
14	UNDER-SPEED DEVICE
15	SPEED OR FREQUENCY MATCHING DEVICE
16	DATA COMMUNICATIONS DEVICE
17	SHUNTING OR DISCHARGE SWITCH
18	ACCELERATING OR DECELERATING DEVICE
19	STARTING-TO-RUNNING TRANSITION CONTACTOR
20	ELECTRICALLY OPERATED VALVE
21	DISTANCE RELAY
22	EQUALIZER CIRCUIT BREAKER
23	TEMPERATURE CONTROL DEVICE
24	VOLTS PER HERTZ RELAY
25	SYNCHRONIZING OR SYNCHRONISM-CHECK DEVICE
26	APPARATUS THERMAL DEVICE
27	UNDERVOLTAGE RELAY
27N	GROUND FAULT UNDERVOLTAGE RELAY
28	FLAME DETECTOR
29	ISOLATING CONTACTOR
30	ANNUNCIATOR RELAY
31	SEPARATE EXCITATION DEVICE
32	DIRECTIONAL POWER RELAY
33	POSITION SWITCH
34	MASTER SEQUENCE DEVICE
35	BRUSH-OPERATING OR SLIP-RING SHORT-CIRCUITING DEVICE
36	POLARITY DEVICE
37	UNDERCURRENT OR UNDERPOWER RELAY
38	BEARING PROTECTIVE DEVICE
39	MECHANICAL CONDITION MONITOR
40	FIELD RELAY
41	FIELD CIRCUIT BREAKER
42	RUNNING CIRCUIT BREAKER
43	MANUAL TRANSFER OR SELECTOR DEVICE
44	UNIT SEQUENCE STARTING RELAY
45	ABNORMAL ATMOSPHERIC CONDITION MONITOR
46	REVERSE-PHASE OR BALANCE CURRENT RELAY
47	PHASE-BALANCE OR PHASE-SEQUENCE VOLTAGE RELAY
48	INCOMPLETE SEQUENCE RELAY
49	MACHINE OR TRANSFORMER THERMAL RELAY
50	INSTANTANEOUS OVERCURRENT RELAY
51	AC TIME OVERCURRENT RELAY
52	AC CIRCUIT BREAKER
53	FIELD EXCITATION RELAY
54	TURNING GEAR ENGAGING DEVICE
55	POWER FACTOR RELAY
56	FIELD APPLICATION RELAY
57	SHORT-CIRCUITING OR GROUNDING DEVICE
58	RECTIFICATION FAILURE RELAY
59	OVERVOLTAGE RELAY
60	VOLTAGE OR CURRENT BALANCE RELAY
61	DENSITY SWITCH OR SENSOR
62	TIME-DELAY STOPPING OR OPENING RELAY
63	PRESSURE SWITCH
64	GROUND DETECTOR RELAY
65	GOVERNOR
66	NOTCHING OR JOGGING DEVICE
67	AC DIRECTIONAL OVERCURRENT RELAY
68	BLOCKING OR OUT OF STEP RELAY
69	PERMISSIVE CONTROL DEVICE
70	RHEOSTAT
71	LIQUID LEVEL SWITCH
72	DC CIRCUIT BREAKER
73	LOAD-RESISTOR CONTACTOR
74	ALARM RELAY
75	POSITION CHANGING MECHANISM
76	DC OVERCURRENT RELAY
77	TELEMETERING DEVICE
78	PHASE-ANGLE MEASURING RELAY
79	AC RECLOSING RELAY
80	FLOW SWITCH
81	FREQUENCY RELAY
82	DC LOAD MEASURING RECLOSING RELAY
83	AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY
84	OPERATING MECHANISM
85	PILOT COMMUNICATIONS, CARRIER OR PILOT-WIRE RELAY
86	LOCKOUT RELAY
87	DIFFERENTIAL PROTECTIVE RELAY
88	AUXILIARY MOTOR OR MOTOR GENERATOR
89	LINE SWITCH
90	REGULATING DEVICE
91	VOLTAGE DIRECTIONAL RELAY
92	VOLTAGE AND POWER DIRECTIONAL RELAY
93	FIELD-CHANGING CONTACTOR
94	TRIPPING OR TRIP-FREE RELAY

COMMONLY USED SUFFIX LETTERS APPLIED TO POWER DEVICE FUNCTION NUMBERS

A	ALARM ONLY
B	BUS PROTECTION
G	GROUND FAULT PROTECTION (RELAY CT IN A SYSTEM NEUTRAL CIRCUIT OR GENERATOR PROTECTION)
GS	GROUND FAULT PROTECTION (RELAY CT IN TOROIDAL OR GROUND SENSOR TYPE)
L	LINE PROTECTION
M	MOTOR PROTECTION
N	GROUND FAULT PROTECTION (RELAY COIL CONNECTED IN RESIDUAL CT CIRCUIT)
T	TRANSFORMER PROTECTION
V	VOLTAGE
P	PHASE PROTECTION

ABBREVIATIONS

AFD	- ARC FLASH DETECTOR
CLK	- CLOCK OR TIMING SOURCE
DDR	- DYNAMIC DISTURBANCE RECORDER
DFR	- DIGITAL FAULT RECORDER
ENV	- ENVIRONMENTAL DATA
HIZ	- HIGH IMPEDANCE FAULT DETECTOR
HMI	- HUMAN MACHINE INTERFACE
HST	- HISTORIAN
LGC	- SCHEME LOGIC
MET	- SUBSTATION METERING
PDC	- PHASOR DATA CONCENTRATOR
PMU	- PHASOR MEASUREMENT UNIT
PQM	- POWER QUALITY MONITOR
RIO	- REMOTE I/O DEVICE
RTU	- REMOTE TELEMETRY UNIT/REMOTE TERMINAL UNIT
SER	- SEQUENCE OF EVENTS RECORDER
TCM	- TRIP CIRCUIT MONITOR

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED CAC
DRAWN ASH
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REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER ALAN CRAWFORD No. 20740 ELECTRICAL STATE OF CALIFORNIA

carollo®

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ELECTRICAL
SOLAIRE ASR WELL
ELECTRICAL ABBREVIATIONS

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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. GE02
SHEET NO. OF XX

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PROCESS SWITCHES

- FLOAT SWITCH — CLOSE ON RISING LEVEL
- FLOAT SWITCH — OPEN ON RISING LEVEL
- PRESSURE SWITCH — CLOSE ON RISING PRESSURE
- PRESSURE SWITCH — OPEN ON RISING PRESSURE
- TEMPERATURE SWITCH — CLOSE ON RISING TEMPERATURE
- TEMPERATURE SWITCH — OPEN ON RISING TEMPERATURE
- FLOW SWITCH — CLOSE ON INCREASE IN FLOW
- FLOW SWITCH — OPEN ON INCREASE IN FLOW
- VIBRATION SWITCH — OPEN ON RISING VIBRATION
- VIBRATION SWITCH — CLOSE ON RISING VIBRATION
- TORQUE SWITCH — OPEN ON HIGH TORQUE
- TORQUE SWITCH — CLOSE ON HIGH TORQUE
- NORMALLY CLOSED — LIMIT SWITCH
- NORMALLY CLOSED — HELD OPEN LIMIT SWITCH
- NORMALLY OPEN — LIMIT SWITCH
- NORMALLY OPEN — HELD CLOSED LIMIT SWITCH

HAND SWITCHES

- NORMALLY OPEN — MOMENTARY PUSHBUTTON
- NORMALLY CLOSED — MOMENTARY PUSHBUTTON
- THREE POSITION SELECTOR SWITCH (xoo) — x - DENOTES POSITION CONTACTS CLOSED IN
- TWO POSITION SELECTOR SWITCH (xo) — x - DENOTES POSITION CONTACTS CLOSED IN
- MUSHROOM HEAD PUSHBUTTON
- PUSH-PULL PUSHBUTTON — MAINTAINED CONTACT
- PADLOCK SWITCH (xox) — x - DENOTES POSITION CONTACTS CLOSED IN
- PULL CORD SWITCH
- STOP-LOCKOUT PUSHBUTTON
- SPRING-RETURN (xoo) — x - DENOTES POSITION CONTACTS CLOSED IN

INDICATORS

- PILOT LIGHT — a = LENS COLOR: R = RED, G = GREEN, W = WHITE, A = AMBER, B = BLUE, Y = YELLOW, C = CLEAR
- BEACON — a = LENS COLOR: R = RED, G = GREEN, W = WHITE, A = AMBER, B = BLUE, M = MAGENTA, C = CLEAR
- HORN

RELAYS

- RELAY COIL (a, b, c, d) — a = TYPE: CR - CONTROL RELAY; TD - TIME DELAY RELAY; M - MOTOR STARTER COIL; L - MOTOR STARTER COIL - LOW SPEED; H - MOTOR STARTER COIL - HIGH SPEED; F - MOTOR STARTER COIL - FORWARD; R - MOTOR STARTER COIL - REVERSE. b = TDON - TIME DELAY ON ENERGIZATION; TDOFF - TIME DELAY ON DEENERGIZATION. c = TIMING RANGE/SETTING. d = DESCRIPTION
- NORMALLY OPEN — CONTROL CONTACT
- NORMALLY CLOSED — CONTROL CONTACT
- NOTC — TIME DELAY CONTACT, NORMALLY OPEN, TIMED CLOSING
- NCTO — TIME DELAY CONTACT, NORMALLY CLOSED, TIMED OPENING
- NOTO — TIME DELAY CONTACT, NORMALLY OPEN, TIMED OPENING
- NCTC — TIME DELAY CONTACT, NORMALLY CLOSED, TIMED CLOSING

TERMINAL BLOCKS

- TERMINAL — IN PLC/PCM PANEL
- TERMINAL — IN MOTOR CONTROL CENTER
- TERMINAL — IN LOCAL STARTER CONTROL PANEL
- TERMINAL — AT FIELD DEVICE
- TERMINAL — IN RTU
- TERMINAL — IN FIELD PANEL
- TERMINAL — IN (USER CHOICE)
- DIGITAL BUS CONNECTOR — * = D - DEVICENET; * = PA - PROFIBUS PA; * = DP - PROFIBUS DP; * = H1 - FOUNDATION FIELDBUS H1; * = H2 - FOUNDATION FIELDBUS H2; * = E - ETHERNET

I/O

- PLC DISCRETE (a) — a = INPUT OR OUTPUT AS INDICATED
- PLC ANALOG (ANALOG / a) — a = INPUT OR OUTPUT AS INDICATED
- DIGITAL BUS (DIGITAL / BUS)

MISC

- SOLENOID
- METER UNIT (M) — M = TYPE
- MOTOR (HP)
- CIRCUIT BREAKER
- DISCONNECT
- FUSE
- TRANSIENT SURGE PROTECTION
- MOTOR WINDING HEATER (MWH-*) — * - MOTOR TAG I.D.
- SPACE HEATER
- VARISTOR
- CAPACITOR
- RESISTOR
- BATTERY
- DIODE
- MOTOR OVERLOAD HEATERS
- OVERLOAD CONTACT
- DRAWOUT CONNECTION
- GROUND
- LIGHTNING ARRESTOR
- CONTROL POWER TRANSFORMER (H1, H3, H2, H4, X1, X2)
- ELAPSED TIME METER (KI-* / ETM)

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED CAC
DRAWN ASH
CHECKED
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — CHRISTOPHER ALAN CARLSTED — No. 20740 — ELECTRICAL — STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ELECTRICAL
SOLAIRE ASR WELL
SCHEMATICS SYMBOLS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 — 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. GE03
SHEET NO.
OF XX

Plot Date: 12-OCT-2021 4:18:35 PM
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ColorTable: gshade.ctb
Model: Layout1
LAST SAVED BY: tmorabito

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1018GE03.dgn

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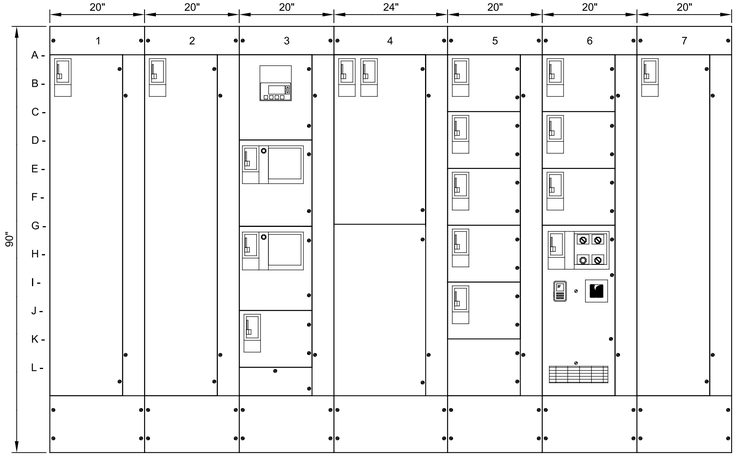
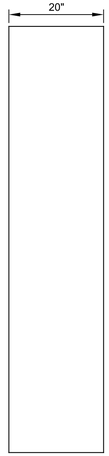


FRONT VIEW

SCALE: 3/4"=1'-0"
FILE: 11843A1003E601



SIDE VIEW

SCALE: 3/4"=1'-0"
FILE: 11843A1003E601

GENERAL NOTES:

1. XXXX
2. XXXX

KEY NOTES:

(#) XXXX

1A- WD31-BKRX-35105 MAIN BREAKER

2A- GENERATOR CONNECTION

3A- WD31-SPDX-35106 SPD

3D- WD37-FANX-35302 CHEMICAL ROOM EXHAUST FAN

3G- WD37-FANX-35301 PUMP ROOM EXHAUST FAN

3J- WD34-MOVX-35160 AQUIFER FLUSH VALVE

3L- SPACE

4A- WD31-XFMR-35107 WD31-LPXX-35108 SOLAIRE LIGHTING PANEL

5A- WD37-HEAT-35203 CHEMICAL ROOM UNIT HEATER

5C- WD37-HVAC-35101 ELECTRICAL ROOM AC UNIT

5E- WD37-HEAT-35201 PUMP ROOM HEATER NO. 1

5G- WD37-HEAT-35202 PUMP ROOM HEATER NO. 2

5I- WD34-MOVX-35130 PUMP COLUMN RECHARGE VALVE

5K- WD34-MOVX-35120 WELL ANNULUS RECHARGE VALVE

6A- WD34-MOVX-35140 RECOVERY VALVE

6C- SPARE

6E- SPARE

6G- WD33-PUMP-35410 SAMPLE PUMP

7A- WD37-PUMP-35101 ASR PUMP

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

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DRAWN ASH
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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER ALAN CARLSON No. 20740 ELECTRICAL STATE OF CALIFORNIA

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CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ELECTRICAL
SOLAIRE ASR WELL
WD31-MCCX-35100 ELEVATION

VERIFY SCALES
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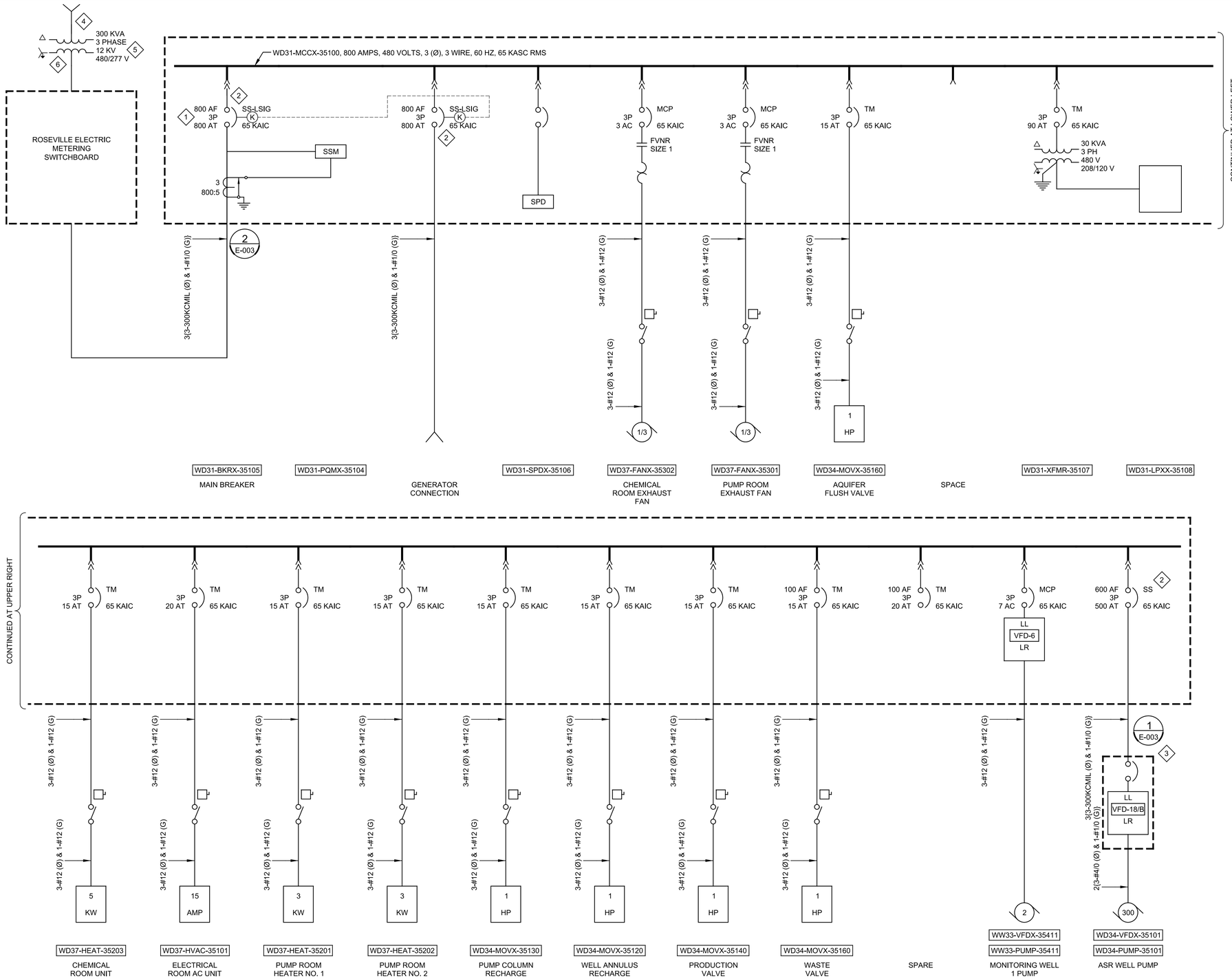
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 18E01
SHEET NO.
OF XX



GENERAL NOTES:

1. ALL WORK ON THE INCOMING SERVICE SHALL CONFORM TO ROSEVILLE ELECTRIC STANDARDS.

KEY NOTES:

1. PROVIDE THE MAIN BREAKER WITH A MOTOR OPERATOR ALLOWING FOR REMOTE OPEN, CLOSE AND RESET.
2. THE SOLID STATE CIRCUIT BREAKER TRIP UNITS SHALL INCLUDE MAINTENANCE MODE SETTINGS.
3. 18-PULSE VFD WITH FULL VOLTAGE, NON-REVERSING BYPASS STARTER.
4. PROVIDE A 4" DIRECT BURIED PVC CONDUIT FROM THE TRANSFORMER TO THE ROSEVILLE ELECTRIC VAULT AT THE LOCATION SHOWN ON THE ELECTRICAL SITE PLAN. THE PRIMARY CONDUCTORS ARE PROVIDED BY ROSEVILLE ELECTRIC
5. PROVIDE A THE TRANSFORMER PAD PER ROSEVILLE ELECTRIC STANDARDS. THE TRANSFORMER IS PROVIDED BY ROSEVILLE ELECTRIC.
6. PROVIDE THE SECONDARY CONDUIT AND CONDUCTORS AS SHOWN ON THE ELECTRICAL PLANS AND THE CONDUIT SCHEDULE

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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER ALAN CARVALHO No. 20740 ELECTRICAL STATE OF CALIFORNIA

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CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ELECTRICAL
SOLAIRE ASR WELL
WD31-MCCX-35100 ONE-LINE DIAGRAM

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
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JOB NO. 11843A.10
DRAWING NO. 18E02
SHEET NO. OF 85

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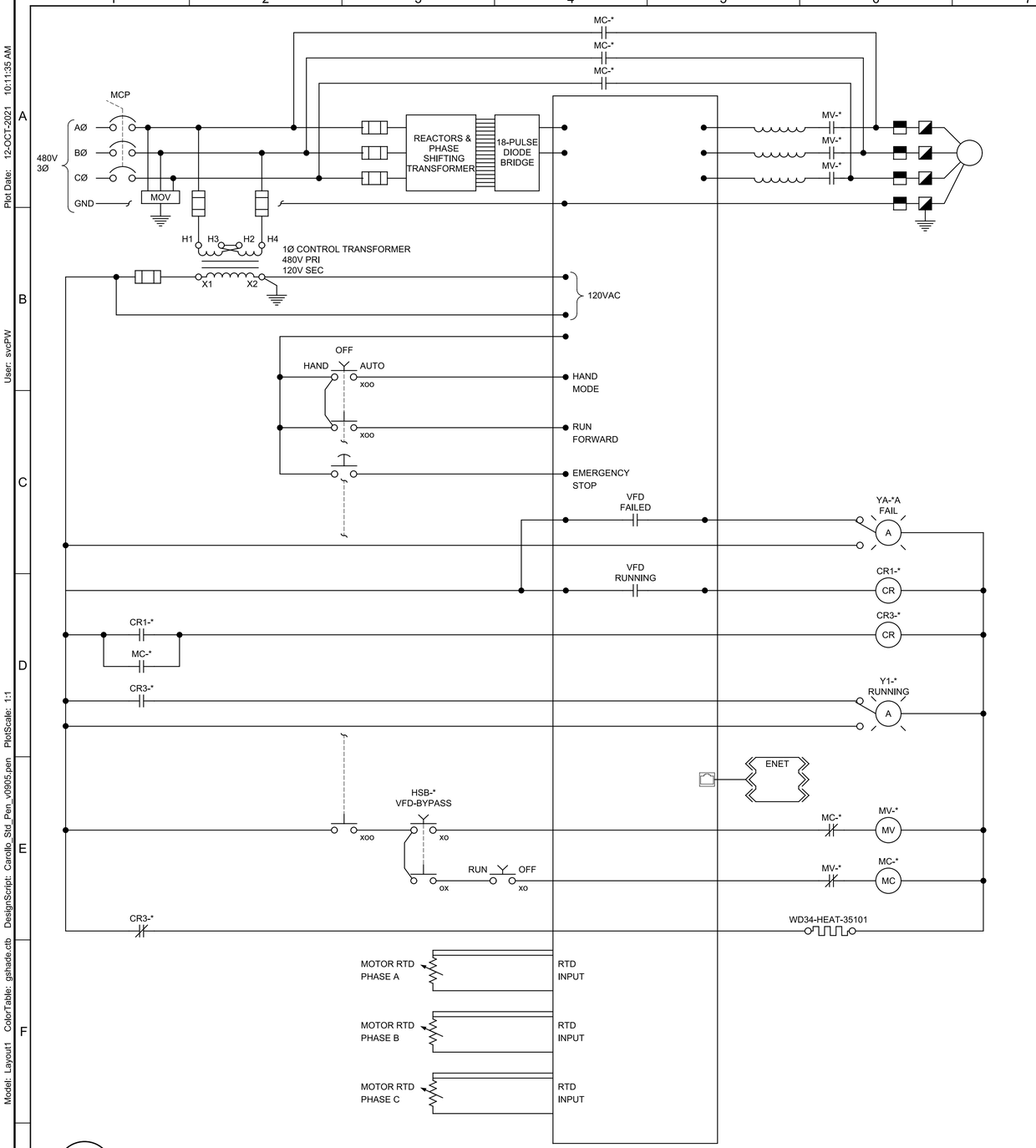
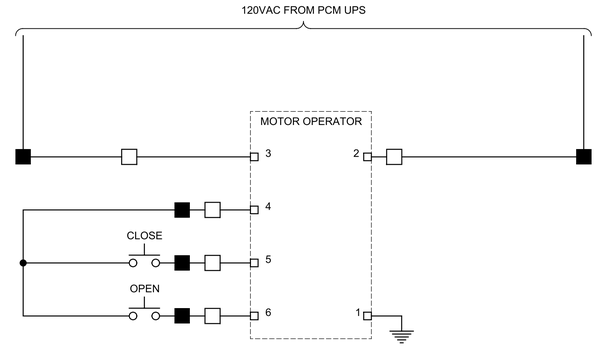
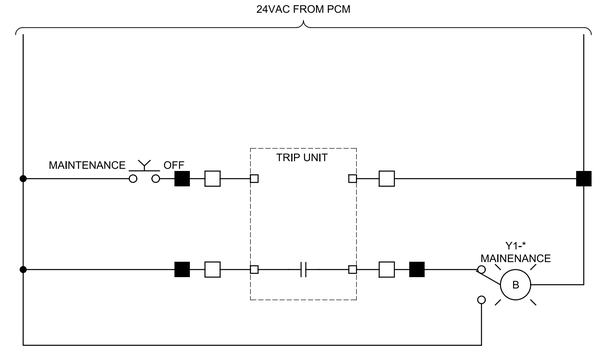


1 WELL PUMP WD34-PUMP-35101
E-002, I-001

GENERAL NOTES:

1. TO RESET THE BREAKER, PRESS THE OPEN BUTTON AND THEN THE CLOSE BUTTON.





2 MAIN BREAKER WD31-BKRX-35105
E-002

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

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REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER ALAN CARLSON No. 20740 ELECTRICAL STATE OF CALIFORNIA

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CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ELECTRICAL
SOLAIRE ASR WELL
CONTROL SCHEMATICS - 1

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 18E03
SHEET NO.
OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1018E03.dgn

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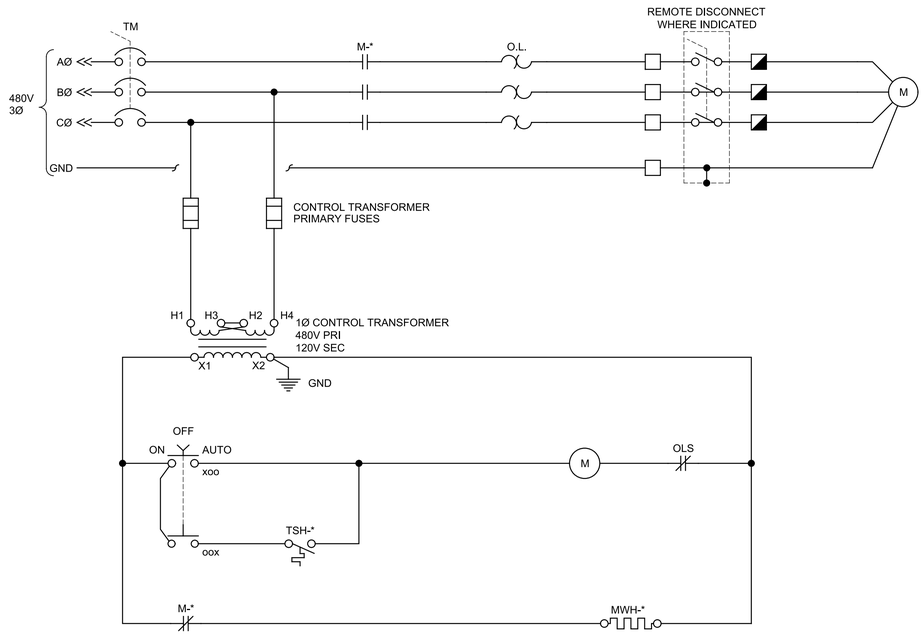
LAST SAVED BY: AHendricks



3 FANS

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			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

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CHECKED
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER ALAN CARULLO
No. 20740
ELECTRICAL
STATE OF CALIFORNIA

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AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ELECTRICAL
SOLAIRE ASR WELL
CONTROL SCHEMATICS - 2

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 18E04
SHEET NO. OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1018E04.dgn

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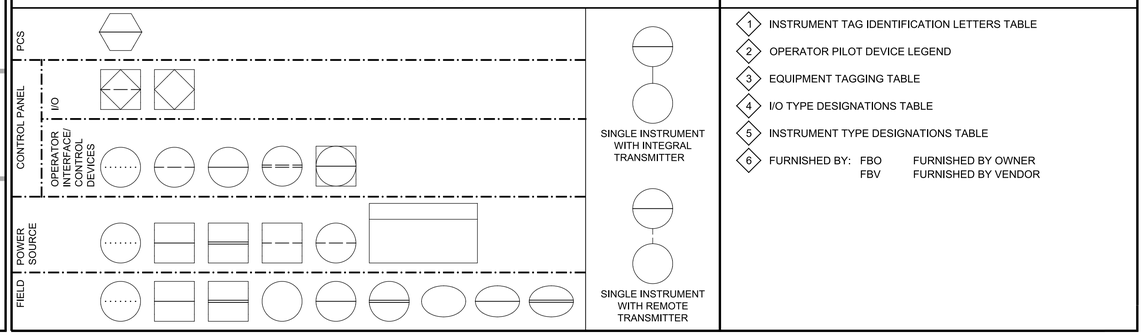
Model: Layout1
LAST SAVED BY: AHendricks

SYMBOL	DRAWING VISIBLE FIELDS	FIELD - 1	FIELD - 2	FIELD - 3	FIELD - 4	FIELD - 5	FIELD - 6
HMI/SCADA SYSTEM OPERATOR INTERFACE TERMINAL	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - DESCRIPTION 6 - EXISTING/FUTURE	REFER	REFER	ACTION ALARM NUM - NUMERIC SP - SET POINT STATUS TREND	DESCRIPTION	DESCRIPTION	E - EXISTING F - FUTURE
HARDWIRED I/O POINT	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	AI - ANALOG INPUT AO - ANALOG OUTPUT DI - DISCRETE INPUT DO - DISCRETE OUTPUT HSC - HIGH SPEED COUNTER INPUT RTD - RTD INPUT	DESCRIPTION	PAC - PROGRAMMABLE AUTOMATION CONTROLLER NO. PLC - PROGRAMMABLE LOGIC CONTROLLER NO. RIO - REMOTE I/O VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
NETWORK / SOFTI/O	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - LOCATION 6 - EXISTING/FUTURE 7 - DIGITAL NETWORK TABLE	REFER	REFER	BUS ID CNET - CONTROLNET DNET - DEVICENET ENET - ETHERNET/IP FF - FOUNDATION FIELDBUS MB - MODBUS RTU MB+ - MODBUS PLUS MBTCP - MODBUS TCP DP - PROFIBUS DP PA - PROFIBUS PA PNET - PROFINET SERIAL - PROPRIETARY PROTOCOL	DESCRIPTION	PAC - PROGRAMMABLE AUTOMATION CONTROLLER NO. PLC - PROGRAMMABLE LOGIC CONTROLLER NO. RIO - REMOTE I/O VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
LOCAL OPERATOR INTERFACE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	ACTION ALARM NUM - NUMERIC SP - SET POINT STATUS	DESCRIPTION	LOI - LOCAL OPERATOR INTERFACE NO. LCP - LOCAL CONTROL PANEL NO. PCM - PROCESS CONTROL MODULE NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
PILOT DEVICE OPERATOR INTERFACE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	AM - AUTO/MANUAL BYPASS - BYPASS CL - CLOSE E-STOP - EMERGENCY STOP FRLR - FIXED RATE/LEVEL RATE HOA - HAND /OFF/AUTO JOHC - JOG OPEN/HOLD/CLOSE JOJC - JOG OPEN/JOG CLOSE LH - LOW/HIGH LOR - LOCAL/OFF/REMOTE LOS - LOCK OUT STOP LS - LEAD/STANDBY LSR - LOCAL/STOP/REMOTE NOOT - NO OFFLINE/OFFLINE TRANSITION OC - OPEN/CLOSE OLOL - ON LINE/OFF LINE OO - OFF/ON OP - OPEN OSC - OPEN/STOP/CLOSE RST - RESET SAAM - SEMI AUTO/AUTO/MANUAL SEL - SELECT SP - STOP SPD - SPEED SS - START/STOP ST - START	DESCRIPTION	LCP - LOCAL CONTROL PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. RVSS - REDUCED VOLTAGE SOLID STARTER NO. VCP - VENDOR CONTROL PANEL NO. VFD - VARIABLE FREQUENCY DRIVE NO.	E - EXISTING F - FUTURE
POWER DEVICE PRIMARY FUNCTION OPERATOR ACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - VOLTAGE-POLE 5 - LOCATION 6 - EXISTING/FUTURE	CB - CIRCUIT BREAKER DISC - DISCONNECT FU - FUSE	REFER	TM - THERMAL MAGNETIC CIRCUIT BREAKER	24VDC - 1P 120VAC - 1P 208VAC - 2P 208VAC - 3P 240VAC - 3P 240VAC - 2P 480VAC - 3P 2400VAC - 3P 4160VAC - 3P	DP - DISTRIBUTION PANEL NO. LCP - LOCAL CONTROL PANEL NO. LP - LIGHTING PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. PP - POWER PANEL NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
POWER DEVICE AUXILIARY FUNCTION FOR OPERATOR ACCESSIBLE DEVICES	1 - TAG 2 - LOOP NUMBER 3 - DESCRIPTION 4 - DESCRIPTION 5 - DESCRIPTION 6 - EXISTING/FUTURE	DISC - DISCONNECT	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	E - EXISTING F - FUTURE
POWER DEVICE PRIMARY FUNCTION OPERATOR INACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - VOLTAGE-POLE 5 - LOCATION 6 - EXISTING/FUTURE	CB - CIRCUIT BREAKER FU - FUSE	REFER	MCP - MOTOR CIRCUIT PROTECTOR SS - SOLID STATE CIRCUIT BREAKER TM - THERMAL MAGNETIC CIRCUIT BREAKER	24VDC - 1P 120VAC - 1P 208VAC - 2P 208VAC - 3P 240VAC - 2P 240VAC - 3P 480VAC - 3P 2400VAC - 3P 4160VAC - 3P	DP - DISTRIBUTION PANEL NO. LCP - LOCAL CONTROL PANEL NO. LP - LIGHTING PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. PP - POWER PANEL NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE

SYMBOL	DRAWING VISIBLE FIELDS	FIELD - 1	FIELD - 2	FIELD - 3	FIELD - 4	FIELD - 5	FIELD - 6
INSTRUMENT PRIMARY ELEMENT	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	AREA NO. BUILDING NO. ROOM NO.	E - EXISTING F - FUTURE
INSTRUMENT/CONTROL ELEMENT PRIMARY FUNCTION OPERATOR ACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - DESCRIPTION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	E - EXISTING F - FUTURE
INSTRUMENT/CONTROL ELEMENT AUXILIARY FUNCTION OPERATOR ACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - DESCRIPTION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	E - EXISTING F - FUTURE
INSTRUMENT/CONTROL ELEMENT PRIMARY FUNCTION OPERATOR INACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER XR - PROTECTION RELAY CR - CONTROL RELAY IR - INTERPOSING RELAY	REFER	DESCRIPTION	DESCRIPTION	LCP - LOCAL CONTROL PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
INSTRUMENT/CONTROL ELEMENT AUXILIARY FUNCTION OPERATOR INACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER XR - PROTECTION RELAY CR - CONTROL RELAY IR - INTERPOSING RELAY	REFER	DESCRIPTION	DESCRIPTION	LCP - LOCAL CONTROL PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
FIELD EQUIPMENT NON-POWERED	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION/SIZE 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	AREA NO. BUILDING NO. ROOM NO.	E - EXISTING F - FUTURE
FIELD EQUIPMENT PRIMARY FUNCTION POWERED	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	AREA NO. BUILDING NO. ROOM NO.	E - EXISTING F - FUTURE
FIELD EQUIPMENT AUXILIARY FUNCTION POWERED	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - DESCRIPTION 6 - EXISTING/FUTURE	MWH - MOTOR WINDING HEATER TSH - TEMPERATURE SWITCH XSH - TORQUE SWITCH	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	E - EXISTING F - FUTURE
FIELD EQUIPMENT STARTER/DRIVE CUBICLE/CABINET	1 - TAG 2 - LOOP NUMBER 3 - TYPE 4 - VOLTAGE-POLE 5 - POWER SOURCE 6 - EXISTING/FUTURE	MS - MOTOR STARTER RVAT - REDUCED VOLTAGE AUTO TRANSFORMER STARTER RVSS - REDUCED VOLTAGE SOLID STATE STARTER VFD - VARIABLE FREQUENCY DRIVE	REFER	FVNR - FULL VOLTAGE NON-REVERSING STARTER FVR - FULL VOLTAGE REVERSING STARTER PWS - PART-WINDING STARTER RVAT - REDUCED VOLTAGE AUTO TRANSFORMER STARTER RVSS - REDUCED VOLTAGE SOLID STATE STARTER TS1W - TWO SPEED SINGLE WINDING TS2W - TWO SPEED TWO WINDINGS VFD - VARIABLE FREQUENCY DRIVE	120VAC - 1P 208VAC - 2P 208VAC - 3P 240VAC - 2P 240VAC - 3P 480VAC - 3P 2400VAC - 3P 4160VAC - 3P	LCP - LOCAL CONTROL PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE

INSTRUMENT BUBBLE LOCATIONS



NOTES

1. INSTRUMENT TAG IDENTIFICATION LETTERS TABLE
2. OPERATOR PILOT DEVICE LEGEND
3. EQUIPMENT TAGGING TABLE
4. I/O TYPE DESIGNATIONS TABLE
5. INSTRUMENT TYPE DESIGNATIONS TABLE
6. FURNISHED BY: FBO FURNISHED BY OWNER
FBV FURNISHED BY VENDOR

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED JLH
DRAWN SGS
CHECKED DEB
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER DANIEL ROBINSON No. 20405 ELECTRICAL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
INSTRUMENTATION
SOLAIRE ASR WELL
SYMBOLS AND ABBREVIATIONS 1

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. GI01
SHEET NO. XX OF XX

Plot Date: 12-OCT-2021 11:20:37 AM
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LAST SAVED BY: CYoung

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1018GI001.dgn

INSTRUMENT TAG IDENTIFICATION LETTERS

	MEASURED VARIABLE \ INSTRUMENT FUNCTION	ELEMENT	TRANSMITTER	INDICATING TRANSMITTER	CONVERTER TRANSDUCER, RELAY SPECIAL DEVICES	INDICATOR	RECORDER	CONTROLLER	INDICATING CONTROLLER	RECORDING CONTROLLER	SWITCH	SWITCH LOW LOW	SWITCH LOW	SWITCH HIGH	SWITCH HIGH HIGH	SWITCH COMBINATION HIGH LOW	ACTION	ALARM LOW LOW	ALARM LOW	ALARM HIGH	ALARM HIGH HIGH	TOTALIZE INDICATOR TRANSMITTER	VALVE	GAUGE	LIGHT	SPEED SETTING
A	ANALYSIS	AE	AT	AIT	AY	AI	AR	AC	AIC	ARC	AS	ASLL	ASL	ASH	ASHH	ASHL		AALL	AAL	AAH	AAHH				AL	
B	BURNER FLAME	BE	BT	BIT	BY	BI	BR	BC	BIC	BRC	BS	BSLL	BSL	BSH	BSHH			BALL	BAL	BAH	BAHH				BL	
C	CONDUCTIVITY	CE	CT	CIT	CY	CI	CR	CC	CIC	CRC	CS	CSLL	CSL	CSH	CSHH	CSHL		CALL	CAL	CAH	CAHH				CL	
D	DENSITY	DE	DT	DIT	DY	DI	DR	DC	DIC	DRC	DS	DSLL	DSL	DSH	DSHH	DSHL		DALL	DAL	DAH	DAHH				DL	
E																										
F	FLOW	FE	FT	FIT	FY	FI	FR	FC	FIC	FRC	FS	FSLL	FSL	FSH	FSHH	FSHL		FALL	FAL	FAH	FAHH	FQI	FCV	FG	FL	
FF	FLOW RATIO				FFY	FFI		FFC	FFIC		FFS														FFL	
G	GAUGING (DIMENSION)																									
H	HAND (MANUAL)*							HC			HS*						HA*						HV		HL	HSS
I	CURRENT		IT	IIT	IY	II	IR	IC	IIC	IRC	IS	ISLL	ISL	ISH	ISHH			IALL	IAL	IAH	IAHH				IL	
J	POWER																									
K	TIME				KY	KI	KR	KC	KIC	KRC	KS	KSLL	KSL	KSH	KSHH			KALL	KAL	KAH	KAHH		KV		KL	
L	LEVEL	LE	LT	LIT	LY	LI	LR	LC	LIC	LRC	LS	LSLL	LSL	LSH	LSHH	LSHL		LALL	LAL	LAH	LAHH		LCV	LG	LL	
M	MOISTURE OR HUMIDITY	ME	MT	MIT	MY	MI	MR	MC	MIC	MRC	MS	MSLL	MSL	MSH	MSHH			MALL	MAL	MAH	MAHH				ML	
N	EMERGENCY SHUTDOWN																									
O																										
P	PRESSURE OR VACUUM	PE	PT	PIT	PY	PI***	PR	PC	PIC	PRC	PS****	PSLL	PSL	PSH	PSHH	PSHL		PALL	PAL	PAH	PAHH		PCV		PL	
PD	DIFFERENTIAL PRESSURE		PDT	PDIT	PDY	PDI	PDR	PDC	PDIC	PDRC	PDS	PDSLL	PDSL	PDSH	PDSHH			PDALL	PDAL	PDAH	PDAHH		PDCV		PDL	
Q	QUANTITY	QE	QT	QIT	QY	QI	QR				QS	QSLL	QSL	QSH	QSHH			QALL	QAL	QAH	QAHH					
R	RADIOACTIVITY																									
S	SPEED	SE	ST	SIT	SY	SI	SR	SC	SIC	SRC	SS	SSLL	SSL	SSH	SSHH			SALL	SAL	SAH	SAHH					
T	TEMPERATURE	TE	TT	TIT	TY	TI	TR	TC	TIC	TRC	TS	TSLL	TSL	TSH	TSHH	TSHL		TALL	TAL	TAH	TAHH		TCV		TL	
TD	DIFFERENTIAL TEMPERATURE		TDT	TDIT	TDY	TDI	TDR	TDC	TDIC	TDRC	TDS	TDSLL	TDSL	TDSH	TDSHH			TDALL	TDAL	TDAH	TDAHH		TDCV		TDL	
U	MULTIVARIABLE					UI	UR	UC	UIC	URC	US														UL	
V	VISCOSITY	VE	VT	VIT	VY	VI	VR	VC	VIC	VRC	VS	VSLL	VSL	VSH	VSHH			VALL	VAL	VAH	VAHH				VL	
W	WEIGHT	WE	WT	WIT	WY	WI	WR				WS	WSLL	WSL	WSH	WSHH			WALL	WAL	WAH	WAHH					
X	UNCLASSIFIED	XE	XT	XIT	XY	XI	XR	XC	XIC	XRC	XS	XSLL	XSL	XSH	XSHH			XALL	XAL	XAH	XAHH		XCV	XG	XL	
XV	VIBRATION	XVE	XVT		XVY	XVI	XVR				XVS			XVSH	XVSHH					XVAH	XVAHH				XVL	
Y	STATUS***					YI***																			YL	
Z	POSITION	ZE	ZT	ZIT	ZY	ZI					ZS**												ZV		ZL**	

* REFER TO OPERATOR PILOT DEVICE LEGEND
** LETTER INDICATES POSITION (O=OPEN, C=CLOSED, R=RAISE, L=LOWER, ETC)
*** PI# # = 1,2,3 ETC. AND REPRESENTS A UNIQUE IDENTIFIER AND IS APPLICABLE TO ALL ITEMS IN THE TABLE ABOVE
**** COULD ALSO BE PIS - FOR PRESSURE INDICATING SWITCH

OPERATOR PILOT DEVICE LEGEND

PILOT DEVICE TAG (HAND SWITCHES)	LOCAL-OFF-REMOTE (LOR) OR LOCAL-STOP-REMOTE (LSR)	STOP (SP)	START (ST)	HAND-OFF-AUTO (HOA)	OFF-ON (OO)	SELECT (SEL)	OPEN-STOP-CLOSE (OSC)	JOG OPEN-HOLD-CLOSE (JOHC)	SEMIAUTO-AUTO-MANUAL (SAAM)	LEAD-LAG-STANDBY (LLGS)	JOG OPEN-JOG CLOSE (JOJC)	ONLINE-OFFLINE (OLOF)	AUTO-MANUAL (AM)	FIXED RATE-LEVEL RATE (FRLR)	OPEN-CLOSE (OC)	NO OFFLINE-OFFLINE TRANSITION (NOOT)	LOW-HIGH (LH)	RESET (RST)	SPEED (SPD)	START-STOP (STSP)	E-STOP (E-SP)	BYPASS (BYP)			SILENCE	POSITION (POS)
PILOT DEVICE TAG (HAND SWITCHES)	HSA*	HSB	HSC	HSD*	HSE	HSF	HSG*	HSH*	HSI	HSJ*	HSK*	HSL*	HSM*	HSN	HSO*	HSP	HSQ*	HSR	HSS	HST*	HSU	HSV	HSW	HSX	HSY	HSZ
SCADA/HMI TAG (HAND ACTION)	HAA	HAB	HAC	HAD	HAE	HAF	HAG	HAH	HAI	HAJ	HAK	HAL	HAM	HAN	HAO	HAP	HAQ	HAR	HAS	HAT	HAU	HAV	HAW	HAX	HAY	HAZ

HSA* SELECTOR SWITCH POSITION EG: HSA(R) R = REMOTE, HSD(A) A = AUTO, ETC

I/O TYPE DESIGNATIONS

AUX1	RUNNING	MSL	MOTOR START LOW
AUX2	FAILED/FAULT	MSM	VALVE MODULATE
AUXF1	RUNNING FORWARD	MSP	MOTOR STOP
AUXH1	RUNNING HIGH	MSR	MOTOR START REVERSE
AUXL1	RUNNING LOW	MST	MOTOR START
AUXR1	RUNNING REVERSE	SS	SPEED SIGNAL
SVC	SOLENOID VALVE CLOSE	ZC	POSITION COMMAND
SVO	SOLENOID VALVE OPEN	ZCC	POSITION COMMAND CLOSE
MS	RUN	ZCO	POSITION COMMAND OPEN
MSF	MOTOR START FORWARD		
MSH	MOTOR START HIGH		

INSTRUMENT TYPE DESIGNATIONS

AM	AMMONIA	O3	OZONE	SH	SODIUM HYPOCHLORITE
CAP	CAPACITANCE	ORP	OXIDATION REDUCTION POTENTIAL	TDR	TIME DOMAIN REFLECTOMETRY
CGD	COMBUSTIBLE GAS DETECTOR	P	PRESSURE	TH	THERMAL
CL	CHLORINE	P-SUB	PRESSURE SUBMERSIBLE	TSS	TOTAL SUSPENDED SOLIDS
COND	CONDUCTIVITY	PC	PARTICLE COUNTER	TURB	TURBIDITY
DO	DISSOLVED OXYGEN	PO	PHOSPHOROUS	US	ULTRASONIC
FMCW	FREQ. MODULATED CONT. WAVE	PTOF	PULSE TIME OF FLIGHT	UVI	UV INTENSITY
HSF	FLUORIDE	R/I	RESISTANCE TO CURRENT	UVT	UV TRANSMITTANCE
IS	INTRINSIC SAFETY BARRIER	ROT	ROTAMETER	VAC	VACUUM
LEL	LOWER EXPLOSIVE LIMIT	RTD	RESISTANCE TEMP DETECTOR		
MAG	MAGNETIC	SC	STREAMING CURRENT		

SPECIFIC ABBREVIATIONS

APH	A PHASE	MWH	MOTOR WINDING HEATER
BPH	B PHASE	SSG	SECONDARY SWITCHGEAR
BRB	BEARING BOTTOM	SV*	SOLENOID VALVE
BRT	BEARING TOP	SPD	SURGE PROTECTIVE DEVICE
BTFLY	BUTTERFLY	UPS	UNINTERRUPTIBLE POWER SUPPLY
CPH	C PHASE	YA	STATUS AUTO
CC*	CALIBRATION COLUMN	YR	STATUS REMOTE
HTR	HEATER	Y1	STATUS RUNNING
HTU	HEAT TRACE UNIT	Y2	ALARM FAILED/FAULT

* CC# AND SV# # = 1, 2, 3 ETC. AND REPRESENTS A UNIQUE IDENTIFIER

INSTRUMENT LINE SYMBOLS

- INSTRUMENT OR CONNECTION TO PROCESS
- PNEUMATIC SIGNAL
- ELECTRIC SIGNAL
- HYDRAULIC SIGNAL — L
- CAPILLARY TUBE — X
- ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
- ELECTROMAGNETIC OR SONIC SIGNAL (NOT GUIDED)
- INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK) — o
- COPPER ETHERNET — C
- FIBER OPTIC ETHERNET — F
- WIRELESS ETHERNET — W
- PROFIBUS DP — PBD
- PROFIBUS PA — PBA
- DEVICENET — DN
- FOUNDATION FIELDBUS — FF

PROCESS LINE SYMBOLS

- PRIMARY PROCESS FLOW IN PIPE
- SECONDARY PROCESS FLOW IN PIPE
- PRIMARY PROCESS FLOW IN CHANNEL
- SECONDARY PROCESS FLOW IN CHANNEL

DESIGNATIONS

- EQUIPMENT ENCLOSURE
- EXISTING
- FUTURE

MISCELLANEOUS P&ID SYMBOLS

CONTINUATION TAG: DESC 2, DESC 1, # , A, B — CONTINUATION FROM SHEET; CONTINUATION TO SHEET; UNIQUE IDENTIFIER

PIPE CALLOUT: PIPE TAG (UNIQUE ID)

SIGNAL CONTINUATION — TO DRAWING — FROM DRAWING

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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — DANIEL ROBINSON — No. 20405 — ELECTRICAL — STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
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SYMBOLS AND ABBREVIATIONS 2

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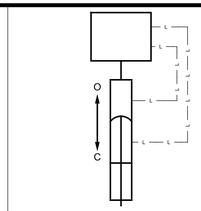
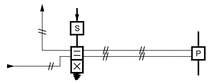
ACTUATORS

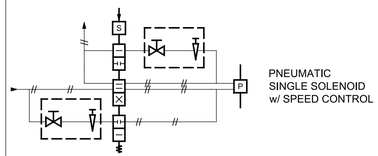
- DIAPHRAGM
- ELECTRIC DISCRETE
- ELECTRIC MODULATING
- ELECTRIC HYDRAULIC
- HAND
- HYDRAULIC
- PNEUMATIC
- SOLENOID



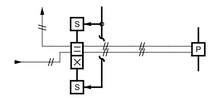
HYDRAULIC MODULATING



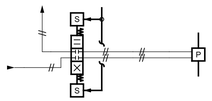
PNEUMATIC SINGLE SOLENOID OPEN/CLOSE



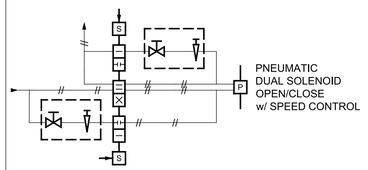
PNEUMATIC SINGLE SOLENOID w/ SPEED CONTROL



PNEUMATIC DUAL SOLENOID OPEN/CLOSE



PNEUMATIC DUAL SOLENOID OPEN/HOLD/CLOSE



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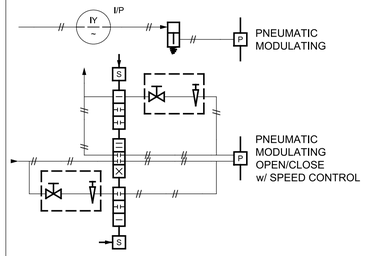

PNEUMATIC MODULATING

PNEUMATIC MODULATING OPEN/CLOSE w/ SPEED CONTROL

PIPING

- AIR GAP
- BLIND FLANGE
- CAPPED OR PLUGGED
- CONCENTRIC INCREASER
- CONCENTRIC REDUCER
- DRAIN
- ECCENTRIC INCREASER
- TEE
- UNION
- ECCENTRIC REDUCER
- EXPANSION COUPLING
- EXPANSION JOINT VIBRATION CENTER
- FLEXIBLE CONNECTION
- QUICK DISCONNECT

PUMPS

- AIR DRIVEN
- CENTRIFUGAL
- CHEMICAL FEED DIAPHRAGM
- DIAPHRAGM
- GEAR
- PERISTALTIC OR HOSE
- PISTON
- PROGRESSIVE CAVITY
- OR SUBMERSIBLE
- VERTICAL TURBINE
- VERTICAL CHOPPER
- WATER CHAMP

BLOWERS/ COMPRESSORS

- CENTRIFUGAL SINGLE STAGE BLOWER
- CENTRIFUGAL MULTI STAGE BLOWER
- RECIPROCATING COMPRESSOR
- SCREW COMPRESSOR
- FAN
- LIQUID RING COMPRESSOR
- ROTARY LOBE BLOWER

CHECK VALVES

- BACK FLOW PREVENTER
- BALL
- DIAPHRAGM CHECK
- DOUBLE FLAP
- FLAPPER
- SPRING LOADED GENERAL
- SPRING LOADED SWING
- SWING

PRESSURE VALVES

- BACKPRESSURE REGULATING SELF CONTAINED
- BACKPRESSURE REGULATING EXTERNAL TAP
- PRESSURE REDUCING SELF CONTAINED
- PRESSURE REDUCING EXTERNAL PRESSURE TAP
- REGULATING
- PRESSURE RELIEF
- VACUUM RELIEF

VALVES

- 3-WAY
- 3-WAY PLUG
- 4-WAY
- AIR-RELIEF
- ANGLE
- BALL
- BALL V-NOTCH
- BUTTERFLY
- BUTTERFLY-BURIED VALVE BOX
- CONE
- DIAPHRAGM
- GATE
- GATE-BURIED VALVE BOX
- GLOBE
- HOSE
- MUD
- NEEDLE
- PINCH
- PLUG ECCENTRIC
- PLUG ECCENTRIC w-VALVE BOX
- PLUG ECCENTRIC LUBRICATED
- PLUG ECCENTRIC LUBRICATED BURIED VALVE BOX
- PLUG CONCENTRIC
- PLUG CONCENTRIC -BURIED VALVE BOX
- PLUG CONCENTRIC LUBRICATED
- PLUG CONCENTRIC LUBRICATED BURIED VALVE BOX
- PUMP DISCHARGE
- TELESCOPING

VALVE DESIGNATIONS

NO	NORMALLY OPEN
NC	NORMALLY CLOSED
FO	FAIL OPEN
FC	FAIL CLOSE
FLP	FAIL LAST POSITION

MISC

- AIR DAMPER
- AIR / CHEMICAL DIFFUSER
- BASKET STRAINER
- BLOW-OFF SILENCER
- CALIBRATION COLUMN
- COALESCER
- DESICCANT DRYER
- EDUCTOR/EJECTOR
- EQUIPMENT/INSTRUMENT LOCATOR
- EXHAUST FAN
- EYEWASH
- FILTER
- FILTER SEPARATOR
- FINE FILTER
- FIRE ALARM/SENSOR
- FLAME ARRESTER
- FLAME ARRESTER w/THERMALLY OPERATED VALVE
- FLOW CONDITIONER
- GAS CANNON
- GRINDER
- HEAT EXCHANGER
- HOIST
- HORIZONTAL MIXER
- HOSE CONNECTION
- INLET STRAINER
- INLINE STATIC MIXER
- MATERIAL CHANGE
- MIXER
- MOTOR
- NOZZLE
- ORIFICE RESTRICTION
- PERISTALTIC COMPOSITE SAMPLER
- OR PULSATION DAMPENER
- REFRIGERATED DRYER
- RUPTURE DISK
- SAMPLE PORT
- SIGHT TUBE
- SMOKE DETECTOR
- STRAINER - MECHANICALLY CLEANED
- STRAINER WITH BLOW OFF
- STRAINER WYE TYPE
- VAPOR HEATER
- VAPORIZER
- VENT
- VENT TO ATMOSPHERE

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FLOW

- BATCH
- CORIOLIS
- MAGNETIC
- ORIFICE
- PADDLE WHEEL
- PISTON
- ANNUBAR
- PITOT TUBE
- POSITIVE-DISPLACEMENT
- PROPELLER-TURBINE
- ROTAMETER
- THERMAL
- ULTRASONIC
- ULTRASONIC BIOGAS
- V-CONE
- VENTURI TUBE OR FLOW NOZZLE
- VORTEX

FLUMES

- LEOPOLD-LAGCO
- PALMER-BOWLUS
- PARSHALL
- REGULAR CUTTHROAT
- TRAPEZOIDAL

GATES

SIDE VIEW	PLAN VIEW
SLIDE	FLAP
SLUICE	KNIFE
STOP	SLIDE
	SLUICE
	STOP
	WEIR
	BUTTERFLY

LEVEL

- BUBBLER
- CAPACITANCE
- DIFFERENTIAL PRESSURE (TANK, PDE, LDIT)
- ELECTRODE
- FLOAT
- INVERTED COLUMN
- PROBE
- RADAR PTOF
- RADAR (FREQUENCY MODULATED CONTINUOUS WAVE)
- RADAR TDR
- SUSPENDED/ SUBMERSIBLE
- TUNING FORK
- ULTRASONIC

PRESSURE/VACUUM

PRESSURE

- GAUGE (PI)
- MANOMETER
- PRESSURE SWITCH (PSH, PE)
- PRESSURE TRANSMITTER (PIT, PE)

DIFFERENTIAL PRESSURE

- GAUGE DIFFERENTIAL INDICATOR (PDI)
- DIFFERENTIAL PRESSURE SWITCH (PDSL, PDE)
- DIFFERENTIAL PRESSURE TRANSMITTER (PDIT, PDE)

PRESSURE SEALS

- SEAL ANNULAR
- SEAL DIAPHRAGM
- SEAL SANITARY

EXAMPLE

- PRESSURE SWITCH (PSH, PE)

TEMPERATURE

- TEMPERATURE w/THERMOWELL
- TEMPERATURE GAUGE
- THERMOMETER (T)

WEIGHT

- HYDRAULIC
- STRAIN GAUGE

WEIRS

SIDE VIEW	PLAN VIEW
RECTANGULAR w/o END CONTRACTIONS	RECTANGULAR w/o END CONTRACTIONS
RECTANGULAR w/ END CONTRACTIONS	RECTANGULAR w/ END CONTRACTIONS
V-NOTCH (TRIANGULAR)	V-NOTCH (TRIANGULAR)
TRAPEZOIDAL (CIPOLLETTI)	TRAPEZOIDAL (CIPOLLETTI)

REV	DATE	BY	DESCRIPTION

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EQUIPMENT TAGGING SYSTEM

XX # # _ XXX X _ # # # # #

- EQUIPMENT
- PRIMARY EQUIPMENT
- REMOTE STATION DESIGNATOR
- MODIFIER
- FUNCTION
- SUB-SYSTEM
- SYSTEM
- FACILITY

KEY NOTES:

1. REFER TO GN02 FOR ADDITIONAL ISA ABBREVIATIONS.

CG	COMPRESSED NATURAL
DC	DRY CREEK WWTP
FD	FIRE DEPARTMENT
PG	PLEASANT GROVE WWTP
PD	POLICE DEPARTMENT
PR	PARKS AND RECREATION
RW	RECYCLED WATER
SO	SOLID WASTE
SW	STORM WATER
WT	BARTON RD WTP
WC	WASTEWATER COLLECTION
WD	**WATER DISTRIBUTION**

SYSTEM DESIGNATOR	SUB-SYSTEM DESIGNATOR	SCADA ALARM	DESCRIPTION
0			**COMMON SUPPORT FACILITIES**
	1	WD	ADMINISTRATION
	2	WD	SHOP FACILITIES
	3	WD	WAREHOUSE / STORAGE
	4	WD	LABORATORY
	5	WD	UTILITIES (HVAC, SANITARY SEWER, POTABLE UTILITY WATER, COMPRESSED AIR)
	6	WD	ELECTRICAL DISTRIBUTION
	7	WD	COMMUNICATIONS / OFFICE NETWORKING
	8	WD	SCADA / PLANT NETWORKING / HDR, RADIO BASE STATION, SECURITY & FIRE SYSTEMS
	9	WD	HEALTH & SAFETY (PPE, PORTABLE GAS GAS DETECTORS, FIRE SYSTEMS, SECURITY
10			**TRANSMISSION**
	11	WD	ELECTRICAL & CONTROL (PLC, PP, MCC, RADIO)
	12	WD	
	13	WD	PROCESS CHEMICAL / PHYSICAL ADJUSTMENT
	14	WD	PRODUCT CONVEYANCE
	15	WD	PROCESS BASINS / TANKS / CHANNELS
	16	WD	
	17	WD	BUILDINGS / STRUCTURES / VAULT / SUMPS
	18	WD	
	19	WD	
20			**DISTRIBUTION**
	21	WD	ELECTRICAL & CONTROL (PLC, PP, MCC, RADIO)
	22	WD	
	23	WD	PROCESS CHEMICAL / PHYSICAL ADJUSTMENT
	24	WD	PRODUCT CONVEYANCE
	25	WD	PROCESS BASINS / TANKS / CHANNELS
	26	WD	
	27	WD	BUILDINGS / STRUCTURES / VAULT / SUMPS
	28	WD	
	29	WD	
30			**WELLS**
	31	**WD**	**ELECTRICAL & CONTROL (PLC, PP, MCC, RADIO)**
	32	**WD**	
	33	**WD**	**PROCESS CHEMICAL / PHYSICAL ADJUSTMENT**
	34	**WD**	**PRODUCT CONVEYANCE**
	35	**WD**	**PROCESS BASINS / TANKS / CHANNELS**
	36	**WD**	
	37	**WD**	**BUILDINGS / STRUCTURES / VAULT / SUMPS**
	38	**WD**	**AQUIFER STORAGE SYSTEM**
	39	**WD**	
40			**STORAGE**
	41	WD	ELECTRICAL & CONTROL (PLC, PP, MCC, RADIO)
	42	WD	
	43	WD	PROCESS CHEMICAL / PHYSICAL ADJUSTMENT
	44	WD	PRODUCT CONVEYANCE
	45	WD	PROCESS BASINS / TANKS / CHANNELS
	46	WD	
	47	WD	BUILDINGS / STRUCTURES / VAULT / SUMPS
	48	WD	
	49	WD	
50			**INTERTIES**
	51	WD	ELECTRICAL & CONTROL (PLC, PP, MCC, RADIO)
	52	WD	
	53	WD	PROCESS CHEMICAL / PHYSICAL ADJUSTMENT
	54	WD	PRODUCT CONVEYANCE
	55	WD	PROCESS BASINS / TANKS / CHANNELS
	56	WD	
	57	WD	BUILDINGS / STRUCTURES / VAULT / SUMPS
	58	WD	
	59	WD	

ACRONYM	DESCRIPTION
ADFF	DIFFUSER, AERATION
AERD	AERATOR, DISC
AERS	AERATOR, SURFACE
AFHx	ACTIVE HARMONIC FILTER
AGIT	AGITATOR
AITx	ANALYZER INDICATING TRANSMITTER
ATSx	AUTOMATIC TRANSFER SWITCH (USE MTSx FOR MANUAL TRANSFER SWITCH)
BASN	BASIN: SED BASIN, AERATION BASIN, U.V. CONTACT BASIN
BATT	BATTERIES
BCHG	BATTERY CHARGER
BFPx	PRESS, BELT FILTER
BIOA	BIO-ASSAY
BOIL	BOILER
BLDG	BUILDING
BLWR	BLOWERS: CENTRIFUGAL, ROTARY LOBE
BKRx	BREAKER, ELECTRICAL
BRNR	BURNERS
BSCR	BAR SCREEN
BCKT	BUCKET (CONTROLS COMPARTMENT LOCATED IN SWGR OR
CAMx	CAMERA
CAPx	CAPACITOR, POWER FACTOR CORRECTION
CENT	CENTRIFUGE
CHAN	CHANNEL, PROCESS FLOW
CLAR	CLARIFIER: PRIMARY, SECONDARY
CLAS	CLASIFIER, GRIT
CNVR	CONVEYOR
COLL	COLLECTOR, SLUDGE
COMP	COMPRESSORS - ALL TYPES
CTFN	COOLING TOWER FAN
CTWR	COOLING TOWERS
DAMP	VENTILLATION AIR DAMPER
DISP	DISPENSER (CNG)
DITx	DENSITY INDICATING TRANMITTER
DRVc	CENTRIFUGE DRIVE
DRYR	GAS DRYER / DESICANT
EDUC	EDUCTOR (VENTURI NOZZLE)
EGEN	EMERGENCY GENERATOR
ENGN	ENGINE: DIESEL BACK-UP, INTERNAL COMBUSTION
EVAP	EVAPORATORATIVE COOLER
EXCH	EXCHANGERS, HEATED SLUDGE
FANx	FAN, COOLING OR VENTILATING
EWSS	EYEWASH – SAFETY SHOWER STATIONS
FALL	FALL RESTAINT, FALL PROTECTION
FGSD	FIXED GAS DETECTOR
FIRE	FIRE SYSTEMS
FITx	FLOW INDICATING TRANSMITTER
FLAS	FLASH PROTECTION EQUIPMENT (FACE SHIELDS, SUITS)
FSCR	FINE SCREENS
FLTR	FILTER: EFFLUENT FILTER AND MECHANICAL FILTERS
FQxx	FLOW TOTALIZER (MECHANICAL COMPOUND OR TURBO
GAGE	GAUGES: PRESSURE, TEMPERATURE, VACUUM - ALL TYPES, CALIBRATION COLUMNS
GATE	ENTRY/EXIT VEHICLE, PERSONNEL
GCND	GAS CONDITIONING EQUIPMENT
GENx	GENERATOR
GRBT	GRAVITY BELT THICKENER
GRBX	GEAR BOX: INCREASER, DECREASER - ALL TYPES
GRND	GRINDER
HEAT	HEATER: BLOCK, PIPE, STRIP
HPGN	SODIUM HYPOCHLORITE GENERATOR
HPRx	HOPPER
HSTS	HOISTS / CRANES
HVAC	HEATING, VENTILATION, AIR CONDITIONING: CLIMATE
HXGR	HEAT EXCHANGER, DEMAND HEATERS, HOT WATER TANKS
HYDc	HYDRAULIC UNIT, CENTRIFUGE
HYDu	HYDRAULIC POWER UNIT (ULTRAVIOLET)
HYDx	HYDRAULIC POWER UNIT
IJBx	INSTRUMENT JUNCTION BOX

ACRONYM	DESCRIPTION
INJR	INJECTOR - CL2 / SO2
LCPx	LOCAL CONTROL PANEL
LDBK	LOAD BANK
LITx	LEVEL INDICATING TRANSMITTER
LPxx	LIGHTING PANEL
LSPx	LOAD SHED RELAY PANEL
LUBE	LUBRICATING OIL SYSTEM
MCCx	MOTOR CONTROL CENTER
MIXR	MIXER
MODL	LAMP MODULE
MONT	MONITOR (WATER CANNON)
MODx	MOTOR OPERATED DOOR
MOGx	MOTOR OPERATED GATE VALVE
MOVx	MOTOR OPERATED VALVE (SLIDE, BALL, GLOBE…)
MSTR	MOTOR STARTER
MTRB	MICROTURBINE
MTRx	MOTOR
MTSx	MANUAL TRANSFER SWITCH
MVFD	MOTOR V.F.D.
ODOR	ODOR SCRUBBING SYSTEM
PCxx	PERSONAL COMPUTERS
PDCu	POWER DISTRIBUTION CENTER (ULTRA-VIOLET)
PEDx	METERING PEDESTAL
PITx	PRESSURE INDICATING TRANSMITTER
PMIX	POLYMER MIXING UNIT
POND	TREATMENT PLANT EMERGENCY OR PROCESS STORAGE
POVx	PNEUMATICALLY OPERATED VALVE
PPxx	POWER DISTRIBUTION PANEL, PANELBOARD
PLCx	PROGRAMMED LOGIC CONTROLLERS
PLCP	PLC PANEL
PQMx	POWER QUALITY MONITOR
PUMP	PUMPS - ALL TYPES
PWRS	POWER SUPPLY (USE UPSx FOR UNINTERUPTIBLE POWER
RADx	RADIO SYSTEMS
RADI	RADIATORS
RDTx	ROTARY DRUM THICKENER
RELx	RELAY, MULTI-FUNCTION ELECTRICAL PROTECTIVE
RESP	RESPIRATORS (FULL & HALF FACE, AIR SUPPLIED, AIR
RVSS	REDUCED VOLTAGE SOFT STARTER
SAMP	SAMPLER UNIT
SECR	SECURITY SYSTEMS
SRVR	SERVER, SCADA / CONTROL
SBFP	SLUDGE BELT FILTER PRESS
SGAT	GATE: SLIDE, SLUICE, KNIFE
SKMR	SKIMMERS: SLUDGE, SCUM
SOVx	SOLENIOD OPERATED VALVE
SPDx	SURGE PROTECTIVE DEVICE (TVSS & SPD)
STAT	STATION (PUMPING, PRESSURE REDUCING…)
STNR	STRAINERS
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TANK	TANKS, STORAGE VESSELS, PRESSURE ACCUMULATORS
TCOM	TELECOMMUNICATIONS SYSTEMS
TCPx	TEMPERATURE CONTROL PANEL
TITx	TEMPERTURE INDICATING TRANSMITTER
TOOL	TOOLS, LATHES, MILLS, SHEARS, PRESS
TRAP	TRAPS: DRIP, CONDENSATE
UPSx	POWER SUPPLY, UNINTERRUPTIBLE
UVRx	ULTRAVIOLET BANK
VALV	VALVES: BALL, GATE, GLOBE, BUTTERFLY - ALL TYPES
VFDx	DRIVE, VARIABLE FREQUENCY
VGLV	VOLTAGE GLOVES
VSCD	VISCOUS, HYDRAULIC DRIVE / TORQUE CONVERTER
WEIR	FLOW REGULATION WEIR
WASH	WASHER / COMPACTOP
WITx	WEIGHT INDICATING TRANSMITTER
WKST	WORKSTATION, SCADA / CONTROL
XFMR	TRANSFORMER

REMOTE STATION DESIGNATOR	DESCRIPTION
0	PRIMARY FACILITY
1	PRESSURE REDUCING STATION, 1589 PLEASANT GROVE BLVD
2	PRESSURE REDUCING STATION, 1303 CANEVARI DR (AKA WOODCREEK OAKS)
3	PRESSURE REDUCING STATION, BLUE OAKS BLVD
4	PRESSURE REDUCING STATION, JUNCTION BLVD (WEST #2)
5	PRESSURE REDUCING STATION, 3400 BASELINE ROAD (WEST
6	PRESSURE REDUCING STATION, 2054 PFE
7	UNUSED
08 – 19	PRESSURE REDUCING STATIONS – FUTURE
20	WELL 1 401 ATLANTIC STREET (SHORT STREET)
21	WELL 3 CHURCH STREET (DECOMMISSIONED)
22	WELL 2 PACIFIC STREET (DECOMMISSIONED)
23	WELL 4 1002 DARLING WAY (DARLING)
24	WELL 5 1746 CHELSEA WAY (OAKMONT)
25	WELL 6 1490 NORTH PARK DRIVE (DIAMOND CREEK)
26	WELL 7 WOODCREEK NORTH
27	WELL 8 2100 HAYDEN PARKWAY
28	WELL, WEST SIDE DRIVE (FUTURE)
29	WELL 12 1745 BLUE OAKS BLVD
30	WELL 13 HEWLETT PACKARD
31	WELL 14 FIDDYMENT ROAD
32	WELL, SIERRA VISTA SPECIFIC PLAN #1
33	WELL, SIERRA VISTA SPECIFIC PLAN #2
34 – 40	WELL SITES - FUTURE
41	RESERVOIR – NORTHEAST
42	RESERVOIR – BARTON ROAD
43	RESERVOIR – STONERIDGE
44	UNUSED
45	UNUSED
46-50	RESERVOIR - FUTURE
51	PUMP STATION – DUAL PURPOSE
52	PUMP STATION – HIGHLAND RESERVE, 9300 FAIRWAY DR
53	PUMP STATION – 1589 PLEASANT GROVE BYPASS PUMP STN
54	PUMP STATION – 4501 WESTPARK DRIVE RESERVOIR AND PUMPING STATION
55	PUMP STATION – 2054 PFE BYPASS PUMP STN
56 – 60	PUMP STATION - FUTURE
61	INTER-TIE - PCWA TINKER
62	INTER-TIE – PCWA CROWDER
63	INTER-TIE – PCWA STONERIDGE
64	INTER-TIE – PFE
65	INTER-TIE – BARTON ROAD (9341 BARTON ROAD)
66	INTER-TIE – BIANCHI (3551 BASELINE ROAD)
67	INTER-TIE – BLOSSOM HILL (1406 BLOSSOM HILL WAY)
68	INTER-TIE – CAVITT (8098 SIERRA COLLEGE BLVD)
69	INTER-TIE – FIVE STAR (6712 STANFORD RANCH ROAD)
70	INTER-TIE – HIGHLAND (9000 HIGHLAND PARK DR)
71	INTER-TIE – ORLANDO (1205 ORLANDO AVE)
72	INTER-TIE – PLEASANT GROVE (600 PLEASANT GROVE BLVD)
73	INTER-TIE – SIERRA COLLEGE (9200 SIERRA COLLEGE BLVD)
74	INTER-TIE – VERNON OAKS (651 VERNON OAKS DR)
75	INTER-TIE – AMERICAN VINEYARD VILLAGE
76	INTER-TIE – BUREAU OF RECLAMATION 72" RAW WATER
76-94	INTER-TIE – FUTURE
95-98	MISCELLANEOUS WD RELATED REMOTE SITES
99	316 REPEATER LOCATION

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REGISTERED PROFESSIONAL ENGINEER DANIEL ROBINSON No. 20405 ELECTRICAL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
INSTRUMENTATION
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SYMBOLS AND ABBREVIATIONS 5

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DRAWING NO. GI05
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PROJECT NO. 11843A10_P2 FILE NAME: 11843A1018GI005.dgn

PMP-210
UTILITY WATER PUMP
MOTOR:
25HP, 480VAC, 3Ø
INV. DUTY, TEFC
TOSHIBA MODEL: XYZ

PUMP
200 GPM @ 20 FT TDH
900-1800 RPM
GOULD MODEL: XYZ

P-01-001 J-BOX P-01-002

MWH 210 (H, C)
PMP 210 (T1, T2, T3)
TSH 210 (NC, C)

(MWH210-H/VFD210-33)
(MWH210-C/VFD210-X2)
(PMP210-T1/VFD210-T1)
(PMP210-T2/VFD210-T2)
(PMP210-T3/VFD210-T3)
(TSH210-NC/PCM300-CB1300H1)
(TSH210-C/PCM300-I001)

C-01-003 J-BOX

VFD-210
SECTION - 3
CUBICLE - 2
30HP, 480VAC, 42 AMPS

33, X2 — MWH-210 MOTOR WINDING HEATER
T1, T2, T3 — MOTOR CONNECTION

SS-210 VFD SPEED OUT: 11, 12
SB-210 REMOTE SPEED IN: 13, 14
MSP-210 REMOTE STOP: 15, 16
E-STOP: 23, 24
MS-210 REMOTE START: 17, 18
AUX1-210 RUNNING: 19, 20
AUX2-210 FAIL: 21, 22

(VFD210-11,12/PCM300-AQ001)
(VFD210-13,14/PCM300-AI001)
(VFD210-15/PCM300-Q001A)
(VFD210-16/PCM300-Q001B)
(VFD210-23/PCM300-C0002)
(VFD210-24/PCM300-C0003)
(VFD210-17/PCM300-Q002A)
(VFD210-18/PCM300-Q002B)
(VFD210-19/PCM300-FU13000H3)
(VFD210-20/PCM300-I003)
(VFD210-21/PCM300-FU1300H4)
(VFD210-22/PCM300-I004)

PE/PSH-210
UTILITY WATER HIGH PRESSURE
MODEL: XYZ
RANGE: 0-200 PSIG
SETPOINT: 50 PSIG

C-01-001
PE 210, PSH 210 (1, 2)

(PSH210-1/PCM300-CB1300H2)
(PSH210-2/PCM300-C0001)

FE/FIT/FQT-210
UTILITY WATER FLOW METER
ENDRESS HAUSER
CAT NO.: XYZ
FLOW RANGE: 200-2500 GPM
FLOW TOTAL: 1 PULSE/500 GAL

L-01-001
S-01-001 J-BOX S-01-003
FE 210, FIT 210 (L, N, G, 1, 2)
FQT 210 (4, 5)

LCP-210
S-01-002
HSS 210 (P1, P2, P3)
HSA 210 (OFF, LOCAL, REMOTE, xoo)
HSB 210 (STOP)
HSC 210 (START, oox)
C-01-002

(LCP210-P1/VFD210-1)
(LCP210-P2/VFD210-2)
(LCP210-P3/VFD210-3)
LOCAL SPEED IN: 1, 2, 3, 4

(LCP210-1/VFD210-5)
(LCP210-2/VFD210-6)
HSAL-210 LOCAL MODE: 5, 6

(LCP210-5/VFD210-7)
(LCP210-6/VFD210-8)
HSB-210 LOCAL STOP: 7, 8

(LCP210-7/VFD210-9)
(LCP210-8/VFD210-10)
HSC-210 LOCAL START: 9, 10

(LCP210-3/PCM300-FU1300H5)
(LCP210-4/PCM300-I006)

TERMINAL:
AQ0001+ <BLK-1>
AQ0001- <WHT-1>
SHLD
FU1300-P1
AI001+ <BLK-1>
FU1300-M1 <WHT-1>
SHLD
FU1300-H1
I001 <BLK>
Q001A <BLK>
Q001B <RED>
FU1300-H2
C0002
C0003
C0001
Q002A <BLU>
Q002B
CB1-210H
CB1-210N
GND
FU1300-P2
AI002+ <BLK-2>
FU1300-M2 <WHT-2>
SHLD
FU1300-P3
C0004
SHLD
FU1300-H3
I003 <BLU>
FU1300-H4
I004 <ORG>
FU1300-H5
I006 <YEL>

PHOENIX MODEL: XYZ 120 VAC
(C0002), (C0003), (C0001), (CB1300-H6)
CR1 210: 3, 1, 5, 4, 2, 6
(CB1-300N1), (I005)
120VAC
(FU1300-M3)
CR2 210: 3, 1, 5, 4, 2, 6
(C0004), (CB1300-H7), (I002)
PHOENIX MODEL: XYZ 120 VAC

FU1-300M, FU1-300P, CB1-300H
24 VDC
(FU1300-P), (CB1300-H)
120 VAC
CB1-300N (CB1300-N)

PLC:
1, 2 — SS 210 — %AQ001 SPEED OUT — RACK 1 SLOT 2
1, 2 — SB 210 — %AI001 SPEED IN — RACK 1 SLOT 3
1, 2 — TSH 210 — %I001 MTR TEMP — RACK 1 SLOT 4
1, 2 — MSP 210 — %Q001 STOP — RACK 1 SLOT 5
9, 10 — PSH 210 — %I005 HI PRESS — RACK 1 SLOT 4
3, 4 — MS 210 — %Q002 START — RACK 1 SLOT 5
3, 4 — F 210 — %AI002 FLOW — RACK 1 SLOT 2
3, 4 — FQ 210 — %I002 FLOW TOT — RACK 1 SLOT 4
5, 6 — AUX1 210 — %I003 RUNNING — RACK 1 SLOT 4
7, 8 — AUX2 210 — %I004 FAIL — RACK 1 SLOT 4
11, 12 — HSAR 210 — %I006 REMOTE — RACK 1 SLOT 4

THE ABOVE DRAWING IS INCLUDED AS AN EXAMPLE ONLY AND IS NOT PROJECT SPECIFIC. CONTRACTOR SHALL FURNISH LOOP DIAGRAMS FOR THE ENTIRE FACILITY. PRELIMINARY DETAILED LOOP DIAGRAMS TO BE SUBMITTED FOR REVIEW PRIOR TO BEGINNING CONSTRUCTION. THE LOOP DIAGRAM SHOWN ABOVE DISPLAYS THE LEVEL OF EXPECTED DETAIL.

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AQUIFER STORAGE AND RECOVERY WELLS PROJECT
INSTRUMENTATION
SOLAIRE ASR WELL
SAMPLE LOOP DRAWING

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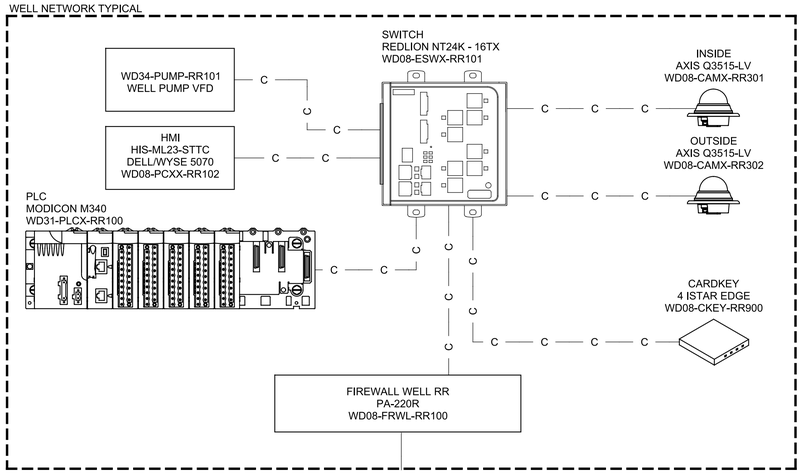

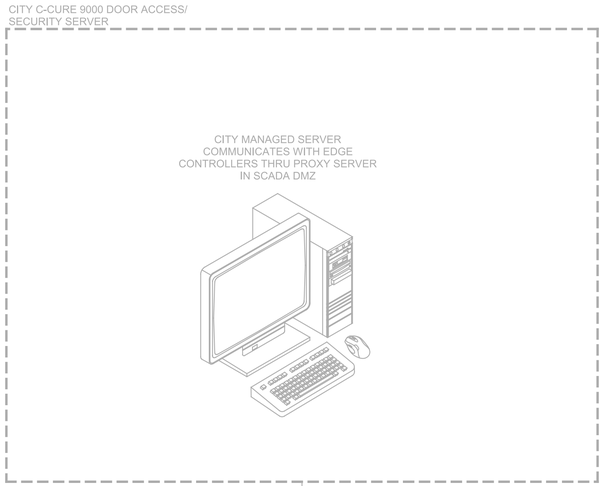

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INSTRUMENTATION

SOLAIRE ASR WELL
CONTROL BLOCK DIAGRAM

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1 2 3 4 5 6 7 8 9 10 11 12 13

A B C D E F G

I/O

POWER SOURCE

FIELD

WD34-HSXX 28101 — DI REMOTE — PLC-RR101
WD34-HCCX 28101 — DO RUN — PLC-RR101
WD34-SIXX 28101 — AI SPEED IN — PLC-RR101
WD34-SCXX 28101 — AO SPEED OUT — PLC-RR101
WD34-FSLX 28101 — DI SEAL ALARM — PLC-RR101
WD34-TSHX 28101 — DI TEMP — PLC-RR101
WD34-PUMP 28101 — DI RUNNING — PLC-RR101
WD34-YAFX 28101 — DI FAILED — PLC-RR101

ETHERNET

WD34-VFDX- 28101
VFD-18/B
480VAC-3P
WD31-MCCX-RR100

WD34-BKR2 28101 — SS 480VAC-3P — WD31-MCCX-RR100

WD34-BKRX 28101 — TM 120VAC-1P — PLCX-RR101

WD34-BKRX 28105 — TM 120VAC-1P — WD31-PLCX-RR101

WD34-PITX 28111 — AI — PLC-RR101
WD34-LTXX 28100 — AI — PLC-RR101
WD34-FITX 28105 — AI — PLC-RR101
WD34-PITX 28102 — AI — PLC-RR101

WD34-PITX 28111 — PRESSURE — WD34-PEXX 28111
WD34-LTXX 28100 — P-SUB — WD34-LEXX 28100
WD34-PUMP 28101 — WD34-HEAT 28101 — RTD
WD34-TE1X 28101 — RTD
WD34-TE2X 28101 — RTD
WD34-TE3X 28101
WD34-FSLX 28101 — THERMAL — WD34-FEXX 28101
WD34-FITX 28105 — MAGNETIC — WD34-FE2X 28105

NITROGEN
WD34-PIXX 28111
S
DOWNHOLE CONTROL PANEL
NITROGEN
NITROGEN

WD34-PIXX 28105

3/4" PW — MM — 3/4" PW — WELL WATER — I-002 I-001 — 3

WD34-PSHH 28107 — PRESS SW — WD34-PEXX 28107

WD34-PITX 28102 — PRESSURE — WD34-PEXX 28102

12" AS/AR — PUMP COLUMN RECHARGE/TO DISTRIBUTION — 1 — I-001 I-002

DOWNHOLE FLOW CONTROL VALVE
WD34-VALV 28111
SCREEN
WET WELL RR29 PUMP

10" AS — 12" AS — ANNULAR RECHARGE — I-002 I-001 — 2

WD34-PIXX-2811 DOWNHOLE VALVE PRESSURE GAUGE
WD34-PEXX-2811 DOWNHOLE VALVE NITROGEN PRESSURE
WD34-PIXX-2810 TRICKLE PRESSURE GAUGE
WD34-PUMP-2810 ASR WELL PUMP 300HP 480VAC 3PH — 1 / E-010
WD34-PEXX-2810 PRESSURE SWITCH HIGH HIGH __ PSIG OPEN
WD34-PEXX-2810 WELL PUMP DISCHARGE PRESS
WD34-LEXX-2810 WELL LEVEL
WD34-FEXX-2810 PUMP SEAL FLOW SWITCH LOW
WD34-FE2X-2810 TRICKLE FLOW __"

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WELL PUMP AND VALVES P&ID 1

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DRAWING NO. 18I01
SHEET NO. XX OF XX

1 2 3 4 5 6 7 8 9 10 11 12 13

I/O

POWER SOURCE

FIELD

WD34-ZCOX 28120 DO OPEN — PLC-RR101
WD34-ZCCX 28120 DO CLOSE — PLC-RR101
WD34-HSXX 28120 DI REMOTE — PLC-RR101
WD34-ZSOX 28120 DI OPENED — PLC-RR101
WD34-MOVX 28120 DI CLOSED — PLC-RR101
WD34-BKRX 28120 TM 480VAC-3P — WD31-MCCX-RR100
WD34-ZSOC 28120 LSR
WD34-HSAX 28120 OSC
WD34-HSGX 28120
WD34-MOVX 28120
WD34-DISC 28120

WD34-ZCOX 28130 DO OPEN — PLC-RR101
WD34-ZCCX 28130 DO CLOSE — PLC-RR101
WD34-HSXX 28130 DI REMOTE — PLC-RR101
WD34-ZSOX 28130 DI OPENED — PLC-RR101
WD34-MOVX 28130 DI CLOSED — PLC-RR101
WD34-BKRX 28130 TM 480VAC-3P — WD31-MCCX-RR100
WD34-ZSOC 28130 LSR
WD34-HSAX 28130 OSC
WD34-HSGX 28130
WD34-MOVX 28130
WD34-DISC 28130

WD34-FITX 28104 AI — PLC-RR101
WD34-BKRX 28104 TM 120VAC-1P — PLC-RR101
WD34-FITX 28104 MAGNETIC
WD34-FEXX 28104

WD34-HSXX 28150 DI REMOTE — PLC-RR100
WD34-ZCOX 28150 DO OPEN — PLC-RR101
WD34-ZCCX 28150 DO CLOSE — PLC-RR101
WD34-ZITX 28150 AI POSITION — PLC-RR101
WD34-BKRX 28150 TM 120VAC-1P — WD31-PLCX-RR101
WD34-HSAX 28150 LSR
WD34-HSGX 28150 OSC
WD34-LCPX 28150
WD34-ZITX 28150
WD34-VALV 28150

WD34-ZCOX 28160 DO OPEN — PLC-RR101
WD34-ZCCX 28160 DO CLOSE — PLC-RR101
WD34-HSXX 28160 DI REMOTE — PLC-RR101
WD34-ZSOX 28160 DI OPENED — PLC-RR101
WD34-MOVX 28160 DI CLOSED — PLC-RR101
WD34-BKRX 28160 TM 480VAC-3P — WD31-MCCX-RR100
WD34-ZSOC 28160 LSR
WD34-HSAX 28160 OSC
WD34-HSGX 28160
WD34-MOVX 28160
WD34-DISC 28160

WD34-ZCOX 28140 DO OPEN — PLC-RR101
WD34-ZCCX 28140 DO CLOSE — PLC-RR101
WD34-HSXX 28140 DI REMOTE — PLC-RR101
WD34-ZSOX 28140 DI OPENED — PLC-RR101
WD34-MOVX 28140 DI CLOSED — PLC-RR101
WD34-BKRX 28140 TM 480VAC-3P — WD31-MCCX-RR100
WD34-ZSOC 28140 LSR
WD34-HSAX 28140 OSC
WD34-HSGX 28140
WD34-MOVX 28140
WD34-DISC 28140

WD34-PDITX 28151 AI — PLC-RR101
WD34-PDITX 28151
WD34-PE1X 28151 PRESS DIFF

WD34-PITX 28106 AI — PLC-RR101
WD34-PITX 28106
WD34-PEXX 28106 PRESSURE

HYPOCHLORITE INJECTION I-003 I-002 7
FLUORIDE INJECTION I-004 I-002 8
3/4" CLS
3/4" NAF
MM
DRAIN
SAMPLE TAP
SPARE TAP
WD34-VALV 28150
WD34-FCVX 28150
WD34-PIXX 28150
H-STRAINER
10" AS
12" AR
12" AS/AR
12"
8" AF
8" AF
8" AF
PUMP COLUMN RECHARGE/TO DISTRIBUTION 1 I-001 I-002
ANNULAR RECHARGE I-002 I-001 2
12" AS
WD34-MOVX 28130
WD34-MOVX 28120
WD34-MOVX 28160
WD34-MOVX 28140
FROM DISTRIBUTION SYSTEM
TO TREATMENT WATER DISTRIBUTION SYSTEM N-002 N-006
WELL WATER SAMPLE 5 I-002 I-005
WELL WATER 3/4" PW 4 I-002 I-005
WELL WATER 3/4" PW 3 I-002 I-001
AIR GAP 6 I-002 I-005

WD34-MOVX-2812
WELL ANNULUS RECHARGE VALVE
1HP 480VAC 3PH

WD34-MOVX-2813
PUMP COLUMN RECHARGE VALVE
1HP 480VAC 3PH

WD34-FEXX-2810
WELL FLOW METER

WD34-VALV-2815
INJECTION FLOW CONTROL VALVE

WD34-MOVX-2816
WASTE VALVE
1HP 480VAC 3PH

WD34-PIXX-2815
RECHARGE LINE PRESSURE GAUGE

WD34-MOVX-2814
PRODUCTION VALVE
1HP 480VAC 3PH

WD34-PE1X-2815
RECHARGE LINE STRAINER DIFF PRESS

WD34-PEXX-2810
DISTRIBUTION SYSTEM PRESSURE

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED JLH
DRAWN SGS
CHECKED DEB
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER DANIEL ROBINSON No. 20405 ELECTRICAL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
INSTRUMENTATION
SOLAIRE ASR WELL
WELL PUMP AND VALVES P&ID 2

VERIFY SCALES
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JOB NO. 11843A.10
DRAWING NO. 18I02
SHEET NO. XX OF XX

1 2 3 4 5 6 7 8 9 10 11 12 13

11843A10_P2 11843A1018I002.dwg

1 2 3 4 5 6 7 8 9 10 11 12 13

A I/O
B POWER SOURCE
C FIELD
D E F G

F WD33-LITX 28205 AI PLC-RR101

WD33-LITX 28204 AI PLC-RR101

WD33-HSXX 28211 DI REMOTE PLC-RR101
WD33-HCCX 28211 DO RUN PLC-RR101
WD33-SIXX 28211 AI SPEED IN PLC-RR101
WD33-SCXX 28211 AO SPEED OUT PLC-RR101
WD33-PUMP 28211 DI RUNNING PLC-RR101
WD33-YAFX 28211 DI FAILED PLC-RR101

WD33-HSXX 28221 DI REMOTE PLC-RR101
WD33-HCCX 28221 DO RUN PLC-RR101
WD33-SIXX 28221 AI SPEED IN PLC-RR101
WD33-SCXX 28221 AO SPEED OUT PLC-RR101
WD33-PUMP 28221 DI RUNNING PLC-RR101
WD33-YAFX 28221 DI FAILED PLC-RR101

WD33-FITX 28203 AI FLOW PLC-RR101

WD34-LSHX 28209 DI PLC-RR101

WW33-VFDX- 28211
VFD
120VAC-1P
WD31-LPXX-RR211

WW33-VFDX- 28221
VFD
120VAC-1P
WD31-LPXX-RR221

WD33-BKRX 28203 TM 120VAC-1P PLCX-RR101

F WD33-LITX 28205 PRESSURE
F WD33-LEXX 28205

WD33-LITX 28204 PRESSURE
WD33-LEXX 28204

2" VENT TO OUTSIDE BUILDING

E-STOP OO
WD33-HSUX 28211
WD33-HSEX 28211
WD33-LCPX 28211

WD33-PUMP 28211
WD33-HEAT 28211

E-STOP OO
WD33-HSUX 28221
WD33-HSEX 28221
WD33-LCPX 28221

WD33-PUMP 28221
WD33-HEAT 28221

WD33-FITX 28203 MAGNETIC
WD33-FEXX 28203

WD34-LSHX 28209
WD34-LEXX 28209

WD33-PSHX 28211 PRESS SW
WD33-PIXX 28211
WD33-PEXX 28211

WD33-PSHX 28221 PRESS SW
WD33-PIXX 28221
WD33-PEXX 28221

MM

HYPOCHLORITE INJECTION ON RECOVERY PIPE
3/4" CLS
7 I-003 I-002

F WD33-TANK 28205
2'D
DRAIN TO SUMP

WD33-TANK 28201
2'D
DRAIN TO SUMP

DRAIN TO SUMP

DRAIN TO SUMP

VENDOR SUPPLIED HYPOCHLORITE FEED SKID

FLUORIDE SYSTEM
9 I-004 I-003

SEWER
CONTAINMENT SUMP

WD33-TANK-2820 FUTURE HYPOCHLORITE TANK
WD33-LEXX-2820 FUTURE HYPO STORAGE TANK LEVEL
WD33-TANK-2820 HYPOCHLORITE TANK
WD33-LEXX-2820 HYPO STORAGE TANK LEVEL
WD33-PIXX-2821 HYPO FEED PUMP 1 PRESS GAUGE
WD33-PEXX-2821 HYPO FEED PUMP 1 PRESS HIGH
WD33-PUMP-2821 HYPOCHLORITE FEED PUMP 1 0.5HP 120VAC 1PH
WD33-PUMP-2822 HYPOCHLORITE FEED PUMP 2 0.5HP 120VAC 1PH
WD33-PIXX-2822 HYPO FEED PUMP 2 PRESS GAUGE
WD33-PEXX-2822 HYPO FEED PUMP 2 PRESS HIGH
WD33-FEXX-2820 HYPO DOSE FLOW
WD34-LEXX-2820 CONTAINMENT SUMP LEVEL SWITCH HIGH

REV	DATE	BY	DESCRIPTION
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DESIGNED JLH
DRAWN SGS
CHECKED DEB
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER DANIEL ROBINSON No. 20405 ELECTRICAL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
INSTRUMENTATION
SOLAIRE ASR WELL
SODIUM HYPOCHLORITE FEED SYSTEM P&ID

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JOB NO. 11843A.10
DRAWING NO. 18I03
SHEET NO. XX OF XX

11843A10_P2 11843A1018I003.dwg

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User: svcPW
Model: Layout1 ColorTable: gshade.ctb DesignScript: Carollo_Std_Pen_v0905.pen PlotScale: 1:1
CYoung

I/O

POWER SOURCE

FIELD

WD09-EWSS 28500 — DI — PLC-RR101

WD09-FSHX 28500

WD09-FEXX 28500

WD09-FEXX-2850
EMERGENCY EYEWASH & SHOWER

INSTANT HOT WATER HEATER

WD33-TANK 28310 — WD33-TANK-28310 SATURATION TANK

WD33-TANK 28311 — WD33-TANK-28311 WATER SOFTENER TANK 1

WD33-TANK 28311 — WD33-TANK-28311 WATER SOFTENER TANK 2

POTABLE WATER — 3/4" PW

WD33-SVXX 28311

WD33-HSXX 28311 — DI REMOTE — PLC-RR101

WD33-HCCX 28311 — DO RUN — PLC-RR101

WD33-SIXX 28311 — AI SPEED IN — PLC-RR101

WD33-SCXX 28311 — AO SPEED OUT — PLC-RR101

WD33-PUMP 28311 — DI RUNNING — PLC-RR101

WD33-YAFX 28311 — DI FAILED — PLC-RR101

WD33-FITX 28311 — AI FLOW — PLC-RR101

WW33-VFDX- 28311
VFD
120VAC-1P
WD31-LPXX-RR311

WD33-BKRX 28311 — TM 120VAC-1P — PLCX-RR101

E-STOP

WD33-HSUX 28311

WD33-HSEX 28311 — OO

WD33-LCPX 28311

WD33-PUMP 28311

WD33-HEAT 28311

WD33-FITX 28311

MAGNETIC

WD33-FEXX 28311

WD33-PSHX 28311

PRESS SW

WD33-PEXX 28311

WD33-PIXX 28311

WD33-PUMP-2831
FLUORIDE FEED PUMP
0.5HP 120VAC 1PH

WD33-PEXX-2831
FLUORIDE FEED PUMP PRESS HIGH

WD33-PIXX-28311
FLUORIDE FEED PUMP PRESS GAUGE

WD33-FEXX-2831
FLUORIDE FLOW

S — WD33-FCVX 28303

OVERFLOW

M

WD33-TANK 28301 — WD33-TANK-2830 SATURATOR TANK

WD33-TANK 28302 — WD33-TANK-2830 SOLUTION TANK

SECONDARY CONTAINMENT

MM

3/4" NAF — FLUORIDE INJECTION ON RECOVERY PIPE — 8 — I-004 I-002

CONTAINMENT SUMP — 9 — I-004 I-003

VENDOR SUPPLIED SODIUM FLUORIDE SYSTEM

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED JLH
DRAWN SGS
CHECKED DEB
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — DANIEL ROBINSON — No. 20405 — ELECTRICAL — STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE

AQUIFER STORAGE AND RECOVERY WELLS PROJECT

INSTRUMENTATION

SOLAIRE ASR WELL
LIQUID FLUORIDE FEED SYSTEM P&ID

VERIFY SCALES
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JOB NO. 11843A.10
DRAWING NO. 18I04
SHEET NO. XX OF XX

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PlotScale: 1:1
DesignScript: Carollo_Std_Pen_v0905.pen
ColorTable: gshade.ctb
Model: Layout1
CYoung

I/O

POWER SOURCE

FIELD

WD33-AITX 28305 AI FL PLC-RR101
WD33-AITX 28205 AI CL PLC-RR101
WD33-AITX 28404 AI TURB PLC-RR101
WD33-AITX 28405 AI COND PLC-RR101
WD33-SIXX 28411 AI SPEED IN PLC-RR101
WD33-SCXX 28411 AO SPEED OUT PLC-RR101
WD33-PUMP 28411 DI RUNNING PLC-RR101
WD33-YAFX 28411 DI FAILED PLC-RR101
WD33-HSXX 28411 DI REMOTE PLC-RR101
WD33-HCCX 28411 DO RUN PLC-RR101
WD33-LTXX 28401 AI PLC-RR101
WD33-LTXX 28402 AI PLC-RR101
WD33-LTXX 28403 AI PLC-RR101

WD33-BKRX 28305 TM 120VAC-1P PLCX-RR101
WD33-BKRX 28205 TM 120VAC-1P PLCX-RR101
WD33-BKRX 28404 TM 120VAC-1P PLCX-RR101
WD33-BKRX 28405 TM 120VAC-1P PLCX-RR101

WD33-VFDX- 28411
VFD
480VAC-3P
WD31-MCCX-RR400

WD33-AITX 28305 FL
WD33-AEXX 28305
WD33-AITX 28205 CL
WD33-AEXX 28205
WD33-AITX 28404 TURB
WD33-AEXX 28404
WD33-AITX 28405 COND
WD33-AEXX 28405

WD33-MWHX 28411
WD33-PUMP 28411

WD33-LTXX 28401 P-SUB
WD33-LEXX 28401
WD33-LTXX 28402 P-SUB
WD33-LEXX 28402
WD33-LTXX 28403 P-SUB
WD33-LEXX 28403

SAMPLE 5 I-002 I-005 1/2" SAM
WELL WATER 4 I-002 I-005 3/4" PW
AIR GAP 6 I-002 I-005 8" AF

HOSE BIB CHEMICAL ROOM
HOSE BIB OUTSIDE BUILDING
SEWER
BUG SCREEN
AIR GAP STRUCTURE
STORM DRAIN
MONITORING WELL 1
MONITORING WELL 2
MONITORING WELL 3

WD33-AEXX-2830 FLUORIDE ANALYZER
WD33-AEXX-2820 CHLORINE ANALYZER
WD33-AEXX-2840 WELL TURBIDITY
WD33-AEXX-2840 MONITORING WELL 1 CONDUCTIVITY ANALYZER
WD33-PUMP-2841 MONITORING WELL 1 PUMP
WD33-LEXX-2840 MONITORING WELL 1 LEVEL
WD33-LEXX-2840 MONITORING WELL 2 LEVEL
WD33-LEXX-2840 MONITORING WELL 3 LEVEL

REV	DATE	BY	DESCRIPTION
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DESIGNED JLH
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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER DANIEL ROBINSON No. 20405 ELECTRICAL STATE OF CALIFORNIA

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CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
INSTRUMENTATION
SOLAIRE ASR WELL
WATER QUALITY P&ID 1

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JOB NO. 11843A.10
DRAWING NO. 18I05
SHEET NO. XX OF XX

I/O

POWER SOURCE

FIELD

WD33-VCP 2871 MBTCP PLC-RR101

WD33-VCP 28172 MBTCP PLC-RR101

WD33-VCP 28173 MBTCP PLC-RR101

WD33-BKRX 2871 TM 120VAC-1P

WD33-BKRX 28172 TM 120VAC-1P

WD33-BKRX 28173 TM 120VAC-1P

WD33-LCPX 2871 FBV

WD33-LCPX 28172 FBV

WD33-LCPX 28173 FBV

WD34-ZCOX 28177 DO OPEN PLC-RR101

WD34-ZCCX 28177 DO CLOSE PLC-RR101

WD34-HSXX 28177 DI REMOTE PLC-RR101

WD34-ZSOX 28177 DI OPENED PLC-RR101

WD34-MOVX 28177 DI CLOSED PLC-RR101

WD33-FITX 28177 AI FLOW PLC-RR101

WD34-BKRX 28177 TM 480VAC-3P WD31-MCCX-RR100

WD33-BKRX 28177 TM 120VAC-1P PLCX-RR101

WD34-ZSOC 28177 LSR

WD34-HSAX 28177 OSC

WD34-HSGX 28177

WD34-MOVX 28177

WD34-DISC 28177

WD33-FITX 28177 MAGNETIC

WD33-FEXX 28177

WD34-MOVX 28172B FBV

WD33-FLTR 28172

WD34-MOVX 28172C FBV

WD34-MOVX 28172A FBV

WD34-MOVX 28172D FBV

VENDOR SUPPLIED FILTER

WD34-MOVX 28173B FBV

WD33-FLTR 28173

WD34-MOVX 28173C FBV

WD34-MOVX 28173A FBV

WD34-MOVX 28173D FBV

VENDOR SUPPLIED FILTER

WD34-MOVX 28171B FBV

WD33-FLTR 28171

WD34-MOVX 28171C FBV

WD34-MOVX 28171A FBV

WD34-MOVX 28171D FBV

VENDOR SUPPLIED FILTER

WD34-MOVX 28177

MM

AIR GAP STRUCTURE

BACKWASH TO SEWER

POTABLE WATER TO DISTRIBUTION

POTABLE WATER SAMPLE

WELL WATER 3/4" PW

WELL WATER 3/4" PW

WELL WATER N-002 N-006

WD33-FLTR-28171 MOUNTED WATER FILTER 1

WD33-FLTR-28172 MOUNTED WATER FILTER 2

WD33-FLTR-28173 MOUNTED WATER FILTER 3

WD34-MOVX-2817 FLOW CONTROL VALVE 1HP 480VAC 3PH

WD33-FEXX-2817 BACKWASH MAG FLOW

REV	DATE	BY	DESCRIPTION
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DESIGNED JLH
DRAWN SGS
CHECKED DEB
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER DANIEL ROBINSON No. 20405 ELECTRICAL STATE OF CALIFORNIA

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CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE

AQUIFER STORAGE AND RECOVERY WELLS PROJECT

INSTRUMENTATION

SOLAIRE ASR WELL
PACKAGED/SKID MOUNTED WATER FILTERS P&ID

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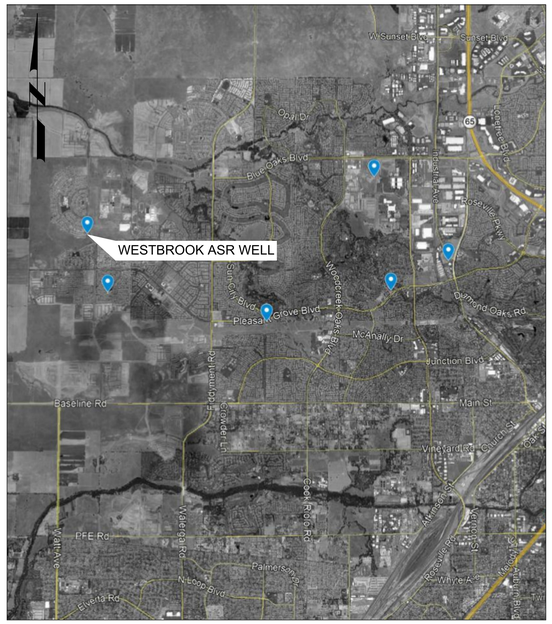
DRAWING NO. 18I06
SHEET NO. XX OF XX

CITY OF ROSEVILLE

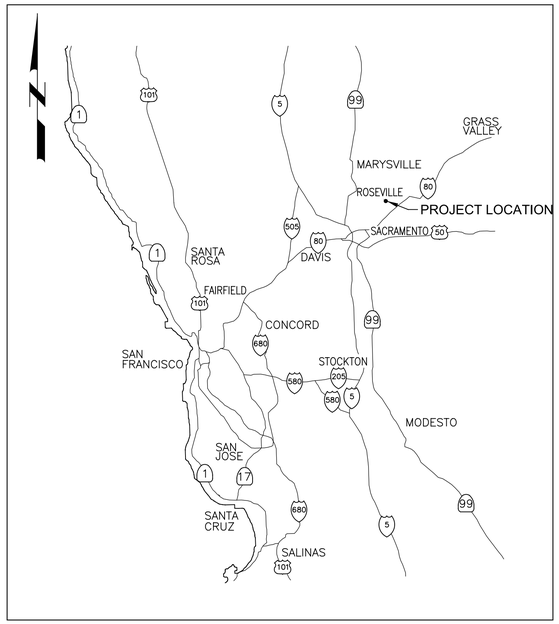
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
WESTBROOK ASR WELL

50% DESIGN SUBMITTAL
OCTOBER 2021

VOLUME 2 OF 3



VICINITY MAP



LOCATION MAP

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER THOMAS CLEVELAND
No. 72713
CIVIL
STATE OF CALIFORNIA

APPROVAL RECOMMENDED BY: _____ DATE: 10/1/2021
JANICE GAINEY, P.E.
SENIOR ENGINEER
DEPARTMENT OF ENVIRONMENTAL UTILITIES
CITY OF ROSEVILLE

APPROVED BY: _____ DATE: 10/1/2021
SEAN BIGLEY
ASSISTANT ENVIRONMENTAL UTILITIES DIRECTOR
ENVIRONMENTAL UTILITIES - WATER UTILITY & GOVERNMENT RELATIONS
CITY OF ROSEVILLE

SUBMITTED BY: _____ DATE: 10/1/2021
CHRISTOPHER CLEVELAND, P.E.
SENIOR PROJECT MANAGER / SENIOR VICE PRESIDENT
CAROLLO ENGINEERS, INC.

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JOB NO.	11843A.10
DRAWING NO.	G01
SHEET NO.	1 OF XX

@	AT (MEASUREMENT)	
△	DEFLECTION ANGLE, CENTRAL ANGLE	
#	NUMBER (REBAR Ø)	
A		
AB	ANCHOR BOLT	
ABC	AGGREGATE BASE COURSE	
ABS	ACRYLONITRILE BUTADIENE STYRENE	
AC	ASPHALTIC CONCRETE	
ACB	AIR CIRCUIT BREAKER	
ACI	AMERICAN CONCRETE INSTITUTE	
ACP	ASBESTOS CEMENT PIPE	
ACU	AIR CONDITIONING UNIT	
AD	AREA DRAIN	
ADDL	ADDITIONAL	
ADJ	ADJACENT, ADJUST, ADJUSTABLE	
ADMIN	ADMINISTRATION	
ADR	ACCESS DOOR	
AED	AREA EQUIPMENT DRAIN	
AER	AERAT(ION)(OR)	
AFC	AFTERCOOLER	
AFF	ABOVE FINISHED FLOOR	
AFM	AIR FLOW MONITOR	
AHU	AIR HANDLING UNIT	
AIC	AIR COMPRESSOR	
AIL	AIR INTAKE LOUVER	
ALT	ALTERNATE	
AL	ALUMINUM	
ANCH	ANCHOR	
ANV	ANGLE VALVE	
APPROX	APPROXIMATE, APPROXIMATELY	
ARCH	ARCHITECTURAL	
ARV	AIR RELEASE VALVE	
ASSY	ASSEMBLY	
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	
AV	ACID VENT	
AVG	AVERAGE	
AVV	AIR AND VACUUM VALVE	
AW	ACID WASTE	
B		
BC	BEGIN CURVE, BRASS CAP, BACK OF CURB, BOLT CIRCLE	
BCKR	BACKER BOARD	
BCM	BATCHMETER	
BD	BOARD	
BDD	BACKDRAFT DAMPER	
BDR	BASIN DRAIN LINE	
BF	BLIND FLANGE	
BFG	BELOW FINISHED GRADE	
BFP	BELT FILTER PRESS	
BFV	BUTTERFLY VALVE	
BG	BREAK GLASS HAND SWITCH	
BKW	BACKWASH	
BLDG	BUILDING	
BLK	BLOCK	
BLKHD	BULKHEAD	
BLR	PROCESS BLOWER	
BM	BEAM, BENCH MARK	
BOTT	BOTTOM	
BOTTS	BOTTOM SLUDGE	
BPV	BACK PRESSURE VALVE	
BRG	BEARING	
BSP	BLACK STEEL PIPE	
BTU	BRITISH THERMAL UNITS	
BTWN	BETWEEN	
BV	BALL VALVE	
BWCCP	BAR-WRAPPED CONCRETE CYLINDER PIPE	
C		
C	CLOSE, CONDUIT CHANNEL (STRUCTURAL)	
CA	CONCRETE ANCHOR	
CAUSTIC	CAUSTIC SOLUTION (CONCENTRATED OR DILUTE)	
CB	CATCH BASIN	
CC	CENTER OF CURVATURE, CENTER TO CENTER	
CCB	CHLORINE CONTACT BASIN	
CD	CEILING DIFFUSER, CONDENSATE DRAIN	
CDL	CHEMICAL DRAIN LINE	
CDT	CONDUIT	
CEF	CEILING EXHAUST FAN	
CF	CUBIC FEET	
CFM	CUBIC FEET PER MINUTE	
CFS	CUBIC FEET PER SECOND	
CHEMD	CHEMICAL DRAIN	
CHF	CHEMICAL FEEDER	
CHKD PL	CHECKERED PLATE	
CI	CAST IRON	
CIP	CAST IRON PIPE	
CIRC	CIRCUMFERENTIAL/CIRCUMFERENCE	
CJ	CONSTRUCTION JOINT	
CKA	CHECK VALVE, ANGLE	
CKB	CHECK VALVE, BALL	
CKF	CHECK VALVE, FLAP	
CKS	CHECK VALVE, SWING	
CL	CENTER LINE	
CLK	CHAIN LINK	
CLD	CHLORINE LEAK DETECTOR	
CLL	CHLORINE LIQUID	
CLP	CHLORINE GAS (PRESSURE)	
CLR	CLEAR	
CLS	CHLORINE SOLUTION	
CLSM	CONTROLLED LOW STRENGTH MATERIAL	
CLV	CHLORINE GAS (VACUUM)	
CML	CEMENT MORTAR LINED	
CMLC	CEMENT MORTAR LINED AND COATED	
CMP	CORRUGATED METAL PIPE	
CMU	CONCRETE MASONRY UNIT	
CNV	CONVEYOR	
CO	CLEANOUT	
COL(S)	COLUMN(S)	
CONC	CONCRETE	
CONN	CONNECT, CONNECTION	
CONST	CONSTRUCTION	
CONT	CONTINUOUS OR CONTINUATION OR (D) (OUS)	
CORR	CORRUGATE(D), CORROSION	
CP	CONTROL POINT	
CPLG	COUPLING	
CPT	CARPET	
CPVC	CHLORINATED POLYVINYL CHLORIDE	
CS	CARBON STEEL, CIRCULATING SLUDGE	
CSP	CHEMICAL SUMP PUMP, CORRUGATED STEEL PIPE	
CT	CURRENT TRANSFORMER, CERAMIC TILE	
CTJ	CONTROL JOINT	
CTL	CONTROL	
CTR	CENTER, CENTERED	
CTSK	COUNTERSUNK	
CU	CUBIC	
CUP	COPPER PIPE	
CV	CHECK VALVE	
CW	COLD WATER	
CWV	COMBINATION WASTE AND VENT	
CY	CUBIC YARD	
D		
D	DEPTH, DIGITAL OR DISCRETE, DRAIN	
D/W	DRIVEWAY	
DBL	DOUBLE	
DDR	DESICCANT DRYER	
DEG or °	DEGREE	
DEMO	DEMOLISH, DEMOLITION	
DET	DETAIL	
DFL	DECANT/FILTRATE	
DG	DOOR GRILLE	
DIA or Ø	DIAMETER	
DIAG	DIAGONAL	
DIF	DIFFUSER	
DIG	DIGESTER	
DIM	DIMENSION	
DIP	DUCTILE IRON PIPE	
DISCH	DISCHARGE	
DIW	DEIONIZED WATER	
DL	DEAD LOAD, DRAIN LINE	
DLV	DOOR LOUVER	
DMP	DAMPER	
DMS	DIAPHRAGM SEAL	
DN	DOWN	
do	DITTO	
DO	DOOR OPENING	
DP	DEEP (OR DEPTH)	
DPV	DIAPHRAGM VALVE	
DR	DOOR, DRAIN	
DRT	DRIP TRAP	
DRV	DRAIN VALVE	
DS	DIGESTED SLUDGE, DOWN SPOUT	
DSW	DISTILLED WATER, DOOR SWITCH	
DUC	DUST COLLECTOR	
DUH	DUCT HEATER UNIT	
DW	DISTILLED WATER	
DWD	DEWATERING DRAIN	
DWG(S)	DRAWING(S)	
DWL(S)	DOWEL(S)	
E		
E	EAST	
EA	EACH	
EC	END OF CURVE	
ECC RED	ECCENTRIC REDUCER	
ECU	EVAPORATOR COOLING UNIT	
ED	EQUIPMENT DRAIN	
EF	EXHAUST FAN, EACH FACE	
EFF	EFFLUENT	
EG	EXHAUST GRILLE	
EIFS	EXTERIOR INSULATION AND FINISH SYSTEM	
EJ	EXPANSION JOINT	
EJR	INJECTOR/EDUCTOR	
EL	ELEVATION	
ELEC	ELECTRICAL	
ELL	ELBOW	
EMBED	EMBEDMENT	
EMH	ELECTRICAL MANHOLE	
EP	EDGE OF PAVEMENT	
EPS	EXPANDED POLYSTYRENE	
EPV	ECCENTRIC PLUG VALVE	
EQ	EQUAL	
EQUIP	EQUIPMENT	
ER	EXHAUST REGISTER	
ES	EACH SIDE	
ESEW	EMERGENCY SHOWER AND EYE WASH	
ESS	EMERGENCY HAND SWITCH	
ET	ELECTRICALLY HEAT TRACED	
EUH	ELECTRIC UNIT HEATER	
EVR	EVAPORATOR	
EW	EACH WAY	
EWC	ELECTRIC WATER COOLER	
EWEF	EACH WAY EACH FACE	
EWH	ELECTRIC WATER HEATER, EXHAUST	
EX	EXISTING	
EXIST	EXISTING	
EXP	EXPANSION, EXPANSION TANK	
EXPO	EXPOSED	
EXT	EXTERIOR	
F		
FACT	FACTORY	
FAD	FOUL AIR DUCT	
FB	FLAT BAR	
FBW	FILTER BACKWASH	
FC	FACE OF CURB, FLEXIBLE COUPLING	
FCA	FLANGE COUPLING ADAPTER	
FCO	FLOOR CLEANOUT	
FCU	FAN COIL UNIT	
FD	FIRE DAMPER, FLOOR DRAIN, FOUND	
FDC	FIRE DEPARTMENT CONNECTION	
FDL	FLOOR DRAIN LINE	
FDR	FEEDER	
FEFF	FINAL EFFLUENT	
FG	FLAP GATE	
FH	FIRE HYDRANT	
FILT	FILTRATE	
FIN	FINISH	
FIN FL	FINISHED FLOOR	
FIN GR	FINISHED GRADE	
FL	FLOOR, FLOW LINE	
FLA	FOUL AIR	
FLD	FILTER DRAIN	
FLE	FILTER EFFLUENT	
FLEX	FLEXIBLE	
FLG	FLANGE, OR FLANGED	
FLR	FILTER	
FM	FORCE MAIN	
FND	FOUNDATION	
FO	FUEL OIL	
FOB	FLAT ON BOTTOM	
FOT	FLAT ON TOP	
FPM	FEET PER MINUTE	
FPP	FLEXIBLE PLASTIC PIPE	
FRP	FIBERGLASS REINFORCED PLASTIC	
FRPP	FIBERGLASS REINFORCED PLASTIC PIPE	
FRS	FROTH SPRAY	
FS	FAR SIDE	
FSTN	FASTEN(ED)	
FT or '	FOOT, FEET	
FTG	FOOTING	
FUP	FUEL DISPENSER	
FV	FLAP VALVE	
FW	FLUSHING WATER	
FX	FIRE EXTINGUISHER	
FXC	FIRE EXTINGUISHER CABINET	
FXE	FIRE EXTINGUISHER - ELECTRICAL	
G		
G	GAS, GROUND, GUTTER	
GA	GAUGE or GAGE	
GAL	GALLONS	
GALV	GALVANIZE(D)	
GAV	GRAVITY VENTILATOR	
GB	GRADE BREAK	
GBT	GRAVITY BELT THICKENER	
GC	GROOVED COUPLING	
GEL	GRAVITY EXHAUST LOUVER	
GEN	GENERAL, GENERATOR	
GL	GLASS	
GLV	GLOBE VALVE	
GM	GAS METER	
GND	GROUND	
GPD	GALLONS PER DAY	
GPM	GALLONS PER MINUTE	
GR	GRADE	
GRTG	GRATING	
GRV	GRAVITY VENTILATOR	
GSP	GALVANIZED STEEL PIPE	
GV	GATE VALVE	
GYP	GYPSUM	
H		
H	EXPLOSION-PROOF, HIGH, HORIZONTAL	
H1E	HOOK ONE END	
H2E	HOOK TWO ENDS	
HAS	HEADED ANCHOR STUD	
HB	HOSE BIBB	
HDPE	HIGH DENSITY POLYEHTYLENE	
HDW	HARDWARE	
HDWL	HEADWALL	
HEF	HOOD EXHAUST FAN	
HGT	HEIGHT	
HH	HAND HOLE, ELECTRICAL PULL BOX	
HORIZ	HORIZONTAL	
HP	HEAT PUMP, HORSEPOWER, HIGH PRESSURE	
HPA	HIGH PRESSURE AIR	
HPT	HIGH POINT	
HPU	HEAT PUMP UNIT AIR	
HR	HANDRAIL, HOSE REEL, HOUR	
HSF	HOOD SUPPLY FAN	
HSS	HOLLOW STRUCTURAL SECTION (STEEL)	
HTX	HEAT EXCHANGER	
HV	HOSE VALVE	
HW	HOT WATER	
HWL	HIGH WATER LEVEL	
HWR	HOT WATER RETURN	
HWS	HOT WATER SUPPLY	
HxW	HEIGHT BY WIDTH	
HYD	HYDRANT	
I		
IA	INSTRUMENT AIR	
ID	INSIDE DIAMETER, INSIDE DIMENSION, IDENTIFICATION	
I.F.	INSIDE FACE	
IN or "	INCHES	
INCL	INCLUDE, INCLUDING	
INF	INFLUENT	
INJ	INJECTOR	
INSTR	INSTRUMENTATION	
INSUL	INSULAT(E)(ED)(ING)(ION)	
INT	INTERIOR	
INV	INVERT	
IP	IRON PIPE	
ISR	INTRINSICALLY SAFE RELAY	
J		
JST	JOIST	
JT	JOINT	
K		
KGV	KNIFE GATE VALVE	
L		
L	ANGLE (STRUCTURAL), LENGTH, LOUVER	
LAB	LABORATORY	
LAV	LAVATORY	
LB(S)	POUND(S)	
LDF	LIQUID DIESEL FUEL	
LDFR	LIQUID DIESEL FUEL RETURN	
LF	LINEAL FEET	
LG	LONG	
LH	LEFT HAND	
LHR	LEFT HAND REVERSE	
LHRA	LEFT HAND REVERSE ACTIVE	
LHRB	LEFT HAND REVERSE BEVEL	
LL	LIVE LOAD	
LLH	LONG LEG HORIZONTAL	
LLV	LONG LEG VERTICAL	
LP	LOW PRESSURE	
LPA	LOW PRESSURE AIR	
LPG	LIQUIFIED PROPANE GAS	
LPT	LOW POINT	
LR	LONG RADIUS	
LS	LAB SINK	
LT	LEFT	
LWL	LOW WATER LEVEL	
M		
M	MOTOR	
MAINT	MAINTENANCE	
MAN	MANUAL	
MASY	MASONRY	
MATL	MATERIAL	
MAU	MAKE-UP AIR UNIT	
MAX	MAXIMUM	
MB	MACHINE BOLT	
MC	MECHANICAL COUPLING	
MCJ	MASONRY CONTROL JOINT	
MD	MOTORIZED DAMPER	
MECH	MECHANICAL	
MET	METAL	
MFR	MANUFACTURER	
MG/L	MILLIGRAMS PER LITER	
MGD	MILLION GALLONS PER DAY	
MH	MANHOLE	
MIN	MINIMUM	
MISC	MISCELLANEOUS	
MIX	MIXER	
MJ	MECHANICAL JOINT	
MK	MARK	
ML	MIXED LIQUOR	
MO	MASONRY OPENING	
MOD	MODIFIED	
MOIST	MOISTURE	
MON	MONUMENT	
MOS	MOISTURE SEPARATOR	
MPM	METERING PUMP	
MS	MOP SINK	
MTD	MOUNTED	
N		
N	NORTH, NEUTRAL	
NA	NOT APPLICABLE	
NC	NORMALLY CLOSED	
NEV	VALVE, NEEDLE	
NG	NATURAL GRADE, NATURAL OR LP GAS	
NIC	NOT IN CONTRACT	
NO., #	NUMBER	
NOM	NOMINAL	
NPT	NATIONAL PIPE THREAD	
NPW	NON-POTABLE WATER	
NS	NEAR SIDE	
NTS	NOT TO SCALE	
O		
O	OPEN	
OBD	OPPOSED BLADE DAMPER	
OC	ON CENTER	
OD	OUTSIDE DIAMETER, OUTSIDE DIMENSION	
OED	OPEN EQUIPMENT DRAIN	
O.F.	OUTSIDE FACE	
OFL	OVERFLOW	
OPNG	OPENING	
OPP	OPPOSITE	
OPP HND	OPPOSITE HAND	
OZ	OUNCE	
P		
P	POLE	
PBL	POLYMER BLENDER	
PC	POINT OF CURVATURE	
PCC	PLANT CONTROL CENTER	
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE	
PCP	PROGRESSIVE CAVITY PUMP	
PD	POSITIVE DISPLACEMENT, PLANT DRAIN	
PD, PLD	PULSATION DAMPENER	
PDP	POSITIVE DISPLACEMENT PUMP	
PE	PLAIN END	
PERP	PERPENDICULAR	
PG	PRESSURE GAUGE	
PH	PHASE, PHYSICALLY HANDICAPPED	
PI	POINT OF INTERSECTION	
PIV	POST INDICATOR VALVE	
PL	PLATE, PROPERTY LINE	
PLAS	PLASTIC	
PLCS	PLACES	
PLS	POLYMER SOLUTION	
PLWD	PLYWOOD	
PMP	PUMP	
PNL(S)	PANEL(S)	
POL	POLYMER	
POLY	POLYETHYLENE	
POS	POSITION	
POW	POTABLE WATER	
PP	POWER POLE	
PPMV	PARTS PER MILLION (VOLUME)	
PRC	POINT OF REVERSE CURVATURE	
PREFAB	PREFABRICATED	
PRG	PRESSURE REGULATOR	
PRI	PRIMARY	
PROJ	PROJECTION	
PRR	PRESSURE OR VACUUM RELIEF VALVE	
PRV	PRESSURE REDUCING VALVE, PRESSURE REGULATION VALVE, PRESSURE RELIEF VALVE	
PS	PUMP STATION, PIPE SUPPORT	
PSF	POUNDS PER SQUARE FOOT	
PSG	PRESSURE GAUGE	
PSI	POUNDS PER SQUARE INCH	
PSIG	POUNDS PER SQUARE INCH GAUGE	
PT	POINT, POINT OF TANGENCY	
PV	PLUG VALVE	
PVC	POINT OF VERTICAL CURVATURE, POLYVINYL CHLORIDE	
PVDF	POLYVINYLIDENEFLUORIDE	
PVI	POINT OF VERTICAL INTERSECTION	
PVMT	PAVEMENT	
PVT	POINT OF VERTICAL TANGENCY	
PLW	PLANT WATER	
Q		
QTY	QUANTITY	
R		
R/W	RIGHT OF WAY	
RAD	RADIUS, RADIAL	
RAS	RETURN ACTIVATED SLUDGE	
RCP	REINFORCED CONCRETE PIPE	
RCCP	REINFORCED CONCRETE CYLINDER PIPE	
RD	ROOF DRAIN	
RDL	ROOF DRAIN LINE	
RDOF	ROOF DRAIN OVERFLOW	
RECIRC	RECIRCULATING	
RED	REDUCER, ROOF EQUIPMENT DRAIN	
REF	REFERENCE	
REG	REGULATOR, REGULATING	
REINF	REINFORCE(D)(ING)(MENT)	
REJ	RUBBER EXPANSION JOINT	
REQD	REQUIRED	
RER	REACTOR	
RES	RESERVOIR	
REV	REVISION, REVERSE	
RF	RETURN FAN	
RG	RETURN GRILLE RUBBER GASKET	
RH	RIGHT HAND	
RHR	RIGHT HAND REVERSE	
RHRA	RIGHT HAND REVERSE ACTIVE	
RHRB	RIGHT HAND REVERSE BEVEL	
RLS	REGISTERED LAND SURVEYOR	
RM	ROOM	
RO	ROUGH OPENING	
ROT	ROTAMETER	
RP	RADIUS POINT	
RPM	REVOLUTIONS PER MINUTE	
RPMP	REINFORCED PLASTIC MORTAR PIPE	
RR	RETURN REGISTER	
RSR	RISER	
RT	RIGHT	
RTF	ROTARY FEEDER	
RTU	ROOF TOP UNIT	
RUD	RUPTURE DISK	
RW	RECLAIMED WATER, REUSE WATER	
RWR	RECLAIMED WATER RETURN	
RWW	RAW WASTEWATER	
S		
S/W	SIDEWALK	
S	SOUTH, SWITCH, SLOPE	
SA	SAMPLE	
SC	SECONDARY CLARIFIER	
SCB	SCRUBBER	
SCD	SMOKE CONTROL DAMPER	
SCFM	STANDARD CUBIC FEET PER MINUTE	
SCH	SCHEDULE	
SCO	SURFACE CLEANOUT	
SCR	BAR SCREEN	
SCR	SILICON CONTROL RECTIFIER	
SD	SMOKE DETECTOR, SPLITTER DAMPER, STORM DRAIN	
SDL	SUMP DISCHARGE DRAIN LINE	
SDO	SLUDGE DRAWOFF	
SE	SECONDARY EFFLUENT	
SEC	SECONDARY, SECOND	
SECT	SECTION	
SED	SEDIMENTATION	
SEP	SEPTAGE	
SF	SUPPLY FAN	
SFW	SOFTENED WATER	
SG	SUPPLY GRILLE	
SGS	STORE FRONT GLAZING SYSTEM	
SHD	SHOWER DRAIN	
SHDR	SOLIDS HANDLING-RECYCLE	
SHR	SHOWER	
SHT	SHEET	
SIM	SIMILAR	
SK	SKIMMINGS	
SL	SLOPE, SLUDGE	
SLC	SLUDGE COLLECTOR DRIVE	
SLG	SLIDE GATE	
SLV	SLEEVE VALVE	
SMP	SAMPLER, SUMP PUMP	
SN	SUPERNATANT OR SUBNATANT	
SOL	SOLUTION	
SP	STATIC PRESSURE, SET POINT	
SPD	SUMP PUMP DRAIN	
SPDT	SINGLE POLE DOUBLE THROW	
SPEC(S)	SPECIFICATION(S)	
SPL	SPLITTER BOX	
SPR	SPARE	
SPS	SAMPLE SINK	
SPW	SAMPLE WATER	
SQ	SQUARE	
SQ FT	SQUARE FEET	
SQ IN(S)	SQUARE INCH(ES)	
SR	SHORT RADIUS, SUPPLY REGISTER	
SRL	SCRUBBER RECIRCULATION LIQUID (CAUSTIC)	
SS	SANITARY SEWER, SELECTOR SWITCH	
SSK	SERVICE SINK	
SSL	SECONDARY SLUDGE	
SST	STAINLESS STEEL	
ST	SLUDGE TRANSFER	
STA	STATION	
STB	STABILIZER	
STD(S)	STANDARDS(S)	
STIFF	STIFFENER	
STIR	STIRRUPS	
STL	STEEL	
STM	STEAM	
STP	STEEL PIPE	
STR	STRAINER	
STRUCT	STRUCTURAL	
SUG	SLUICE GATE	
SUPT	PIPE SUPPORT, SUPPORT	
SV	SERVICE VALVE, SHUTOFF VALVE, SOLENOID VALVE	
SW	SANITARY WASTE	
SWR	SEAL WATER	
SYM	SYMMETRICAL	
SYN	SYNTHETIC	
T		
T	TANGENT LENGTH, THERMOSTAT, TIMER	
T&B	TOP AND BOTTOM	
TAS	THREADED ANCHOR STUD	
TBM	TEMPORARY BENCHMARK	
TC	TOP OF CURB	
TCV	TEMPERATURE CONTROL VALVE	
TDH	TOTAL DYNAMIC HEAD	
TDR	TIME DELAY RELAY, TOWEL DISPENSER/RECEPTACLE	
TEL	TELEPHONE	
TH	TEST HOLE	
THK	THICKENER, THICKNESS, THICK	
TKS	THICKENED SLUDGE	
TLV	TELESCOPING VALVE	
TMH	TELEPHONE MANHOLE	
TMP	TEMPERATURE	
TNK	TANK	
T.O.	TOP OF	
TOC	TOP OF CONCRETE	
TOG	TOP OF GRATING	
TOM	TOP OF MASONRY	
TOS	TOP OF STEEL	
T.O.W.	TOP OF WALL	
TR	TRIAD (THREE CONDUCTOR SHIELDED CABLE), TIMING RELAY	
TRD	TREAD	
TS	THICKENER SUPERNATANT OR SUBNATANT	
TSD	THICKENED SLUDGE DECANT	
TSPL	TURBIDIMETER SAMPLE	
TSTAT	THERMOSTAT	
TTB	TELEPHONE TERMINAL BOARD	
TUR	TURBINE	
TV	TURNING VANES	
TWV	THREE-WAY VALVE	
TYP	TYPICAL	
U		
UC	UNDERCUT	
UG	UNDERGROUND	
UHMWPE	ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE	
UHMW	ULTRA HIGH MOLECULAR WEIGHT	
UNO	UNLESS NOTED OTHERWISE	
US	UTILITY SINK	
V		
V	VALVE	
VAR	VARIES	
VB	VALVE BOX	
VCP	VITRIFIED CLAY PIPE	
VEC	VINYL ESTER COATING	
VERT	VERTICAL	
VFR	VOLUMETRIC FEEDER	
VG	VACUUM GAUGE, VALLEY GUTTER	
VOL	VOLUME	
VRV	VACUUM REGULATING VALVE	
VTR	VENT THROUGH ROOF	
W		
W	WEST, WIDTH	
W/	WITH	
W/O	WITHOUT	
WAS	WASTE ACTIVATED SLUDGE	
WCO	WALL CLEANOUT	
WEF	WALL EXHAUST FAN	
WF	WALL FITTING, WASH FOUNTAIN	
WH	WATER HEATER	
WI	WEIGHT INDICATOR	
WL	WALL LOUVER, WATER LEVEL	
WM	WATER METER	
WOD	WASTE OIL DRAIN	
WP	WEATHERPROOF, WATERPROOF	
WPT	WORKING POINT	
WRG	WEIR GATE	
WRS	WATER SOFTENER	
WS	WATER SURFACE	
WSTP	WATERSTOP	
WT	WALK THROUGH, WEIGHT	
WTF	WATER TREATMENT FACILITY	
WTP	WATER TREATMENT PLANT	
WTR	WATER	
WV	WATER CONTROL VALVE	
WW	WASTEWATER	
WWF	WELDED WIRE FABRIC	
WWTF	WASTEWATER TREATMENT FACILITY	
WWTP	WASTEWATER TREATMENT PLANT	
Y		
Y	WYE	
YCO	YARD CLEANOUT	
YH	YARD HYDRANT	

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED: MED
DRAWN: HPG
CHECKED: CTC
DATE: OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — MICHAEL E. DUCHENE — No. 63626 — CIVIL — STATE OF CALIFORNIA

carollo®

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE

AQUIFER STORAGE AND RECOVERY WELLS PROJECT

GENERAL

WESTBROOK ASR WELL
ABBREVIATIONS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. G02
SHEET NO. XX OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1009G002.dgn

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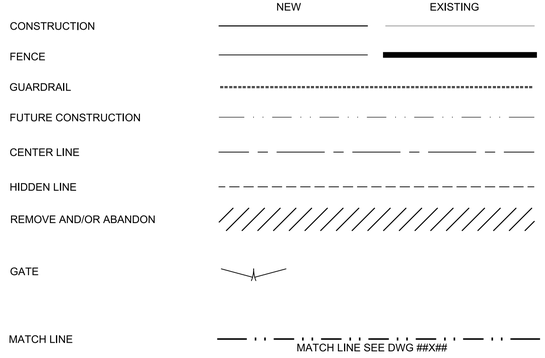
Model: Layout1
LAST SAVED BY: hgarcia
Scale: 1:1

GENERAL NOTES

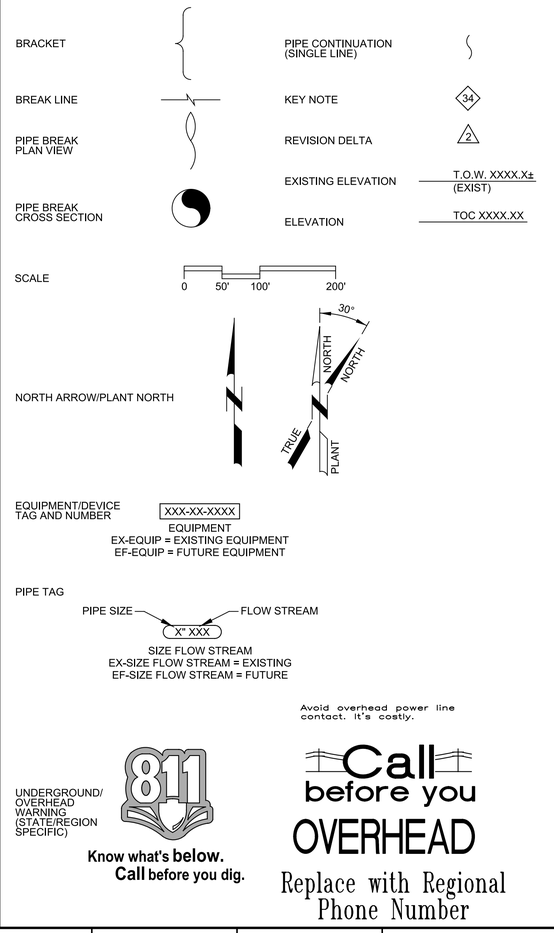
1. FOLLOWING NOTES ARE GENERAL AND APPLY TO ALL SHEETS OF THESE CONTRACT DOCUMENTS AS IF THEY WERE WRITTEN IN THEIR ENTIRETY ON EACH SHEET.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING CONDITIONS INCLUDING LOCATION AND DIMENSIONS OF ALL EXISTING CONSTRUCTION AND UTILITIES. CONTRACTOR SHALL NOTIFY ENGINEER IF THERE IS A CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND EXISTING CONSTRUCTION BEFORE PROCEEDING WITH WORK.
3. UNLESS DETAILED, SPECIFIED, OR OTHERWISE INDICATED ON THE DRAWINGS, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND GENERAL NOTES. TYPICAL DETAILS SHALL APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS ON DRAWINGS.
4. WHERE NO CONSTRUCTION DETAILS ARE SHOWN OR NOTED FOR ANY PART OF WORK. DETAILS SHALL BE IN THE SAME AS FOR OTHER SIMILIAR WORK.
5. CONTRACTOR SHALL COMPLY WITH LOCAL CONSTRUCTION STORM WATER DISCHARGE REGULATIONS AND REQUIREMENTS.
6. PRIOR TO EXCAVATION FOR NEW STRUCTURES, ELECTRICAL CONDUIT, FABRICATION OF NEW PIPING AND/OR OTHER PROPOSED UTILITIES, CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL EXISTING PIPING AND UTILITIES IN THE CONSTRUCTION AREA. THE CONTRACTOR SHALL TEMPORARILY RELOCATE CONFLICTING EXISTING UTILITIES AT TIE-IN/CONNECTION LOCATIONS AND REINSTALL THEM AS REQUIRED TO ELIMINATE THE CONFLICT AT NO ADDITIONAL COST TO THE OWNER.
7. ALL PIPELINES 12" AND LARGER SHALL HAVE A MINIMUM COVER OF 36" UNLESS THE COVER DEPTH IS SPECIFICALLY INDICATED ON THE DRAWINGS. PIPE SMALLER THAN 12" SHALL HAVE A MINIMUM COVER OF 30" UNLESS NOTED OTHERWISE. PIPES SHALL BE ROUTED AS SHOWN UNLESS MINOR REVISIONS ARE NECESSARY TO MISS EXISTING PIPES, STRUCTURES, ETC. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL FITTINGS AND ADAPTERS REQUIRED TO MAKE THE ROUTING CHANGES AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR SHALL INCLUDE COST FOR THIS IN THE BID.
8. EXISTING FACILITY AND UTILITY INFORMATION SHOWN ON THE DRAWINGS WAS OBTAINED FROM AVAILABLE RECORDS OR ELECTRONIC FILES. NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR FACILITIES AND UTILITIES NOT SHOWN OR NOT IN THE LOCATION SHOWN. THE CONTRACTOR SHALL FIELD VERIFY ALL LOCATIONS, SIZES, MATERIAL TYPES, AND ELEVATIONS SHOWN AROUND OR NEAR AREAS OF NEW CONSTRUCTION PRIOR TO START OF CONSTRUCTION.
9. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT FROM DAMAGE EXISTING FACILITIES AND UTILITIES SHOWN OR NOT SHOWN THAT ARE TO REMAIN IN PLACE. ALL FACILITIES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE EXPEDITIOUSLY REPAIRED OR RECONSTRUCTED TO THE ORIGINAL OR BETTER CONDITION AT THE CONTRACTOR'S EXPENSE WITHOUT ADDITIONAL COMPENSATION.
10. CONTRACTOR SHALL MAKE CONNECTIONS TO EXISTING PIPE, EQUIPMENT, ETC. AS REQUIRED AND SHALL PROVIDE ALL FITTINGS, ADAPTERS, AND APPURTENANCES REQUIRED TO MAKE THE CONNECTIONS. PROVIDE ALL SUPPORTS REQUIRED FOR A RIGIDLY SUPPORTED COMPLETE AND WORKING SYSTEM.
11. ADJUST ALL VALVE BOXES, VAULTS, PULL BOXES, AND MANHOLES TO FINISHED GRADE UNLESS OTHERWISE SHOWN OR DIRECTED. MANHOLES IN OPEN FIELDS SHALL BE SET TWELVE INCHES ABOVE FINISHED GRADE AND VAULTS SHALL BE SIX INCHES ABOVE FINISHED GRADE.
12. THE CONTRACTOR SHALL CONTACT THE PROPER UTILITY REPRESENTATIVE AS FOLLOWS FOR QUESTIONS OR COORDINATION OF CONSTRUCTION RELATED TO EXISTING UTILITIES.

    STATE/REGION/MUNICIPALITY SPECIFIC: 1-800-XXX-XXXX
13. CONTRACTOR SHALL VERIFY THAT PIPING SHOWN TO BE ABANDONED OR AS ABANDONED PREVIOUSLY IS NO LONGER IN SERVICE. LINES IN SERVICE SHALL BE MAINTAINED UNTIL NO LONGER REQUIRED BY THE PLANT.
14. ALL EXISTING PIPES THAT ARE TO BE ABANDONED IN PLACE OR REMOVED MAY NOT BE SHOWN. WHERE PIPING IS TO BE ABANDONED AND MUST REMAIN IN SERVICE UNTIL COMPLETION OF OTHER PHASES OF WORK, AND IT CONFLICTS WITH NEW PIPING, TEMPORARILY RELOCATE PIPING AS REQUIRED TO MAINTAIN SERVICE BY THE PLANT.
15. CONTRACTOR SHALL REROUTE THE EXISTING PIPING IF REQUIRED TO MISS THE PROPOSED STRUCTURES. THE EXISTING PIPE SHALL REMAIN IN SERVICE UNTIL NEW PIPING IS READY TO BE PLACED INTO SERVICE. DOWNTIME SHALL BE A MAXIMUM OF 2 HOURS, UNLESS SPECIFIED OR SHOWN OTHERWISE.
16. ALL SIDEWALKS TO BE 3'-0" WIDE UNLESS SHOWN OTHERWISE.
17. THE CONTRACTOR SHALL TAKE SPECIAL PRECAUTIONS IN THE VICINITY OF ANY OVERHEAD ELECTRIC LINES. CONTRACTOR SHALL ABIDE BY THE NATIONAL ELECTRIC CODE AND ANY REQUIREMENT BY THE OWNER OF THE ELECTRIC LINES.
18. PROVIDE ALL SHEETING/SHORING REQUIRED TO PROTECT EXISTING STRUCTURES, PIPES AND FACILITIES.
19. CONTRACTOR SHALL VERIFY LOCATION OF ALL ARCHITECTURAL, MECHANICAL, AND ELECTRICAL ITEMS BEFORE PLACING ANY STRUCTURAL STEEL OR CONCRETE. ALSO, STRUCTURAL DIMENSIONS AND OPENINGS CONTROLLED BY ARCHITECTURAL, MECHANICAL, OR ELECTRICAL EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
20. MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES, AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS, THAT ARE REQUIRED BY OTHER CONTRACT DRAWINGS, SHALL BE PROVIDED PRIOR TO CASTING CONCRETE.

LINE WORK



SYMBOLS



UNDERGROUND/ OVERHEAD WARNING (STATE/REGION SPECIFIC)

811

Know what's **below.**
Call before you dig.

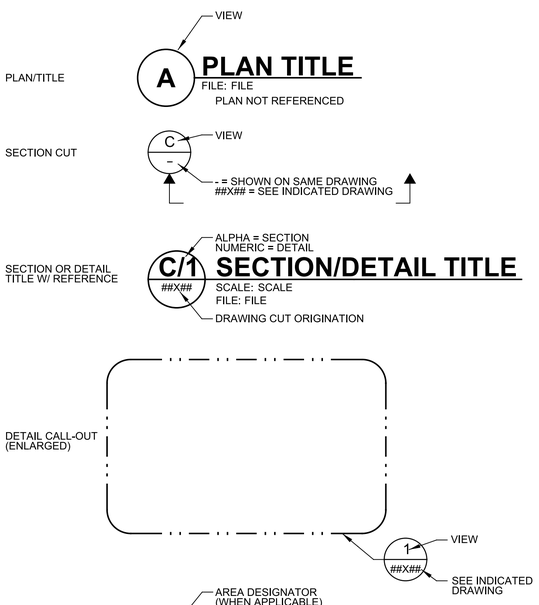
Avoid overhead power line contact. It's costly.

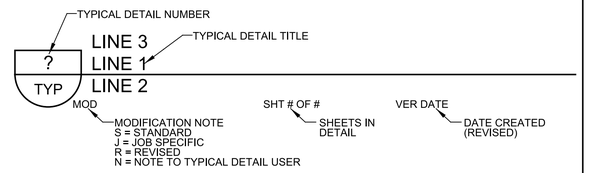
Call before you

OVERHEAD

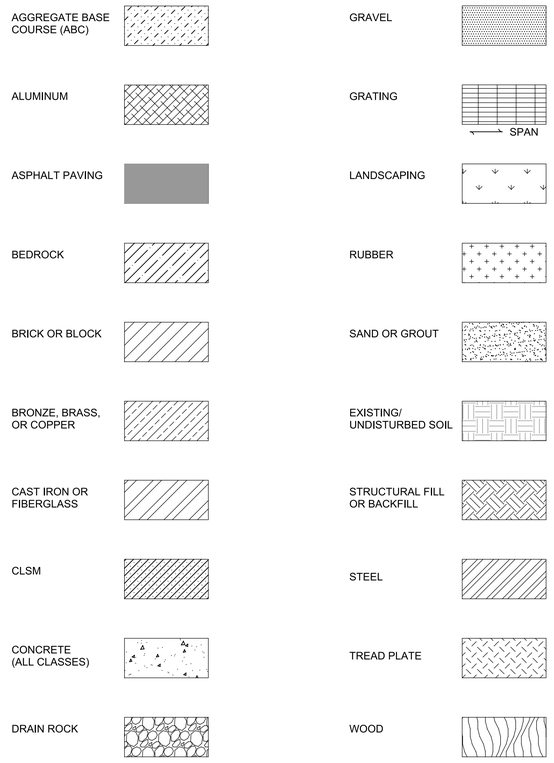
Replace with Regional Phone Number

DETAIL REFERENCES





HATCH PATTERNS



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CHECKED CTC
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER
MICHAEL E. DUCKER
No. 63626
CIVIL
STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
GENERAL
WESTBROOK ASR WELL
GENERAL NOTES, SYMBOLS, AND LEGENDS

VERIFY SCALES
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JOB NO. 11843A.10
DRAWING NO. G03
SHEET NO. XX OF ~~XX~~

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PROJECT NO. 11843A10_P2
LAST SAVED BY: hgarcia

DRAWING INDEX:

	SHEET NO.	DRAWING NO.	DESCRIPTION
	GENERAL		
X	1	G01	COVER SHEET
X	2	G02	ABBREVIATIONS
X	3	G03	GENERAL NOTES, SYMBOLS AND LEGENDS
X	4	G04	DRAWING INDEX
X	5	G05	DESIGN CRITERIA
	6	G06	CALIFORNIA GREEN BUILDING STANDARDS CODE CHECKLIS
	7	G07	CALIFORNIA GREEN BUILDING STANDARDS CODE CHECKLIS
	8	G08	CALIFORNIA GREEN BUILDING STANDARDS CODE CHECKLIS
	9	G09	CALIFORNIA GREEN BUILDING STANDARDS CODE CHECKLIS
	CIVIL		
X	10	GC01	GENERAL CIVIL NOTES AND LEGEND
X	11	09C01	DEMOLITION SITE PLAN
X	12	09C02	PAVING, GRADING, AND SITE PLAN
X	13	09C03	YARD PIPING AND UTILITIES PLAN
	14	09C04	PIPE PROFILES
	15	09C05	DETAILS AND SECTIONS 1
	16	09C06	DETAILS AND SECTIONS 2
	17	09C07	DETAILS AND SECTIONS 3
	ARCHITECTURAL		
X	18	GA01	BUILDING CODE ANALYSIS AND SCHEDULES
	19	GA02	EGRESS PLAN
X	20	18A01	FLOOR PLAN
X	21	18A02	ROOF PLAN
X	22	18A03	NORTH AND EAST ELEVATIONS
X	23	18A04	SOUTH AND WEST ELEVATIONS
	24	18A05	INTERIOR ELEVATIONS
	STRUCTURAL		
	25	GS01	GENERAL STRUCTURAL NOTES AND LEGEND
X	26	09S01	FOUNDATION PLAN
X	27	09S02	ROOF PLAN
X	28	09S03	BUILDING SECTIONS AND DETAILS 1
	29	09S04	BUILDING SECTIONS AND DETAILS 2
	30	09S05	DETAILS AND SECTIONS 1
	31	09S06	DETAILS AND SECTIONS 2
	32	09S07	DETAILS AND SECTIONS 3
	MECHANICAL		
X	33	GM01	GENERAL MECHANICAL NOTES AND LEGEND
X	34	GM02	GENERAL PLUMBING NOTES, ABBREVIATIONS, AND SYMBOL
X	35	GM03	GENERAL HVAC NOTES, ABBREVIATIONS, AND SYMBOLS
	36	09GM04	PROCESS EQUIPMENT AND PIPE SCHEDULES
	37	09GM05	VALVE SCHEDULE
X	38	09M01	BUILDING PLAN
X	39	09M02	BUILDING SECTIONS AND DETAILS 1
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X	41	09M04	PLUMBING SCHEDULES
	42	09M05	PLUMBING PLAN
	43	09M06	PLUMBING ISOMETRICS
X	44	09M07	HVAC SCHEDULES
	45	09M08	HVAC PLAN
X	46	09M09	HVAC AIRFLOW SCHEMATIC
	47	09M10	WELLHEAD DETAILS
	48	09M11	CHEMICAL ROOM
	49	09M12	FIRE ALARM AND SPRINKLER PLAN
	50	09M13	DOWNHOLE CONTROL VALVE AND MECHANICAL DETAILS
	51	09M14	MONITORING WELL SECTIONS AND DETAILS
	52	09M15	DETAILS AND SECTIONS

	SHEET NO.	DRAWING NO.	DESCRIPTION
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X	55	GE03	SCHEMATIC SYMBOLS
	56	09E01	SITE PLAN
	57	09E02	DUCT BANK SECTIONS
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X	59	09E04	WD31-MCCX-28100 ONE-LINE DIAGRAM
	60	09E05	DISCONNECT, MH/HH & LUMINAIRE SCHEDULES
	61	09E06	PANELBOARD SCHEDULES
X	62	09E07	CONTROL SCHEMATICS 1
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	65	09E10	ASR WELL BUILDING LIGHTING & GROUNDING PLAN
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X	74	GI07	CONTROL BLOCK DIAGRAM
	75	GI08	PLC CONTROL PANEL EXTERNAL ELEVATION
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	77	GI10	PLC CONTROL PANEL POWER DISTRIBUTION AND CONTROL
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X	79	09I02	P&ID - WELL PUMP AND VALVES P&ID 2
X	80	09I03	P&ID - SODIUM HYPOCHLORITE FEED SYSTEM P&ID
X	81	09I04	P&ID - LIQUID FLUORIDE FEED SYSTEM P&ID
X	82	09I05	P&ID - WATER QUALITY 1
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	93	TE01	TYPICAL DETAILS - ELECTRICAL 1
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	102	TP01	TYPICAL DETAILS - PLUMBING 1
	103	TS01	TYPICAL DETAILS - STRUCTURAL 1
	104	TS02	TYPICAL DETAILS - STRUCTURAL 2
	105	TS03	TYPICAL DETAILS - STRUCTURAL 3

X = INCLUDED IN THIS SUBMITTAL

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carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
GENERAL
WESTBROOK ASR WELL
DRAWING INDEX

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JOB NO. 11843A.10
DRAWING NO. G04
SHEET NO. XX OF XX

DESIGN CRITERIA

DESCRIPTION	UNITS	WESTBROOK VALUE
EXISTING WELL		
CONDUCTOR CASING	INCH	36
WELL CASING	INCH	18
COLUMN PIPE DIA.	INCH	12
WELL DEPTH	FT (BGS)	531
SCREEN DEPTH	FT (BGS)	486-521
SOUNDING TUBE	FT (BGS)	276
GRAVEL FILL TUBE	FT (BGS)	406
WELL PUMP		
PUMP		
DESIGN FLOW	GPM	2,750
LINE PRESSURE AT POC	FT (PSI)	207.9 (90)
TDH	FT	488
HORSEPOWER	HP	500
STATIC WATER LEVEL	FT (BGS)	120
PUMPING WATER LEVEL	FT (BGS)	238.7
PUMP ELEVATION	FT (BGS)	300
PUMP DISCHARGE	INCH	12
ANNULUS RECHARGE INLET	INCH	10
GROUNDWATER QUALITY TEST RESULTS		9/7/2021
SPECIFIC CONDUCTANCE (EC)	UMHOS/CM	490
TURBIDITY	NTU	2.2
IRON, DISSOLVED	MG/L	0.12
IRON, DISSOLVED	MG/L	0.38
MANGANESE, DISSOLVED	MG/L	ND
MANGANESE, DISSOLVED	MG/L	ND
TOTAL HARDNESS AS CaC03	MG/L	99
CALCIUM	MG/L	22
MANGANESE	MG/L	10
PTOSSIUM	MG/L	3.3
SODIUM	MG/L	48
SILICA (SiO2)	MG/L	65
ARSENIC	UG/L	3.7
TREATMENT VESSELS		
FILTER VESSELS	MGD	0.37
NO. OF VESSELS	EACH	11
MATERIAL		WLD STL
SHIPPING DIA.	FT	6'-9"
SHIPPING HIEGHT	FT	10'-9"

DESCRIPTION	UNITS	WESTBROOK VALUE
BACKWASH WATER CHARACTERIZATION		
WASTE DISCHARGE DESIGN FLOW	GPM	396
MAX DAILY DISCHARGE	GPD	35,000
TOTAL SUSPENDED SOLIDS	MG/L	227
IRON	MG/L	43
MANGANESE	MG/L	0.2
ARESENIC	MG/L	0.4
CHROMIUM (6+)	MG/L	0.03
ESTIMATED GRAVITY SEWER CAPACITY, ASSUMING 6" DIA. LATERAL @ 2% SLOPE	GPM	450
BACKWASH TANK		
VOLUME	GAL	4,300
DIAMETER	FT	11'-11"
HIEGHT	FT	7'-1"
MATERIAL	FT	POLYETHYLENE
INLET SIZE	INCH	4"
SODIUM HYPOCHLORITE PUMP		
TYPE		PACKAGED SYSTEM
DUTY/STANDBY	EACH	1 DUTY/1 STBY DUPLEX
DESIGN FLOW RATE	GPM	2,750
FLOW	GPH	0.4-4.0
TDH		
SOLUTION NaOCL		12.50%
TANK SIZE PER 15 DAY DAY STORAGE	GAL	1,000
SODIUM HYPOCHLORITE TANK		
TYPE		DOUBLE WALL
DUTY/FUTURE		1 DUTY/ 1 FUTURE
MATERIAL		POLYETHYLENE (XLPE)
VOLUME	GAL	1,000
DIAMETER	FT	6'-5"
HIEGHT	FT	7'-1"
WATER SOFTENER		
FLOW	GPM	5
PRESSURE	PSI	30

DESCRIPTION	UNITS	WESTBROOK VALUE
SODIUM FLUORIDE - PACKAGED SYSTEM		
CONTAINMENT		SECONDARY
DESIGN PROCESS FLOW RATE	GPM	2,750
SATURATOIN TANK	GAL	55
TANK TYPE		POLYETHYLENE (LINEAR)
CAPACITY, SODIUM FLUORIDE	LBS	300
SOLUTION TANK	GAL	70
TANK TYPE		POLYETHYLENE (LINEAR)
PUMP TYPE		POSITIVE DISPLACEMENT
FEED RATE	MG/L	1.5
FLOW	GPH	1.35 - 6.2
PRESSURE	PSIG	100
NO. OF PUMPS		1 DUTY / 0 STANDBY

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SHEET NO. XX OF XX

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PROJECT NO. 11843A10_P2
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NOTES

GENERAL PIPELINE NOTES:

1. DIMENSIONS TO STRUCTURES, REFERENCED PIPING, PAVING, AND OTHER IMPROVEMENTS IS APPROXIMATE. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND CONDITIONS 14 DAYS IN ADVANCE OF THE CONSTRUCTION PROGRESS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER.
2. CONTRACTOR SHALL MAINTAIN A MINIMUM CLEARANCE OF 10 FEET HORIZONTAL AND 3 FEET VERTICAL BETWEEN THE SEWER LINES AND EXISTING WATER LINES.
3. REFER TO THE GEOTECHNICAL REPORT LOCATED IN THE APPENDIX OF THE SPECIFICATIONS FOR ADDITIONAL INFORMATION ON THE GEOTECHNICAL CONDITIONS AND BORING INFORMATION.
4. IN ALL LOCATIONS WHERE TRENCH PLATE IS USED FOR VEHICULAR OR PEDESTRIAN TRAFFIC, THE CONTRACTOR SHALL APPLY SKID RESISTANT COATING ON THE TRENCH PLATES AND COLD MIX ASPHALT CONCRETE AT THE EDGES. THE TRENCH PLATES SHALL BE NOTCHED INTO THE ASPHALT, CONCRETE, OR TRAVELED SURFACE TO PREVENT SLIPPAGE AND ROCKING UNDER TRAFFIC.
5. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL PROPERTIES ADJACENT TO THE WORK, THROUGHOUT THE CONSTRUCTION PERIOD.
6. ALL OPEN TRENCHES, WORK AREAS AND SHAFTS SHALL HAVE A SHORING SYSTEM IN ACCORDANCE WITH OSHA, STATE AND LOCAL REQUIREMENTS.
7. THE CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, COUNTY, AND LOCAL LAWS AND ORDINANCES RELATING TO THE SAFETY AND CHARACTER OF WORK, EQUIPMENT AND PERSONNEL. THIS INCLUDES BUT IS NOT LIMITED TO SHEETING, SHORING, BRACING, VENTILATION, CONFORMANCE WITH TRAFFIC CONTROL AND MAINTENANCE OF BARRICADES AND WARNING DEVICES.
8. LAYOUT DRAWINGS ARE REQUIRED FOR PIPING INSTALLED.
9. ALL RIPARIAN AREAS DISTURBED SHALL BE RESTORED PER THE _____ DRAWINGS.
10. ALL ROAD DITCHES, FENCE LINES, PASTURES AND SIMILAR AREAS SHALL BE RESTORED PER SPECIFICATION 02925.
11. ALL CROPPED AREAS DISTURBED SHALL HAVE THE TOPSOIL REPLACED AND THE ENTIRE AREA DISTURBED SHALL BE RIPPED 2 FT DEEP PER THE LAND OWNERS REQUIREMENTS.
12. CONTRACTOR SHALL TAKE ALL PRACTICAL PRECAUTIONS TO MINIMIZE DISTURBANCES TO STREAMS, VEGETATION, TREES AND CROP LANDS. WHEREVER PRACTICAL LEAVE EXISTING TREES AND VEGETATED AREAS UNDISTURBED.

UTILITY NOTES:

1. EXISTING UTILITIES IN THE PROJECT MAY BE IN A FRAGILE CONDITION. THE CONTRACTOR SHALL EXERCISE NECESSARY CAUTION WHEN WORKING NEAR EXISTING UTILITIES.
2. PLAN LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES ARE BASED ON RECORD DRAWINGS, POTHOLING AND SURVEY INFORMATION AND ARE CONSIDERED APPROXIMATE ONLY. WHERE NO ELEVATIONS ARE SHOWN, NO INFORMATION WAS AVAILABLE DURING THE DESIGN PERIOD.
3. SOME UTILITY SERVICES MAY NOT BE SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL TAKE NECESSARY MEASURES TO LOCATE AND PROTECT SERVICE DURING CONSTRUCTION.
4. CONTRACTOR SHALL CALL THE "LOCAL UTILITY LOCATOR" AT _____ PRIOR TO ANY EXCAVATION ACTIVITIES.
5. THE LOCATION, SIZE, AND MATERIALS OF EXISTING UNDERGROUND UTILITIES SHOWN ON THESE DRAWINGS ARE APPROXIMATE AND IS SHOWN FOR BIDDING PURPOSES. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT THE UTILITY OWNERS SO THAT THOSE UTILITIES MAY MARK THE LOCATION OF THEIR UTILITIES PRIOR TO ANY EXCAVATION ACTIVITIES. THE CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE AND PROTECT EXISTING UTILITIES.

EARTHWORK NOTES:

1. CLEAR THE CONSTRUCTION AREA OF NATURAL OBSTRUCTIONS EXISTING FOUNDATIONS, BUILDINGS, FENCES, LUMBER, WALLS, STUMPS, BRUSH, WEEDS, RUBBISH, TREES, BOULDERS, AND ANY OTHER ITEMS WHICH INTERFERES WITH CONSTRUCTION OPERATIONS OR ARE DESIGNATED FOR REMOVAL.
2. GRUB OUT AND DISPOSE OF TREE TRUNKS AND ROOT MATERIAL BELOW THE GROUND SURFACE REMAINING AFTER CLEARING.
3. DISPOSE OF THE UNACCEPTABLE BACKFILL MATERIAL FROM THE CLEARING AND GRUBBING OPERATIONS AT NO ADDITIONAL COST TO THE OWNER.
4. STRIP AND STOCKPILE THE TOPSOIL. THE DEPTH OF STRIPPING SHALL BE ESTIMATED TO BE 12-INCHES BUT WILL BE DETERMINED IN THE FIELD AS SOIL CONDITIONS DICTATE.
5. REPLACE STOCKPILED SOIL AND RESTORE SITE AS SPECIFIED.
6. ROCK AND AGGREGATE STORAGE AREAS SHALL BE RESTORED BY EXCAVATING ANY SOILS CONTAINING ROCK OR AGGREGATE AND BACKFILLING WITH TOPSOIL. SOIL REMOVED MAY BE USED FOR TRENCH BACKFILL ABOVE THE PIPE ZONE AND 3 FEET BELOW FINISHED GRADE.

LINE WORK

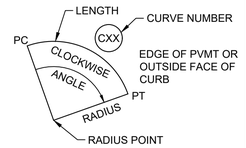
NEW STRUCTURES OR EDGE OF PAVEMENT
EXISTING STRUCTURES (SCREENED)
NEW PIPING (TRIPLE LINES)
NEW PIPING (SINGLE LINE)
EXISTING PIPING (TRIPLE LINES) (SCREENED)
EXISTING PIPING (SINGLE LINE)(SCREENED)
HIDDEN LINE OR TRAIL EDGE
CENTER, MONUMENT, OR SURVEY LINE
GUARDRAIL
EXISTING CONTOURS (SCREENED) — 310
NEW CONTOURS — 310
NEW FENCE
EXISTING FENCE (SCREENED)
REMOVE OR ABANDONED (CROSS HATCHING: FENCE SHOWN AS EXAMPLE)
POWER POLE & LINE — PP
CABLE TV (UNDERGROUND) — CTV
FIBER OPTIC — FO
FUEL — F
NATURAL GAS — G
UNDERGROUND ELECTRIC — UGE
SANITARY SEWER — SS
FORCEMAIN SANITARY SEWER — FM
STORM DRAIN — SD
TELEPHONE — TEL
WATER — W
PROPERTY LINE OR RIGHT OF WAY
SLOPE
NEW ROAD
EXISTING ROAD (SCREENED)
FUTURE ROAD, WATER EDGE OR RIDGE
CURB & GUTTER
CURB
SWALE
FLOWLINE
SHORING
RAILROAD TRACKS
LIMITS OF CONSTRUCTION — LOC
SILT FENCE — SF
EASEMENT
EXISTING EASEMENT
CITY LIMITS
EXISTING GRADE (PROFILE)
PROPOSED GRADE (PROFILE)
MATCH LINE — MATCH LINE STA XXX SEE DWG XXX

COORDINATES / ELEVATION

COORDINATES — XX — N=1600000 E=1000000 — N=XXXXXX.XX E=XXXXXX.XX
CONTROL POINT — XX
SPOT ELEVATION — FG XX.XX / TC XX.XX (REFER TO ABBREVIATIONS FOR DESIGNATION)
EXISTING SPOT ELEVATION — X 1325.00
SLOPE CALLOUT — 2:1 — 2 / 1 — 2.0% — S=0.0020

ROADWAY / PIPE CURVES

ROADWAY / PIPE CURVE
(SEE TABLE ON EACH PAVING AND GRADING OR CIVIL PIPING DWG WITH ROADWAY / PIPE CURVES.)



HATCH PATTERNS

AGGREGATE BASE COURSE (ABC)
ASPHALT PAVING
OR
(WITH AERIAL)
BEDROCK
CLSM
CONCRETE (ALL CLASSES)
DRAIN ROCK
GRAVEL
GRATING — SPAN
LANDSCAPING
RIPRAP
EXISTING/ UNDISTURBED SOIL
STRUCTURAL FILL OR BACKFILL
STEEL
STAGING AREA
TREAD PLATE

SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	EXISTING CONTROL POINT		LIGHT
	EXISTING MONUMENT		UTILITY POLE
XX	CONTROL POINT		UTILITY POLE GUY WIRE
B-XX	SOIL BORING LOCATIONS	PP	POWER POLE
PH	POTHOLE		FIRE HYDRANT
PHXX	POTHOLE NUMBER	CO	CLEANOUT
	FLOW/SLOPE DIRECTION		AIR RELEASE VALVE
	MANHOLE (PLAN)		BLOW OFF VALVE
	MANHOLE (PROFILE)		HOSE BIBB / YARD HYDRANT
			SERVICE CONNECTION
	CATCH BASIN		BURIED VALVE
E	ELECTRICAL MANHOLE AND PULL BOX		FLANGE
M	METER BOX		BALL VALVE
P	PULL BOX		BUTTERFLY VALVE
T	TELEPHONE PEDESTAL		CHECK VALVE
CTV	CABLE TV		GATE VALVE
	POWER TOWER		PLUG VALVE
	GATE		PIPE CAP OR CONNECTION
	GUARD POST		REDUCER
	HEADWALL		
	ROCK WALL		
	SHRUB/HEDGE		
	TREE		
	SIGN/SIGN POST		

NOTE: ALL SYMBOLS SHOWN AS NEW. EXISTING SYMBOLS ARE SCREENED.

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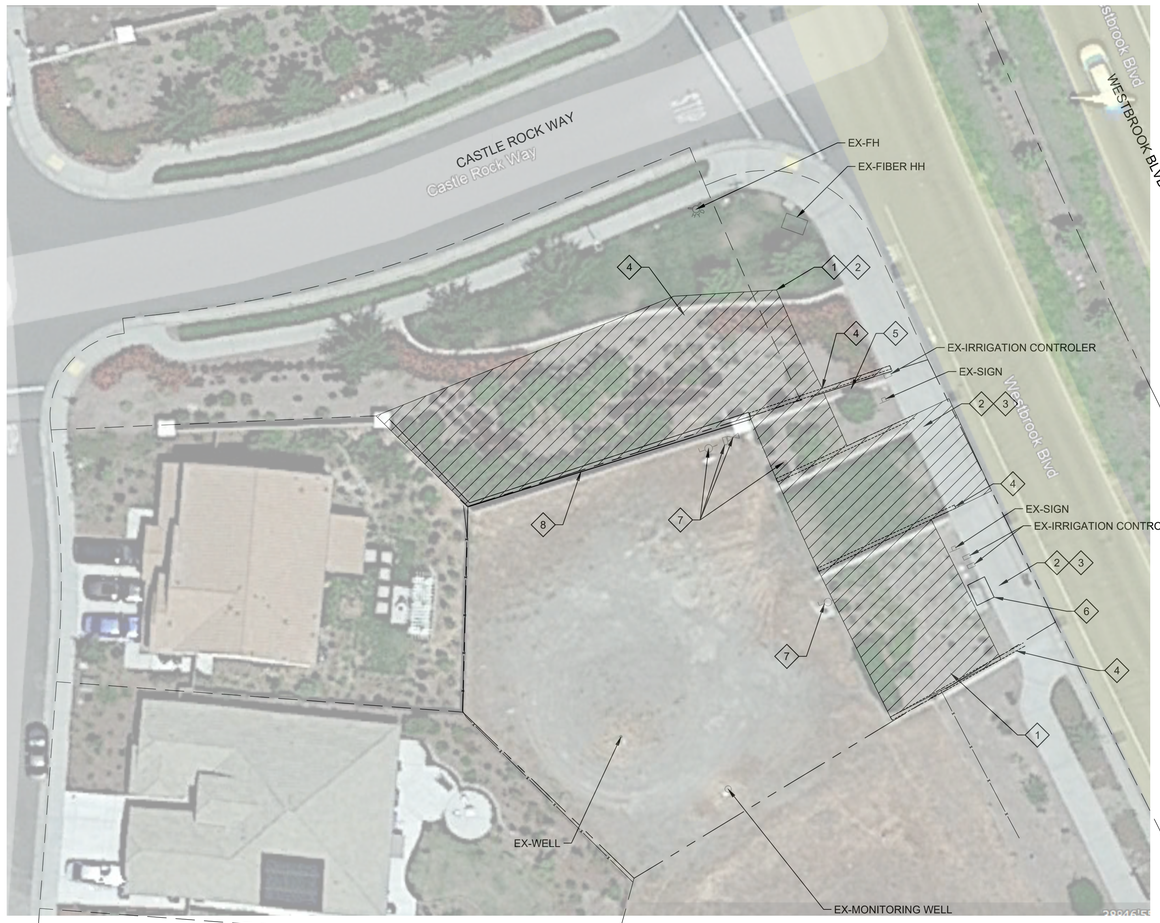
0 10' 20' 40'
SCALE: 1" = 20'



KEY NOTES:

1. DEMOLISH EXISTING LANDSCAPING AND IRRIGATION SYSTEM.
2. CONTRACTOR SHALL CUT, CAP, REPAIR, AND RELOCATE EXISTING IRRIGATION SYSTEM A REQUIRED SO THAT SYSTEM REMAINS IN SERVICE.
3. THE CONTRACTOR MAY CHOOSE TO REMOVE AND REPLACE THE LANDSCAPING AND IRRIGATION SYSTEM IN THIS AREA.
4. DEMOLISH EXISTING CONCRETE MOW STRIP, TYPICAL.
5. PROTECT EXISTING TREE, IRRIGATE AS REQUIRED.
6. EXISTING STORM DRAIN INLET TO BE REMOVED AND REPLACED, SEE YARD PIPING AND UTILITIES PLAN.
7. PROTECT EXISTING LATERALS AND UTILITIES, TYPICAL ALL.
8. DEMOLISH EXISTING BLOCK WALL.

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED MED
DRAWN HPG
CHECKED RAH
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER MICHAEL E. DUCKER No. 63626 CIVIL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
CIVIL
WESTBROOK ASR WELL
DEMOLITION SITE PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 09C01
SHEET NO. XX OF XX

Plot Date: 10/12/2021 11:50:55 AM
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PROJECT NO. 11843A10_P2
LAST SAVED BY: hgarcia

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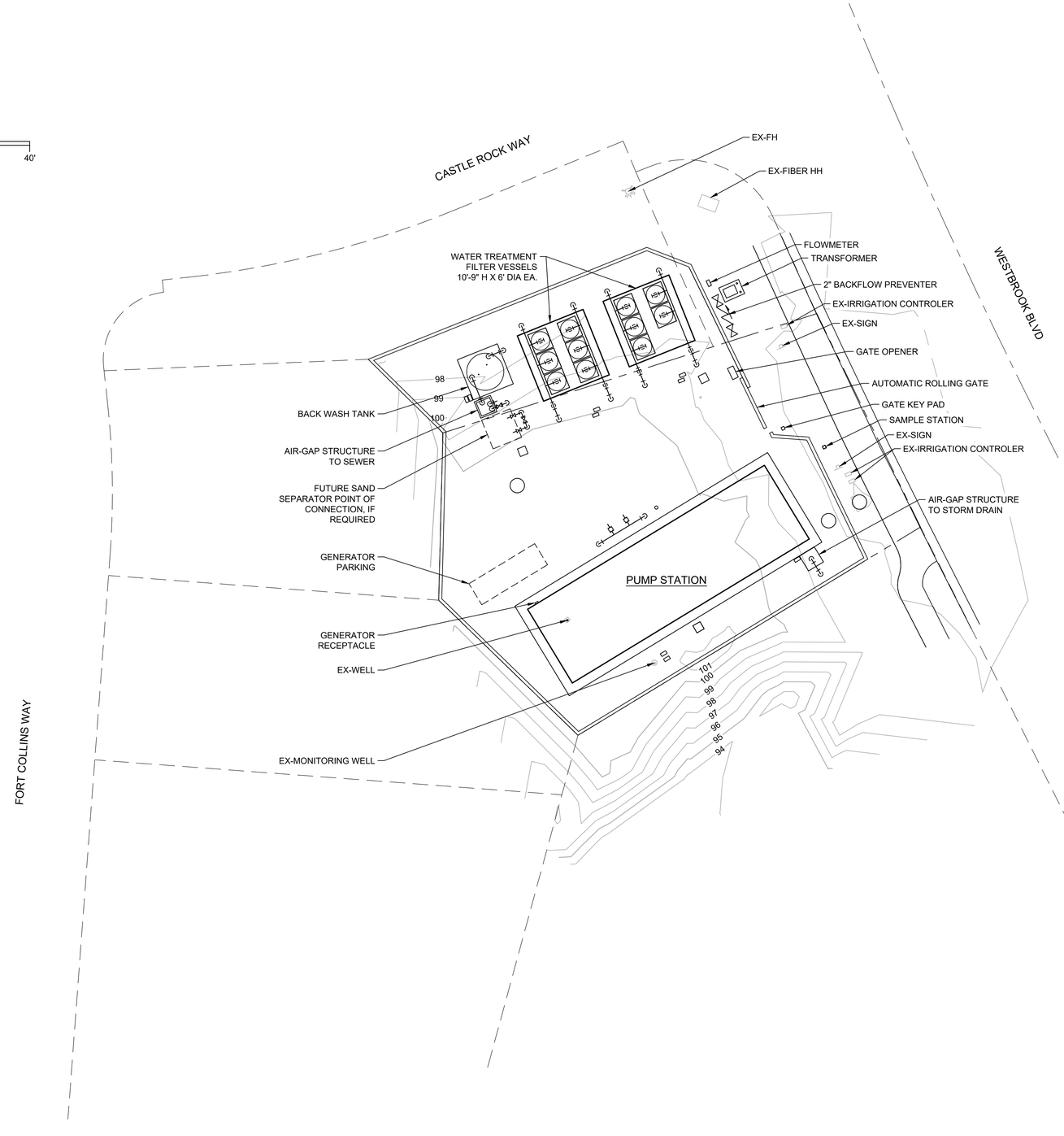

GENERAL NOTES:

1. THE PLANS HAVE BEEN PREPARED IN PART BASED ON AVAILABLE RECORD INFORMATION. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING THE WORK.
2. SURFACE RESTORATION REQUIRED AT TRENCHES AND EXCAVATION IS NOT SHOWN ON THESE PLANS.
3. CONTRACTOR SHALL MAINTAIN IRRIGATION SERVICED TO EXISTING LANDSCAPING AT ALL TIMES DURING CONSTRUCTION/

LEGEND:

- CONCRETE
- 4" ASPHALT PAVEMENT OVER 12" COMPACTED CLASS 2 AGGREGATE BASE
- LANDSCAPED AREA
- 12" THICK COMPACTED CLASS 2 AGGREGATE BASE OVER STABILIZATION FABRIC

REV	DATE	BY	DESCRIPTION
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DESIGNED MED
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CHECKED RAH
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER MICHAEL E. DUCHENE No. 63626 CIVIL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
CIVIL
WESTBROOK ASR WELL
PAVING, GRADING SITE PLAN

VERIFY SCALES
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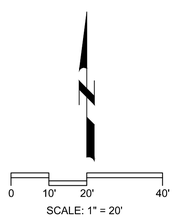
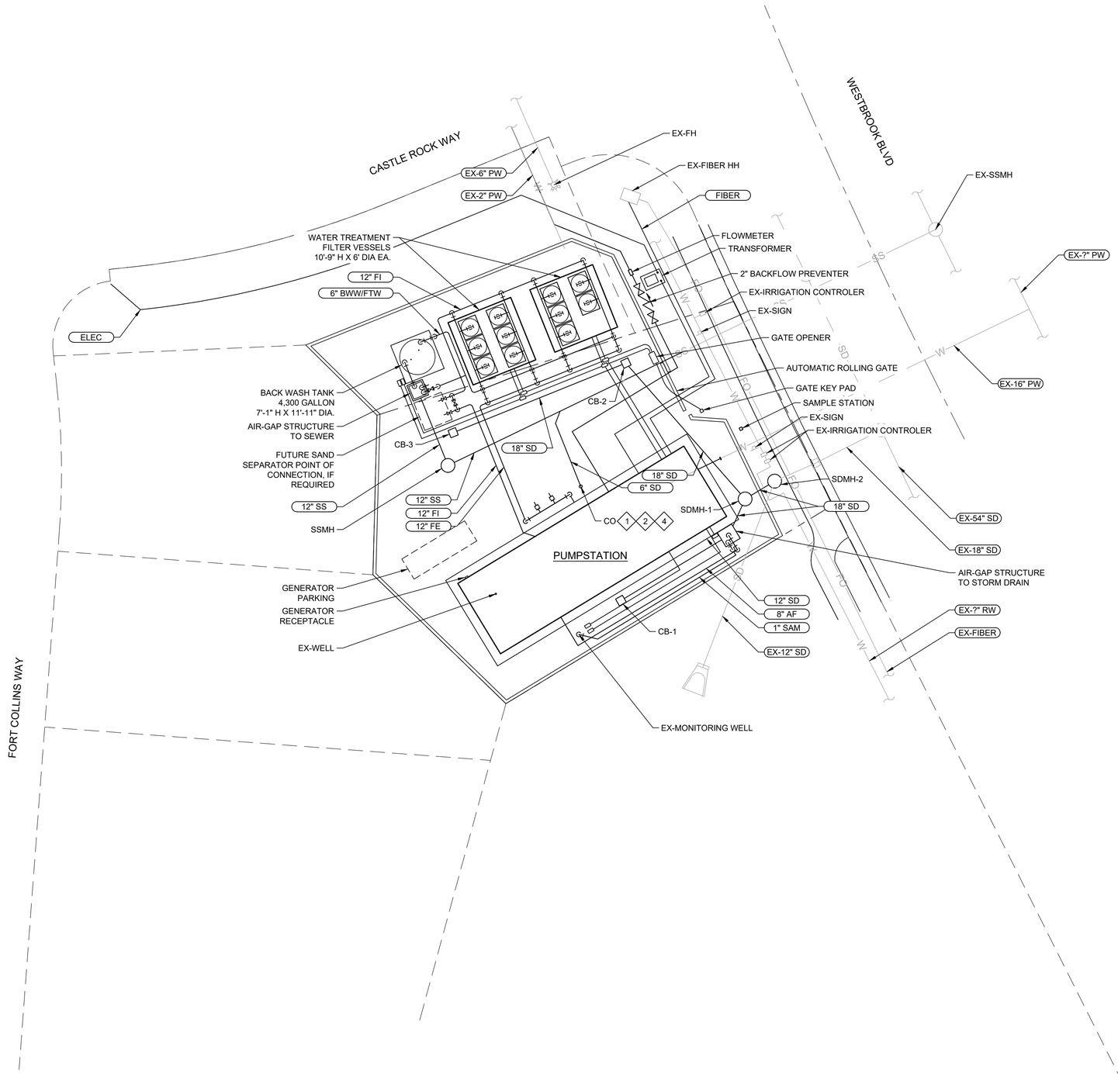
JOB NO. 11843A.10
DRAWING NO. 09C02
SHEET NO. XX OF XX





GENERAL NOTES:

1. SEE GENERAL NOTES ON SHEET G-003.
2. REFER TO DEMOLITION DRAWING GC-001 FOR EXISTING PIPES TO BE DEMOLISHED OR ABANDONED.
3. REFER TO PIPE PROFILES FOR INVERT ELEVATIONS NOT CALLED OUT ON THE PLANS. MAINTAIN MINIMUM 36" COVER WHERE ANY INVERT ELEVATION IS NOT IDENTIFIED.
4. PIPE TRENCHING AND SURFACE RESTORATION SHALL BE PER THE CITY OF ROSEVILLE STANDARD DETAIL XX/XX.
5. THE CONTRACTOR SHALL RESTORE ALL LANDSCAPING AND IRRIGATION COMPONENTS PER THE CITY OF ROSEVILLE STANDARDS WHERE DISTURBED AS A RESULT OF THIS WORK.
6. REFER TO THE PIPE SCHEDULE IN SPECIFICATION SECTION 15052 FOR PIPE MATERIALS.
7. THESE PLANS HAVE BEEN PREPARED IN PART. BASED ON AVAILABLE RECORD INFORMATION. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING OF THE WORK.
8. SURFACE RESTORATION REQUIRED AT TRENCHES AND EXCAVATION IS NOT SHOWN ON THESE PLANS.
9. CONTRACTOR SHALL MAINTAIN IRRIGATION SERVICED TO EXISTING LANDSCAPING AT ALL TIMES DURING CONSTRUCTION.
10. EXISTING INVERT ELEVATIONS ARE BASE ON AVAILABLE RECORD INFORMATION. CONTRACTOR SHALL FIELD VERIFY INVERT ELEVATIONS PRIOR TO BEGINNING THE WORK.

REV	DATE	BY	DESCRIPTION
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DESIGNED MED
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CHECKED RAH
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER MICHAEL E. DUCKER No. 63626 CIVIL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
CIVIL
WESTBROOK ASR WELL
YARD PIPING AND UTILITIES PLAN

VERIFY SCALES
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0 1"
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JOB NO. 11843A.10
DRAWING NO. 09C03
SHEET NO. XX OF XX

2019 CALIFORNIA ENERGY CONSERVATION CODE

BUILDING ENVELOPE REQUIREMENTS - PLACER COUNTY, CLIMATE ZONE 11

ENVELOPE COMPONENT		U - VALUE REQUIRED	U - VALUE PROVIDED
ROOFS		U - 0.034	U - 0.034
WALLS ABOVE GRADE, MASS LIGHT		U - 0.170 ci	U - 0.170 ci
SLAB ON GRADE FLOORS		U - 0.071	U - 0.071
ROOF - STEEP SLOPE	AGED SOLAR REFLECTANCE	U - 0.20	U - 0.20
	THERMAL EMITTANCE	U - 0.75	U - 0.75
AIR BARRIER		R	R
DOORS - SWINGING		U - 0.70	U - 0.70
DOORS - NONSWINGING		U - 1.45	U - 1.45
FIXED FENESTRATION		U - 0.36	U - 0.36
OPERABLE FENESTRATION		U - 0.46	U - 0.46
SKYLIGHTS - PLASTIC DOME		U - 0.88	U - 0.88

TABLE 140.3-B, CHAPTER 5, 2019 CALIFORNIA ENERGY CODE, TITLE 24

2019 CALIFORNIA BUILDING CODE, TITLE 24, PART 2, VOL.1 & 2

ROOM NO.	ROOM NAME	OCCUPANCY	CONSTRUCTION TYPE	BASIC ALLOW STORIES/HEIGHT	ACTUAL SQ FT	BASIC ALLOWABLE AREA	ALLOWABLE FLOOR AREA PER OCCUP	OCCUPANCY LOAD	EXITS REQUIRED/ PROVIDED	SPRINKLERED	OCCUPANCY SEPARATION	ACCESSIBILITY	COMMENTS:
ASR WELL - DRAWING 09A01													
101	PUMP ROOM	F-1	V- B	2 STORIES/55 FT	1,174	15,500	300	4	1/1	NR	NR	* NR	-
102	RESTROOM	B	V- B	3 STORIES/55 FT	66	15,500	100	1	1/1	NR	NR	* NR	-
103	CHEMICAL ROOM	H-4	V- B	3 STORIES/55 FT	501	23,000	300	2	2/2	R	2-HR	* NR	-
104	ELECTRICAL ROOM	F-1	V- B	2 STORIES/55 FT	460	15,500	300	2	2/2	NR	NR	* NR	-
	BUILDING ACTUAL	F-1	V- B	1 STORY / ±20'-8"	2,201	15,500							

* MACHINERY SPACES VISITED ONLY BY SERVICE PERSONNEL FOR MAINTENANCE, REPAIR OR OCCASIONAL MONITORING OF EQUIPMENT SHALL NOT BE REQUIRED TO COMPLY WITH ADA ACCESSIBILITY (2019 CALIFORNIA TITLE 24).

DOOR & HARDWARE SCHEDULE

DOOR NO.	DOOR WIDTH	DOOR HEIGHT	DOOR THICK	DOOR MAT'L	DOOR FINISH	DOOR STYLE	FRAME WIDTH	FRAME HEIGHT	FRAME DEPTH	FRAME TYPE	FRAME MAT'L	FRAME FINISH	DETAILS HEAD (AJ105 TYP)	DETAILS JAMB (AJ107 TYP)	DETAILS SILL (AJ109 TYP)	HW GROUP	UL LABEL	CARD READER	REMARKS
ASR WELL - DRAWING 09A01																			
101-1	8'-0"	10'-0"	3/4"	STEEL	FACT FIN	C	-	-	-	-	STEEL	FACT FIN	AJ123/TYP	AJ123/TYP	AJ123/TYP	-	NR	-	-
101-2	8'-0"	10'-0"	3/4"	STEEL	FACT FIN	C	-	-	-	-	STEEL	FACT FIN	AJ123/TYP	AJ123/TYP	AJ123/TYP	-	NR	-	-
101-3	PR 3'-2"	7'-2"	1 3/4"	STEEL	COATING	F	6'-8"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	E	HW 1	NR	NR	-
102-1	3'-0"	7'-2"	1 3/4"	STEEL	COATING	F	3'-4"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	B	HW 3	NR	NR	-
103-1	3'-0"	7'-2"	1 3/4"	STEEL	COATING	F	3'-4"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	B	HW 4	2-HR	NR	-
103-2	8'-0"	10'-0"	3/4"	STEEL	FACT FIN	C	-	-	-	-	STEEL	FACT FIN	AJ123/TYP	AJ123/TYP	AJ123/TYP	-	NR	-	-
103-3	3'-0"	7'-2"	1 3/4"	STEEL	COATING	F	3'-4"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	E	HW 2	NR	NR	-
104-1	3'-0"	7'-2"	1 3/4"	STEEL	COATING	F	3'-4"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	B	HW 5	NR	NR	-
104-2	PR 3'-2"	7'-2"	1 3/4"	STEEL	COATING	F	6'-8"	7'-4"	5 3/4"	R	STEEL	COATING	C	C	E	HW 1	NR	NR	-

ROOM FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR MAT'L	FLOOR FINISH	BASE MAT'L	NORTH WALL MAT'L	NORTH WALL FINISH	EAST WALL MAT'L	EAST WALL FINISH	SOUTH WALL MAT'L	SOUTH WALL FINISH	WEST WALL MAT'L	WEST WALL FINISH	CEILING MAT'L	CEILING HEIGHT	CEILING FINISH	CEILING SEPARATION
ASR WELL - DRAWING 09A01																
101	PUMP ROOM	CONC	SEALER	PAMP	CMU/PAMP	FACT FIN	CMU/PAMP	FACT FIN	CMU/PAMP	FACT FIN	CMU/PAMP	FACT FIN	WDECK	VARIES	COATING	NR
102	RESTROOM	CONC	SEALER	WFRP	CMU/WFRP	EXPO/FACT FIN	CMU/WFRP	EXPO/FACT FIN	CMU/WFRP	EXPO/FACT FIN	CMU/WFRP	EXPO/FACT FIN	GYP	± 9'-0"	PAINTED	NR
103	CHEMICAL ROOM	CONC	SEALER	CMU	CMU	EXPO	CMU	EXPO	CMU	EXPO	CMU	EXPO	GYP	± 9'-0"	PAINTED	2-HR
104	ELECTRICAL ROOM	CONC	SEALER	RESILIENT	CMU/MCIG	PAINTED	CMU/MCIG	PAINTED	CMU/MCIG	PAINTED	CMU/MCIG	PAINTED	WDECK	VARIES	COATING	NR

CODE ANALYSIS ABBREVIATION LIST:

B	BUSINESS GROUP (2019, TITLE 24)
ci	CONTINUOUS INSULATION
CMU	INTEGRALLY COLORED CONCRETE MASONRY UNIT, REFERENCE SPECIFICATION SECTION 04220
CONC	CONCRETE
EXPO	EXPOSED MATERIAL
F-1	FACTORY INDUSTRIAL GROUP, MODERATE HAZARD OCCUPANCY (2019, TITLE 24)
FACT FIN	FACTORY FINISH
GYP	GYPSUM WALL BOARD, REFERENCE SPECIFICATION SECTION 09250
HW	HARDWARE GROUP, REFERENCE SPECIFICATION SECTION 08710
MAT'L	MATERIAL
MCIG	7/8" METAL FURRING HAT CHANNELS WITH RIGID INSULATION, AND GYPSUM WALL BOARD PAINTED. SYSTEM SHALL EXTEND TO THE UNDERSIDE OF WOOD DECK. REFERENCE SPECIFICATIONS SECTION 07212
NR	NOT REQUIRED
PAMP	PERFORATED ACOUSTICAL METAL PANELS. SYSTEM SHALL EXTEND TO THE UNDERSIDE OF WOOD DECK. REFERENCE SPECIFICATION SECTION 09523
PR	PAIR
R	REQUIRED
SEALER	FLOOR COATING, REFERENCE SPECIFICATION SECTION 09960
U-FACTOR	THERMAL TRANSMITTANCE, IS THE COEFFICIENT OF HEAT TRANSMISSION (AIR TO AIR) THROUGH A BUILDING COMPONENT OR ASSEMBLY, EQUAL TO THE TIME RATE OF HEAT FLOW PER UNIT AREA AND UNIT TEMPERATURE DIFFERENCE BETWEEN THE WARM SIDE AND COLD SIDE AIR FILMS (2019, TITLE 24)
WDECK	WOOD DECK PER STRUCTURAL DESIGN
WFRP	STANDARD FRP WALL SYSTEM, SMOOTH FINISH, LIGHT GRAY S490N AS MANUFACTURED BY MARLITE OR EQUAL. FRP SHALL BE INSTALLED AT THE PERIMETER (INTERIOR FACE) OF THE FOUR RESTROOM WALLS, THE FRP WALL SYSTEM SHALL BE 4'H FROM FINISH FLOOR.

REV	DATE	BY	DESCRIPTION

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REGISTERED PROFESSIONAL ENGINEER — CHRISTOPHER THOMAS CLEVELAND — No. 72713 — CIVIL — STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ARCHITECTURAL
WESTBROOK ASR WELL
BUILDING CODE ANALYSIS, AND SCHEDULES

VERIFY SCALES
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0 1"
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JOB NO. 11843A.10
DRAWING NO. 09GA01
SHEET NO. OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1009GA01.dgn

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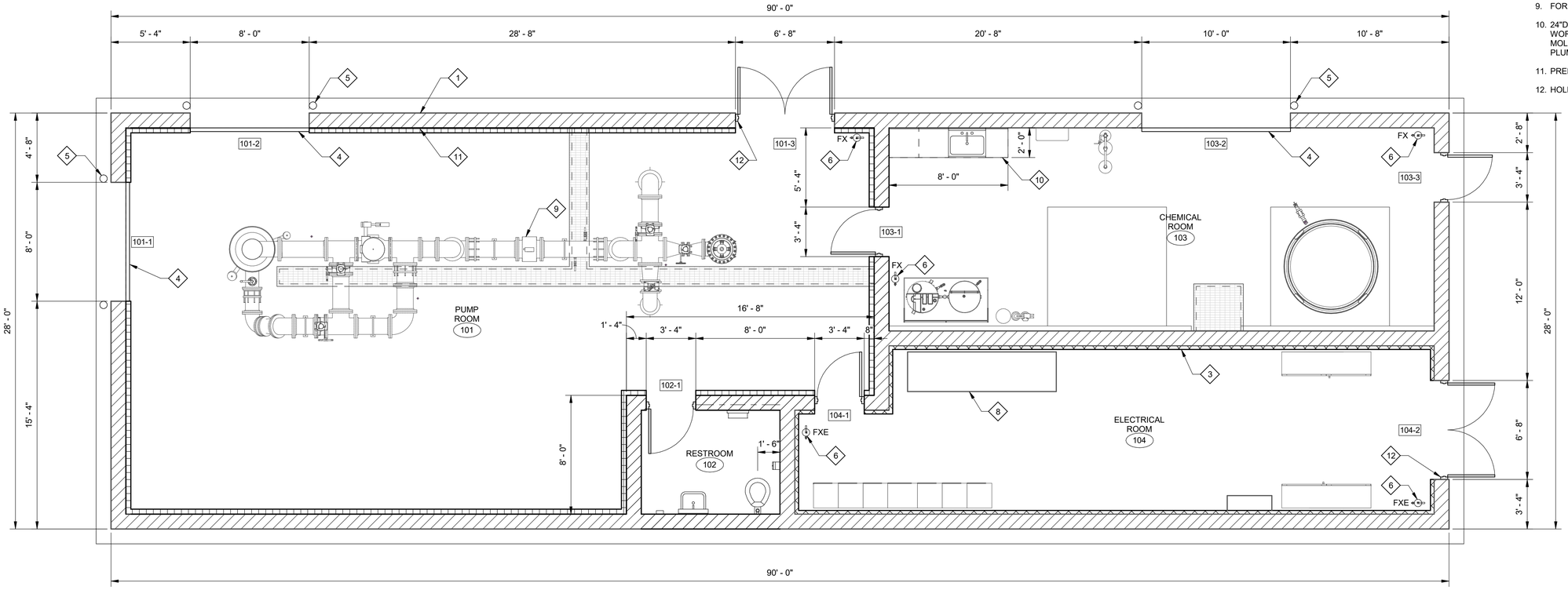
PlotScale: 1:1
DesignScript: Carollo_Std_Pen_v0905.pen
ColorTable: gshade.ctb
Model: Layout1
LAST SAVED BY: FValdezGalvan

GENERAL NOTES:

1. EXTERIOR FACE OF ALL CONCRETE MASONRY UNITS SHALL BE FINISHED WITH WATER REPELLANT, REFERENCE SPECIFICATION SECTION 07190.
2. FOR DOOR SCHEDULES AND ROOF FINISHES SEE SHEET 00A01.
3. FOR EXTERIOR ENTRANCE PADS SEE CIVIL DRAWINGS.
4. FOR RESTROOM ACCESSORY MOUNTING SEE TYPICAL DETAIL AN400/TYP.

KEY NOTES:

1. 12" INTEGRALLY COLORED SMOOTH-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER
2. 12" INTEGRALLY COLORED SPLIT-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER
3. HAT CHANNEL FURRING STRIPS WITH RIGID INSULATION R-11.4 ci MINIMUM, AND GYPSUM WALL BOARD PAINTED. SYSTEM SHALL EXTEND TO THE UNDERSIDE OF METAL DECK
4. OVERHEAD COILING DOOR
5. GUARD POST AT EACH SIDE OF COILING DOOR, C160/TYP
6. FIRE EXTINGUISHER, TYPE AS INDICATED, AN400/TYP
7. FOR EQUIPMENT PADS AND GRATING, SEE STRUCTURAL DRAWINGS
8. FOR EQUIPMENT REQUIREMENTS, SEE ELECTRICAL DRAWINGS
9. FOR EQUIPMENT REQUIREMENTS, SEE MECHANICAL DRAWINGS
10. 24"D x 34"H METAL LABORATORY BASE CABINETS, MOLDED EPOXY WORK SURFACE WITH 4" BACK SPLASH, AND UNDERMOUNTED MOLDED EPOXY SINK WITH HOT AND COLD WATER SUPPLY PER PLUMBING
11. PREFABRICATED ACOUSTICAL METAL PANELS
12. HOLLOW METAL DOOR AND FRAME



B FLOOR PLAN

SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED BMR
DRAWN FVG
CHECKED MEH
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER THOMAS CLEVELAND No. 72713 CIVIL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE

AQUIFER STORAGE AND RECOVERY WELLS PROJECT

ARCHITECTURAL

WESTBROOK ASR WELL FLOOR PLAN

VERIFY SCALES
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0 1"
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JOB NO. 11843A.10
DRAWING NO. 09A01
SHEET NO. OF XX

PLOT DATE: 10/12/2021 12:53:35 PM

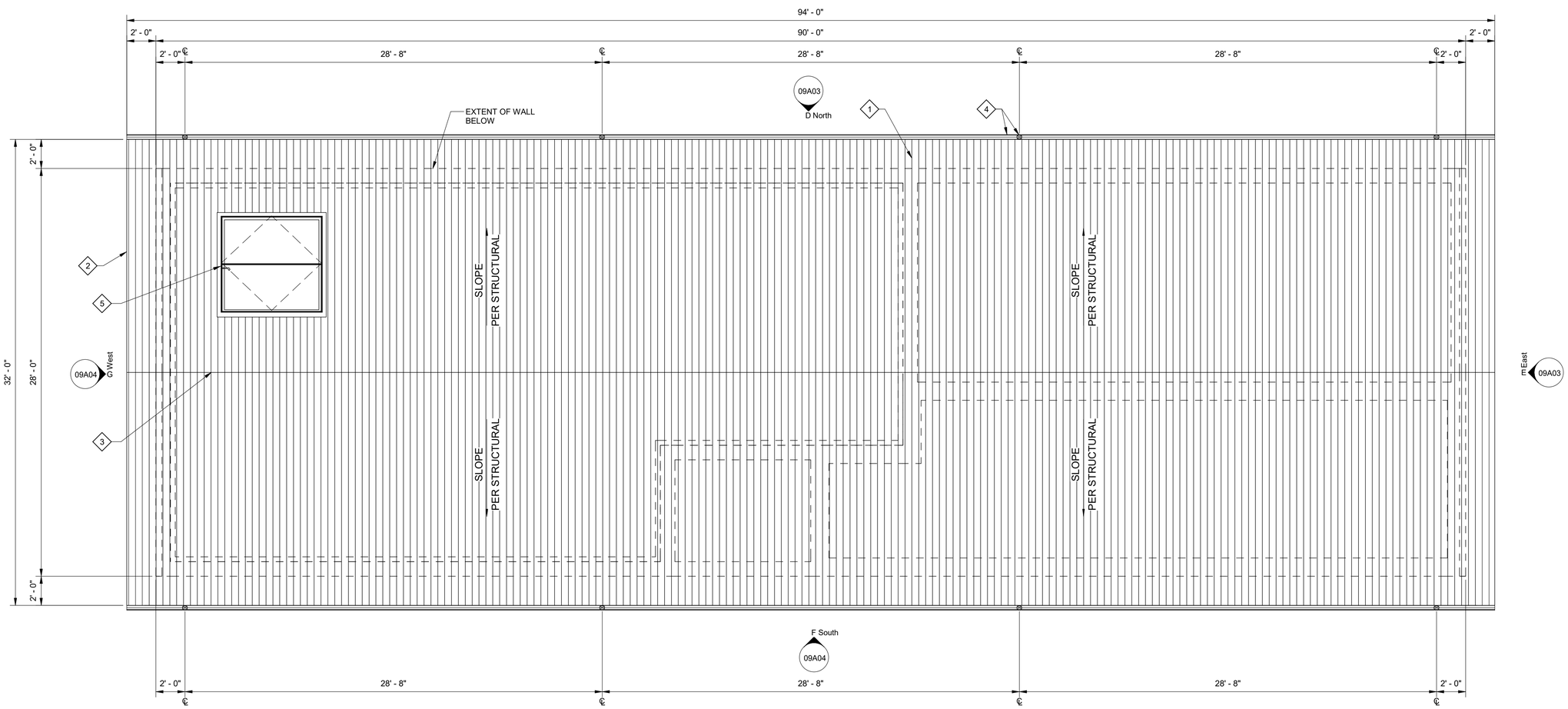
FILE NAME: R:\d1096957\11843A1009A0801.rvt

GENERAL NOTES:

1. ROOF HIGH POINTS (HP) AND LOW POINTS (LP) SHALL BE COORDINATED WITH STRUCTURAL DRAWINGS FOR METAL DECK SLOPING.

KEY NOTES:

1. STANDING SEAM METAL ROOF SYSTEM
2. ALUMINUM FASCIA
3. ROOF RIDGE
4. FOR GUTTER AND DOWNSPOUT INFORMATION, SEE AG227/TYP
5. 7'-0" x 7'-0" ROOF HATCH



C ROOF PLAN

SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER THOMAS CLEVELAND No. 72713 CIVIL STATE OF CALIFORNIA

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CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ARCHITECTURAL
WESTBROOK ASR WELL
ROOF PLAN

VERIFY SCALES
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JOB NO. 11843A.10
DRAWING NO. 09A02
SHEET NO. OF XX

PLOT DATE: 10/12/2021 12:53:36 PM

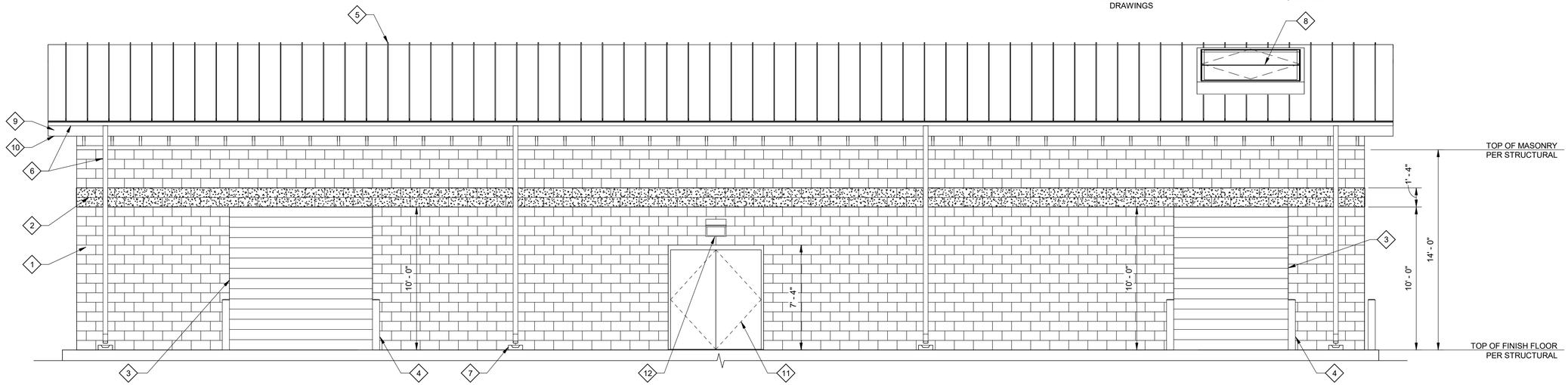
FILE NAME: R:\d1096957\11843A1009A0801.rvt

KEY NOTES:

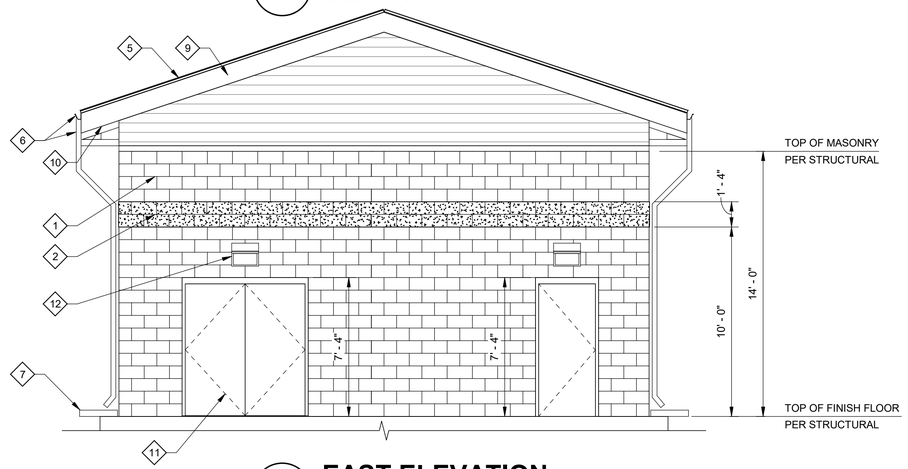
1. 12" INTEGRALLY COLORED SMOOTH-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER.
2. 12" INTEGRALLY COLORED SPLIT-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER.
3. OVERHEAD COILING DOOR.
4. GUARD POST AT EACH SIDE OF COILING DOOR, C160/TYP.
5. STANDING SEAM METAL ROOF SYSTEM
6. FOR GUTTER AND DOWNSPOUT INFORMATION, SEE AG227/TYP
7. FOR CONCRETE SPLASH BLOCK INFORMATION, SEE AG229/TYP
8. 7'-0" x 7'-0" ROOF HATCH
9. ALUMINUM FASCIA
10. ALUMINUM SOFFIT
11. HOLLOW METAL DOOR AND FRAME
12. FOR EXTERIOR LIGHT FIXTURE INFORMATION, SEE ELECTRICAL DRAWINGS

GENERAL NOTES:

1. EXTERIOR FACE OF ALL CONCRETE MASONRY UNITS SHALL BE FINISHED WITH WATER REPELLANT, REFERENCE SPECIFICATION SECTION 07190.
2. FOR DOOR SCHEDULES AND ROOF FINISHES, SEE SHEET 00A01.
3. FOR EXTERIOR ENTRANCE PADS, SEE CIVIL DRAWINGS.
4. ROOF HIGH POINTS (HP) AND LOW POINTS (LP) SHALL BE COORDINATED WITH STRUCTURAL DRAWINGS FOR METAL DECK SLOPING.



D **NORTH ELEVATION**
SCALE: 1/4" = 1'-0"



E **EAST ELEVATION**
SCALE: 1/4" = 1'-0"

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CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ARCHITECTURAL
WESTBROOK ASR WELL
NORTH AND EAST ELEVATIONS

VERIFY SCALES
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0 1"
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JOB NO. 11843A.10
DRAWING NO. 09A03
SHEET NO. OF XX

PLOT DATE: 10/12/2021 12:53:36 PM

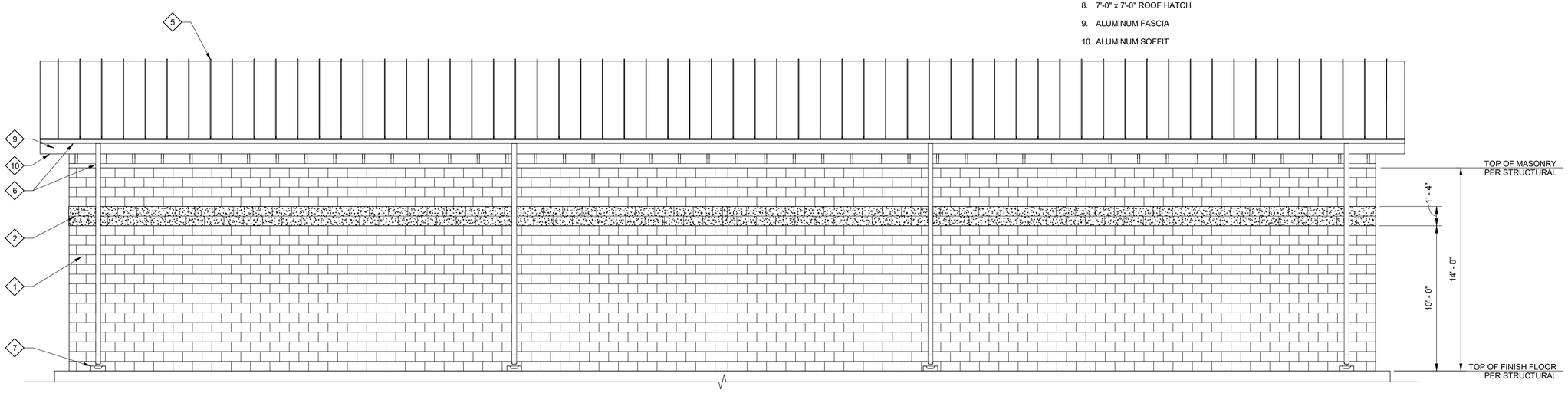
FILE NAME: R:\d1096957\11843A1009A0801.rvt

KEY NOTES:

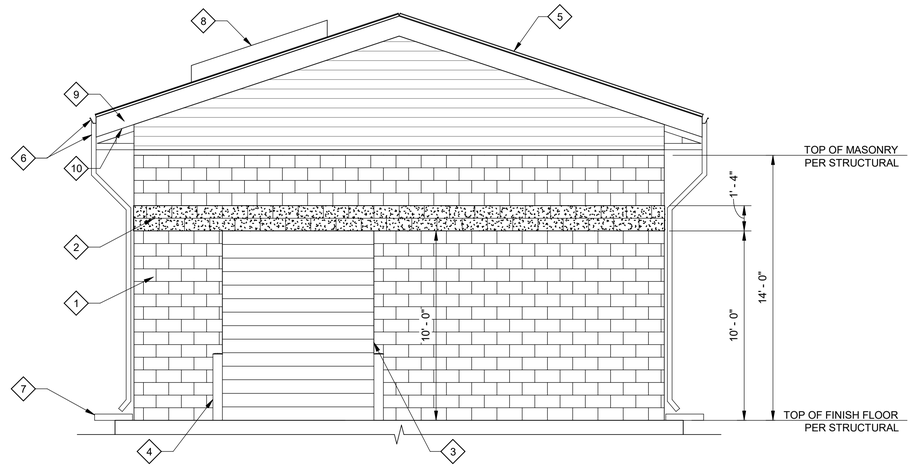
1. 12" INTEGRALLY COLORED SMOOTH-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER
2. 12" INTEGRALLY COLORED SPLIT-FACE CONCRETE MASONRY UNITS, COLOR AS SELECTED BY OWNER
3. OVERHEAD COILING DOOR
4. GUARD POST AT EACH SIDE OF COILING DOOR, C160/TYP
5. STANDING SEAM METAL ROOF SYSTEM
6. FOR GUTTER AND DOWNSPOUT INFORMATION, SEE AG227/TYP
7. FOR CONCRETE SPLASH BLOCK INFORMATION, SEE AG229/TYP
8. 7'-0" x 7'-0" ROOF HATCH
9. ALUMINUM FASCIA
10. ALUMINUM SOFFIT

GENERAL NOTES:

1. EXTERIOR FACE OF ALL CONCRETE MASONRY UNITS SHALL BE FINISHED WITH WATER REPELLANT, REFERENCE SPECIFICATION SECTION 07190.
2. FOR DOOR SCHEDULES AND ROOF FINISHES, SEE SHEET 00A01.
3. FOR EXTERIOR ENTRANCE PADS, SEE CIVIL DRAWINGS.
4. ROOF HIGH POINTS (HP) AND LOW POINTS (LP) SHALL BE COORDINATED WITH STRUCTURAL DRAWINGS FOR METAL DECK SLOPING.



F SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



G WEST ELEVATION
SCALE: 1/4" = 1'-0"

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DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER THOMAS CLEVELAND
No. 72713
CIVIL
STATE OF CALIFORNIA

carollo®

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ARCHITECTURAL
WESTBROOK ASR WELL
SOUTH AND WEST ELEVATIONS

VERIFY SCALES
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JOB NO. 11843A.10
DRAWING NO. 09A04
SHEET NO. OF XX

PLOT DATE: 10/12/2021 12:53:37 PM

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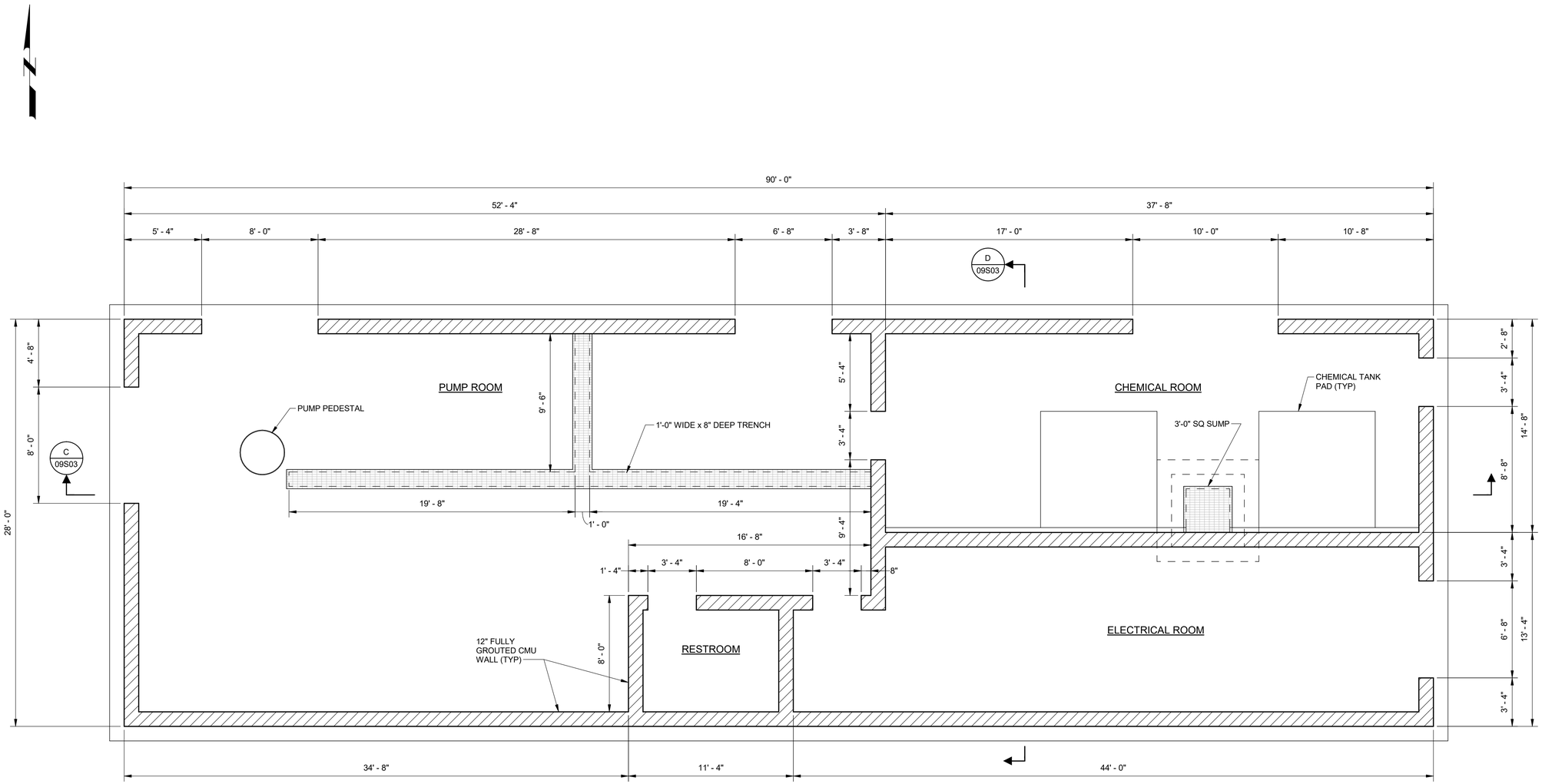

A PLAN
SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
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DESIGNED MJH
DRAWN RYW
CHECKED Checker
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER
MICHAEL E. DADIK
No. S5368
STRUCTURAL
STATE OF CALIFORNIA

carollo®

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
STRUCTURAL
WESTBROOK ASR WELL
FOUNDATION PLAN

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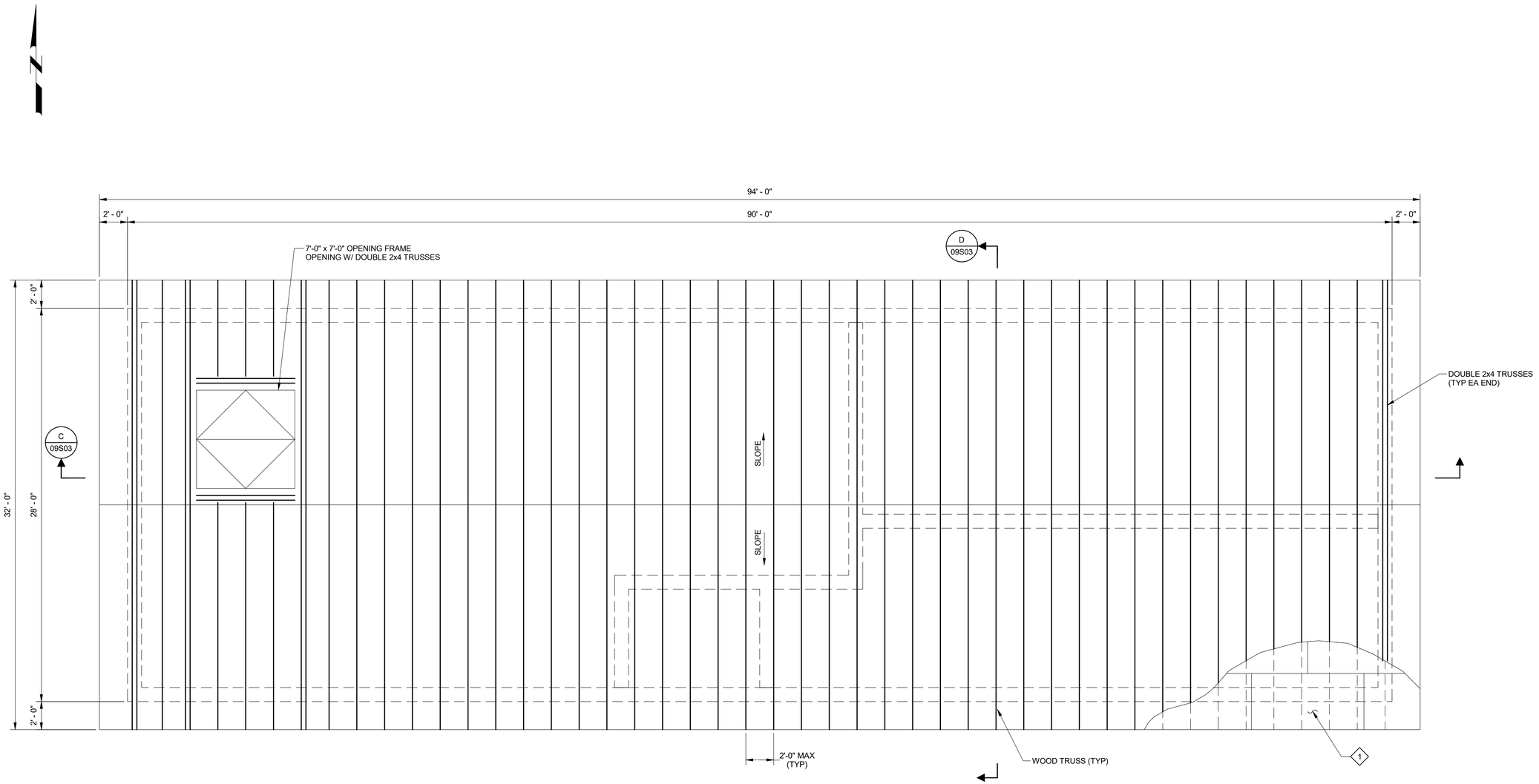
JOB NO. 11843A.10
DRAWING NO. 09S01
SHEET NO. OF XX

PLOT DATE: 10/12/2021 1:14:01 PM
FILE NAME: R:\d1096963\11843A1009S801.rvt

KEY NOTES:

1. 15/32 PLWD AP4 RATED STRUCT 1 W/ 10d NAILS @ 6" EDGE SPACING AND 12" FIELD SPACING.



B PLAN

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DRAWING NO. 09S02
SHEET NO. OF XX

PLOT DATE: 10/12/2021 1:11:09 PM

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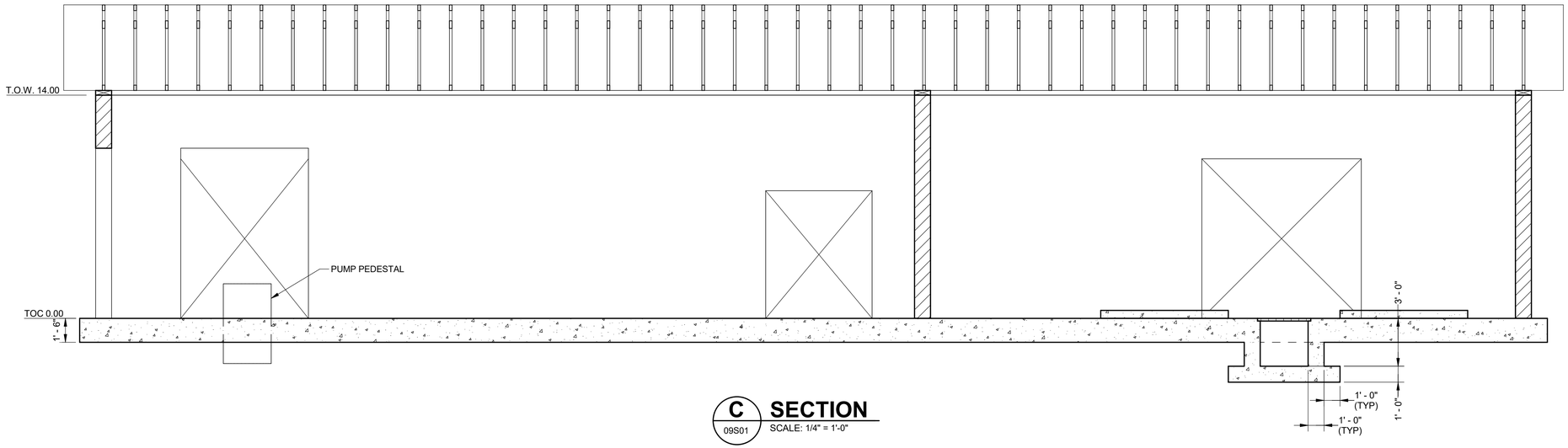
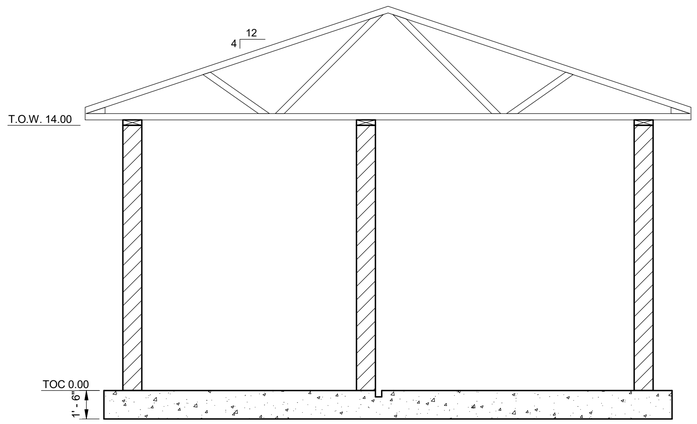


C SECTION

09S01

SCALE: 1/4" = 1'-0"



D SECTION

09S01

SCALE: 1/4" = 1'-0"

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WESTBROOK ASR WELL
SECTIONS AND DETAILS 2

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SHEET NO. OF XX

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PIPING SYMBOLS

DOUBLE LINE	SINGLE LINE	DESCRIPTION
		WELDED JOINT
		GROOVED END JOINT
		FLANGED JOINT
		HUB & SPIGOT JOINT (RUBBER GASKET)
		PUSH-ON JOINT (RESTRAINED)
		ADAPTER SIDE GROOVED END ADAPTER FLANGE
		FLANGED COUPLING ADAPTER
		FLANGED COUPLING ADAPTER WITH THRUST TIES
		FLEXIBLE COUPLING
		FLEXIBLE COUPLING WITH THRUST TIES
		METAL BELLOWS EXP JOINT
		ELASTOMER BELLOWS EXP JOINT
		FLEXIBLE COUPLING ADAPTER
		DISMANTLING JOINT
		EXPANSION COMPENSATOR
		ELBOW UP
		ELBOW DOWN
		TEE UP
		TEE DOWN
		LATERAL UP
		LATERAL DOWN
		CONCENTRIC REDUCER
		ECCENTRIC REDUCER (FOT. FOB)
		UNION
		CAP
		ANCHOR
		ELBOW, 90 DEGREE
		CROSS
		TEE
		ELBOW, 45 DEGREE
		ELBOW, 22.5 DEGREE
		ELBOW, 11.25 DEGREE
		LATERAL

SINGLE LINE	DESCRIPTION
	GATE VALVE
K	KNIFE GATE VALVE
	BUTTERFLY VALVE
V	CHARACTERIZED BALL CONTROL VALVE
	BALL VALVE
	GLOBE VALVE
	3-WAY GLOBE TYPE MIXING VALVE
	FOUR WAY VALVE
	PINCH VALVE
	DIAPHRAGM VALVE
	PLUG VALVE
	LUBRICATED PLUG VALVE
	ECCENTRIC PLUG VALVE
	CONCENTRIC PLUG VALVE
	SWING CHECK VALVE
	WAFER CHECK VALVE
	BALL CHECK VALVE
	DUAL CHECK VALVE
	CHECK BACKFLOW PREVENTER
	HOSE VALVE
	MUD VALVE (PLAN VIEW)
	NEEDLE VALVE
	CONE VALVE
	PRESSURE RELIEF PRESSURE-REDUCING REGULATOR
	TELESCOPING VALVE
	THREE WAY VALVE AIR OPERATED
M	THREE WAY VALVE MOTOR OPERATED
S	THREE WAY VALVE SOLENOID OPERATED
	VACUUM VALVE
	BACKPRESSURE REGULATOR SELF-CONTAINED
	BACKPRESSURE REGULATOR W/ EXTERNAL PRESSURE TAP
	PRESSURE-REDUCING REGULATOR: SELF-CONTAINED
	PRESSURE-REDUCING REGULATOR W/EXTERNAL PRESSURE TAP

MECHANICAL SYMBOLS

SINGLE LINE	DESCRIPTION
	AIR OR CHEMICAL DIFFUSER
	QUICK DISCONNECT HIGH PRESSURE AIR OR FLUSHING
	BATCHMETER
	AIR VENT
	BASKET STRAINER
	BLOWER
	CALIBRATION COLUMN
	COMPRESSOR/TURBINE
	COMPRESSOR: RECIPROCATING
	DIAPHRAGM SEAL
	DRAIN
	EJECTOR OR EDUCTOR
M	ELECTRIC MOTOR
	EQUIPMENT DRAIN
	EXPANSION JOINT, FLEXIBLE VIBRATION JOINT
	FAN: EXHAUST/SUPPLY
	FILTER
	FIRE HYDRANT
	FLAME ARRESTER
	FLAME ARRESTER WITH THERMALLY OPERATED VALVE
	FLOOR DRAIN
	FLOW SWITCH
	GAUGE: PRESSURE
	GAUGE: DIFFERENTIAL PRESSURE
	WEIR
	MIXER
	OIL OR MOISTURE TRAP
	PRIMARY LEVEL ELEMENT: BUBBLER
	PRIMARY LEVEL ELEMENT: ELECTRODE
	PRIMARY LEVEL ELEMENT: FLOAT SWITCH
	PRIMARY LEVEL ELEMENT: FLUID
	PRIMARY LEVEL ELEMENT: INVERTED COLUMN

SINGLE LINE	DESCRIPTION
	PRIMARY LEVEL ELEMENT: RADAR
	PRIMARY LEVEL ELEMENT: ULTRASONIC
	PRIMARY FLOW ELEMENT: FLUME
X	PRIMARY FLOW ELEMENT: X = C - CORIOLIS X = M - MAGNETIC X = P - PROPELLER X = PT - PITOT TUBE X = R - ROTAMETER X = T - TURBINE X = TH - THERMAL X = U - ULTRASONIC X = D - DENSITY
	PRIMARY FLOW ELEMENT: ORIFICE PLATE
	PRIMARY FLOW ELEMENT: VENTURI TUBE
	PRIMARY FLOW ELEMENT: WEIR
	PULSATION DAMPENER
	PUMP: CENTRIFUGAL
	PUMP: DIAPHRAGM
	PUMP: METERING
	PUMP: PLUNGER
	PUMP: PERISTALTIC TUBE METERING
	PUMP: PROGRESSIVE CAVITY
	PUMP: RECIPROCATING
	PUMP: ROTARY
	PUMP: SCREW
	PUMP: SUBMERSIBLE
	PUMP: VERTICAL LIFT
	PIPE REDUCER: CONCENTRIC
	PIPE REDUCER: ECCENTRIC (FOT, FOB)
	ROTARY CHEMICAL FEEDER
	RUPTURE DISK
	SAMPLE PORT
	SIGHT GLASS
	SLIDE GATE
	SLUICE GATE
	STRAINER: WYE TYPE

SINGLE LINE	DESCRIPTION
	STRAINER: WYE TYPE WITH BLOWOFF
	THERMOMETER
	VALVE: ANGLE
	VALVE: AIR RELIEF
	PIPE MATERIAL CHANGE

IDENTIFICATION SYMBOLS

CHEMICAL INJECTION POINT — CHEMICAL / DWG NO.

PIPE DESIGNATOR — PIPE SIZE, FLOW STREAM, X" XXX

CONTINUATION TAG — UNIQUE IDENTIFIER, CONTINUATION FROM DWG NO., CONTINUATION TO DWG NO., A, B, C

EQUIPMENT / VALVE TAG — XXX-XX-XXXX

KEY TAG — X

LINE SYMBOLS

PIPE ABOVE OR BELOW GROUND

PIPE UNDERNEATH SLAB OR STRUCTURE

FUTURE

EXISTING

DEMO

PROCESS LINE SYMBOLS

PRIMARY PROCESS FLOW IN PIPE

SECONDARY PROCESS FLOW IN PIPE

PRIMARY PROCESS FLOW IN CHANNEL

SECONDARY PROCESS FLOW IN CHANNEL

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CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
MECHANICAL
GENERAL MECHANICAL NOTES AND LEGEND

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DRAWING NO. GM01
SHEET NO. OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1000GM001.dgn

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ABBREVIATIONS

A	@	AT
	AD	AREA DRAIN
	AFF	ABOVE FINISHED FLOOR
B	BFP	BACKFLOW PREVENTER
	BLDG	BUILDING
	BOP	BOTTOM OF PIPE
	BWV	BACKWATER VALVE
C	CL	CENTERLINE
	CA	COMPRESSED AIR
	CI	CAST IRON
	CO	CLEANOUT
	CONT	CONTINUOUS, CONTINUE
	CU FT	CUBIC FEET
	CV	CHECK VALVE
	CW	COLD WATER
D	D	DRAIN
	DCO	DOUBLE CLEANOUT
	DI	DUCTILE IRON
	DN	DOWN
	DWG	DRAWING
E	E	EMERGENCY WATER
	ECO	EXTERIOR CLEANOUT
	EL	ELEVATION
	ES	EMERGENCY SHOWER
	ESEW	EMERGENCY SHOWER / EYEWASH STATION
	ETP	ELECTRONIC TRAP PRIMER
	EWC	ELECTRIC WATER COOLER
	EWH	ELECTRIC WATER HEATER
	EWU	EYE WASH UNIT
F	FAS	FLOW ALARM SWITCH
	FCO	FLOOR CLEANOUT
	FD	FLOOR DRAIN
	FE	FIRE EXTINGUISHER
	FHV&C	FIRE HOSE VALVE AND CABINET
	FS	FLOW SWITCH
	FV	FIRE VALVE
	F/BS	FACE/BODY SPRAY
G	G	GAS
	GPM	GALLONS PER MINUTE
H	HB	HOSE BIBB
	HD	HUB DRAIN
	HEV	HOSE END VALVE
	HP	HANDICAPPED (ADA ACCESSIBLE)
	HW	HOT WATER
	HWR	HOT WATER RETURN
	HWS	HOT WATER SUPPLY
I	INV	INVERT
	IOS	INSTALLED BY OTHER SECTION
	IPS	IRON PIPE SIZE
K	KS	KITCHEN SINK
	KU	KITCHEN UNIT
L	LAB	LABORATORY
	LAV	LAVATORY
	LBV	LOCKABLE BALL VALVE
	LSV	LOCK SHIELD VALVE
M	MAX	MAXIMUM
	MIN	MINIMUM
	MR	MOP RECEPTOR
N	ND	NUMBER
	NPW	NON-POTABLE WATER
O	OED	OPEN END OR OPEN EQUIPMENT DRAIN
P	P	PROTECTED WATER
	PD	PUMP DISCHARGE
	PG	PRESSURE GAUGE
	PH	POST HYDRANT
	PHW	PROTECTED HOT WATER
	PRW	PRESSURE WATER
	PRH	HIGH PRESSURE
	PSI	POUNDS PER SQUARE INCH
	PSL	LOW PRESSURE
	P&T	PRESSURE & TEMPERATURE
	PVC	POLYVINYL CHLORIDE
	PW	POTABLE WATER
R	RD	ROOF DRAIN
	RM	ROOM
	RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
S	S	SOIL
	SA	SHOCK ABSORBER
	SF	SQUARE FOOT
	SH	SHOWER
	SHT	SHEET
	SP	SPRINKLER
	SQ	SQUARE
	SS	SANITARY SEWER
	SK	SINK
	SSK	SAMPLE
T	T&P	TEMPERATURE & PRESSURE RELIEF
	TD	TANK DRAIN
	THK	THICK(NESS)
	TP	TRAP PRIMER
	TW	TEPID WATER
	TWH	TANKLESS WATER HEATER
	TYP	TYPICAL
U	UNO	UNLESS NOTED OTHERWISE
	UR	URINAL
V	V	VENT
	VAC	VACUUM
	VB	VACUUM BREAKER
	VE	VACUUM EXHAUST
	VTR	VENT THROUGH ROOF
W	W	WASTE
	W/	WITH
	WC	WATER CLOSET
	WCO	WALL CLEANOUT
	WF	WASH FOUNTAIN
	WH	WALL HYDRANT
	WHA	WATER HAMMER ARRESTOR
	WHS	WASH HOSE STATION
	WT	(SANITARY) WASTE
	W&T	WASTE & TRAP
	W&V	WASTE & VENT

PLUMBING LINE SYMBOLS

- NEW COLD WATER (POTABLE)
- EXISTING COLD WATER (POTABLE)
- NEW HOT WATER (POTABLE)
- EXISTING HOT WATER (POTABLE)
- NON-POTABLE WATER
- NEW SANITARY SEWER
- EXISTING SANITARY SEWER
- SOIL OR WATER (DRAINAGE) (D)
- TEMPERED WATER (POTABLE)
- VENT

PLUMBING SYMBOLS

- CO — CLEANOUT
- FLOOR CLEANOUT
- WCO — WALL CLEANOUT
- YCO — DOUBLE YARD CLEANOUT
- FLOOR DRAIN
- HUB DRAIN
- HOSE BIBB OR WALL HYDRANT
- HOSE RACK
- WATER PROOF SLEEVE
- DN OR DROP
  "DN" DENOTES PIPE WHICH PENETRATE THE FLOOR BELOW.
  "DROP" DENOTES PIPES WHICH DO NOT.
- UP OR RISE
  "UP" DENOTES PIPE WHICH PENETRATE THE FLOOR ABOVE.
  "RISE" DENOTES PIPES WHICH DO NOT.

NOTE: THE TERMS "DN" "DROP" "UP" & "RISE" ARE USED TO INDICATE THE VERTICAL DIRECTION IN WHICH A PIPE LINE CONTINUES FROM THE IMAGINARY PLANE OF VIEW. THE TERMS HAVE NO RELEVANCE TO THE DIRECTION OF FLOW WITHIN THE PIPE LINE.

- P-TRAP
- TEE
- TEE UP
- TEE DOWN
- LOCKABLE BALL VALVE
- CHECK VALVE
- GATE VALVE
- COLD BYPASS VALVE
- OR — BALL VALVE
- GLOBE VALVE
- BUTTERFLY VALVE
- PLUG VALVE
- FLOW CONTROL
- PRESSURE REGULATOR VALVE
- UNION
- BOTTOM CONNECTION
- TOP CONNECTION
- REDUCED PRESSURE BACKFLOW PREVENTER
- TEMPERATURE GAUGE
- RE-CIRCULATION PUMP

NOTE: THIS IS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS. NOT ALL ITEMS SHOWN HERE APPEAR ON THE CONTRACT DRAWINGS.

SCHEDULES

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AQUIFER STORAGE AND RECOVERY WELLS PROJECT
MECHANICAL
GENERAL PLUMBING NOTES, ABBREVIATIONS, AND SYMBOLS

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ColorTable: gshade.ctb
Model: Layout1
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NOTES

1. SIZES OF EQUIPMENT PADS INDICATED ON THE DRAWINGS ARE APPROXIMATE. EXACT DIMENSIONS SHALL BE DETERMINED BY THE CONTRACTOR FOR THE EQUIPMENT FURNISHED. ALL FLOOR MOUNTED EQUIPMENT SHALL BE SET ON CONCRETE PADS CONFORMING TO DETAILS SHOWN ON THE TYPICAL STRUCTURAL DRAWINGS.
2. DIELECTRIC COUPLINGS, FLANGES OR UNIONS SHALL BE INSTALLED AT ALL CONNECTIONS OF COPPER PIPE TO OTHER TYPES OF METALLIC PIPING.
3. HVAC PIPING AND DUCTWORK DRAWINGS DO NOT SHOW ALL DRAINS, VENTS, OFFSETS AND FITTINGS ETC. REQUIRED FOR THE COMPLETE SYSTEM. SMALL PIPING IS SHOWN APPROXIMATELY TO SCALE BUT NOT EVERY FITTING AND OFFSET IS SHOWN. THE CONTRACTOR SHALL FURNISH, INSTALL AND TEST ALL HVAC SYSTEMS TO PROVIDE THE COMPLETE SYSTEM.
4. UNLESS OTHERWISE SHOWN ON THE DRAWINGS ALL FLOOR SLAB AND WALL PENETRATIONS SHALL BE AS SHOWN ON THE TYPICAL DETAILS.
5. NOT ALL AND ONLY CERTAIN TYPES OF SUPPORTS ARE SHOWN ON THE HVAC DRAWINGS. UNLESS OTHERWISE DETAILED ON THE DRAWINGS ALL PIPE AND DUCT SUPPORTS SHALL BE DESIGNED, FURNISHED AND INSTALLED BY THE CONTRACTOR AS SPECIFIED.
6. THIS IS A GENERAL LIST OF SYMBOLS. NOT ALL ITEMS SHOWN HERE APPEAR ON CONTRACT DRAWINGS.
7. TYPICAL DETAILS SHALL BE USED FOR ALL PERMANENT WORK EVEN THOUGH THEY ARE NOT CALLED OUT AT ALL LOCATIONS WHERE THEY APPLY.
8. COORDINATE FINAL LOUVER SIZE AND LOCATION WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS.
9. PROVIDE TURNING VANES IN ALL ELBOWS. (SHOWN OR NOT)

ABBREVIATIONS

A	@	AT
	AC	AIR CONDITIONING
	AFF	ABOVE FINISHED FLOOR
	AFS	AIR FLOW SWITCH
	AHU	AIR HANDLING UNIT
B	BD	BALANCING DAMPER
	BDD	BACKDRAFT DAMPER
	BLR	BOILER
	BOD	BOTTOM OF DUCT
C	CH	CHILLER
	CO	CARBON MONOXIDE DETECTOR
	CT	COOLING TOWER
	CS	CURRENT SENSOR
	CU	CONDENSING UNIT
D	DG	DOOR GRILLE
	DP	DIFFERENTIAL PRESSURE
E	EA	EXHAUST AIR
	ECU	EVAPORATIVE COOLING UNIT
	EF	EXHAUST FAN
	EUH	ELECTRIC UNIT HEATER
F	FA	FOUL AIR
	FCU	FAN COIL UNIT
	FD	FIRE DAMPER
G	GUH	GAS UNIT HEATER
H	HP	HEAT PUMP
M	MAU	MAKEUP AIR UNIT
	MD	MOTORIZED DAMPER
N	NC	NORMALLY CLOSED
	NO	NORMALLY OPEN
O	OA	OUTSIDE AIR
	OCF	ODOR CONTROL FAN
P	PPU	POSITIVE PRESSURIZATION UNIT
R	RA	RETURN AIR
	RR	RETURN REGISTER OR GRILLE
S	SA	SUPPLY AIR
	SD	SMOKE DAMPER OR SMOKE DETECTOR
	SF	SUPPLY FAN
	SFD	SMOKE & FIRE DAMPER COMBINATION
	SR	SUPPLY REGISTER, GRILLE OR DIFFUSER
V	VAV	VARIABLE AIR VOLUME
W	WUH	WATER UNIT HEATER

DUCTWORK SYMBOLS

FEATURE	SYMBOL
DIRECTION OF FLOW	
DUCT SIZE- FIRST NUMBER IS SIDE SHOWN	12x20
ROUND DUCT	12 DIA OR 12"Ø
DUCT SECTION, POSITIVE PRESS FIRST NUMBER IS TOP	20x12
DUCT SECTION, NEGATIVE PRESS FIRST NUMBER IS TOP	20x12
SIDE MOUNT DEVICE	
ELEVATION CHANGE (R) RISE, (D) DROP	R
ACCESS DOOR	AD / AD
BOTTOM MOUNT DEVICE REGISTER, GRILLE, DIFFUSER OR DUCT TAKEOFF	
FLEXIBLE CONNECTION	
FLEXIBLE DUCT	OR
DUCT INSULATION (INSIDE) OR (OUTSIDE) SIZE VARIES	XX" INSULATION (INSIDE) / XX" INSULATION (OUTSIDE)
TURNING VANES	
RECTANGULAR TO RECTANGULAR TRANSITION	20x12 16x8
RECTANGULAR TO ROUND TRANSITION	20x12 16 DIA
POSITIVE PRESSURE DUCT - ELBOW TURNED UP (USE ONE DIAGONAL FOR NEGATIVE PRESSURE)	
POSITIVE PRESSURE DUCT - ELBOW TURNED DOWN (USE ONE DIAGONAL FOR NEGATIVE PRESSURE)	
SMOKE DETECTOR CONFIRM ORIENTATION OF INSTALLATION	
DAMPERS	
BACKDRAFT	
BALANCING	
FIRE W/ ACCESS DOOR	FD
MOTORIZED	M
SMOKE CONFIRM ORIENTATION OF INSTALLATION	
COMBINATION SMOKE AND FIRE CONFIRM ORIENTATION OF INSTALLATION	

EQUIPMENT SYMBOLS

FEATURE	SYMBOL
A/C OR HEAT PUMP COMPRESSOR	
CENTRIFUGAL FAN	
CONTROL PANEL	
COOLING COIL	C / C
CURRENT SENSOR	CS
DIRECT EXPANSION COIL	D / X
DUCT SMOKE DETECTOR	
ELECTRIC HEATER	
FILTER	
AIR FLOW SWITCH	AFS
GAS HEATER	
HUMIDISTAT	H
INLINE/AXIAL FAN	
MOTOR OPERATED VALVE	M
PRESSURE DIFFERENTIAL SWITCH	PD
ROOF/SIDEWALL FAN	
ROOF VENT OR ROOF FAN	
SOLENOID VALVE	S
THERMOSTAT 60" ABOVE FINISH FLOOR	T
UNIT HEATER (HORIZONTAL TYPE)	
UNIT HEATER (VERTICAL TYPE)	

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REGISTERS, GRILLES & LOUVERS SYMBOLS

FEATURE	SYMBOL
LOUVER/BRICK VENT - FIXED	
LOUVER/BRICK VENT - OPERABLE	
TRANSFER GRILLE	
TO SPACE	
FROM SPACE	
SUPPLY DIFFUSER OR GRILLE ARROWS INDICATE FLOW DIRECTION	
RETURN DIFFUSER OR GRILLE ARROWS INDICATE FLOW DIRECTION	
EXHAUST DIFFUSER OR GRILLE ARROWS INDICATE FLOW DIRECTION	

LEGEND FOR REGISTERS & GRILLES

TYPE OF REGISTER OR GRILLE (AS DESCRIBED IN SPECIFICATIONS) — SR-1(B)/12x12 — BOOT (IF REQ'D) — NECK SIZE — 400/4 — CFM — FLOW PATTERN; SIDEWALL-ADJUSTABLE; C-CORNER

	SUPPLY	RETURN	EXHAUST
DUCT UP THRU ROOF OR FLOOR			
DUCT UP			
DUCT DOWN			

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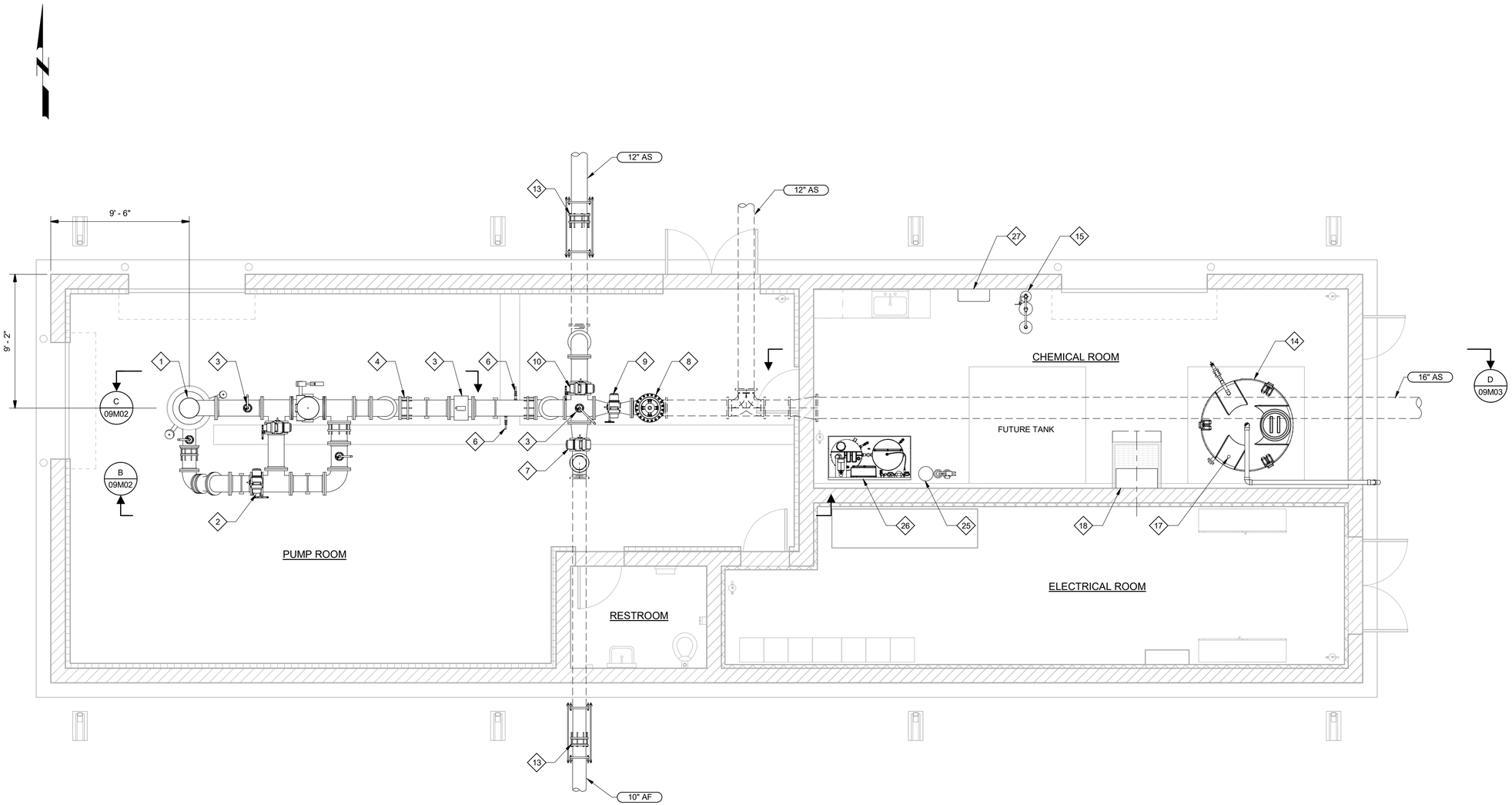

A PLAN
SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. SEE CIVIL FOR PIPING CONTINUATIONS
2. NOT ALL REQUIRED PIPE SUPPORTS ARE SHOWN.
3. ALL PIPE SUPPORTS WITHIN THE CHEMICAL ROOM SHALL BE FRP, UNLESS OTHERWISE NOTED. WALL PIPE SUPPORTS PER P660/TYP, FLOOR PIPE SUPPORTS PER P618/TYP, AND VERTICAL PIPE SUPPORTS PER P615/TYP.
4. ALL PIPE SUPPORTS USED FOR CHEMICAL SERVICE TO USE CUSHION STRIPS BY ANVIL #AS 3792 OR EQUAL.
5. ALL BALL VALVES USED FOR SODIUM HYPOCHLORITE SERVICE SHALL BE VENTED BALL TYPE.

KEY NOTES:

1. ASR WELL PUMP
2. WELL ANNULUS RECHARGE VALVE
3. 2" AIR RELEASE VALVE (TYP)
4. RESTRAINED FLANGE COUPLING ADAPTER (TYP)
5. BI-DIRECTIONAL FLOW METER
6. 1" SPARE NIPPLE AND FULL-PORT BALL VALVE
7. AQUIFER FLUSH VALVE
8. PRESSURE REDUCING VALVE
9. MODULATING RECHARGE CONTROL VALVE
10. RECOVERY VALVE
11. SODIUM HYPOCLORITE INJECTION
12. FLUORIDE INJECTION
13. RESTRAINED FLEXIBLE COUPLING PER P110/TYP
14. 1,000 GALLON DOUBLE CONTAINED SODIUM HYPOCHLORITE TANK
15. EMERGENCY SHOWER & EYEWASH STATION PER M270/TYP
16. 3" TANK VENT ROUTED THROUGH WALL PER P302/TYP, TERMINATE AT A 45 DEGREE ANGLE WITH BIRD SCREEN
17. LEVEL INSTRUMENT
18. SODIUM HYPOCHLORITE DUAL PUMP SKID
19. 2" VENTED BALL VALVE
20. WALL PENETRATION PER P302/TYP
21. 3" BALL VALVE WITH STEM EXTENSION
22. 2" QUICK DISCONNECT HOSE COUPLING WITH CAP, VENTED BALL VALVE, AND BALL CHECK VALVE
23. 3" OVERFLOW
24. FLEXIBLE FITTING PER TANK MANUFACTURER
25. WATER SOFTENER WITH BRINE TANK
26. PACKAGED FLUORIDE DOSING SKID
27. INSTANT WATER HEATER
28. UTILITY SINK

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DATE OCTOBER 2021

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REGISTERED PROFESSIONAL ENGINEER MICHAEL E. DUCKER No. 63626 CIVIL STATE OF CALIFORNIA

ASR SYSTEMS

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MECHANICAL
WESTBROOK ASR WELL BUILDING PLAN

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SHEET NO. OF XX

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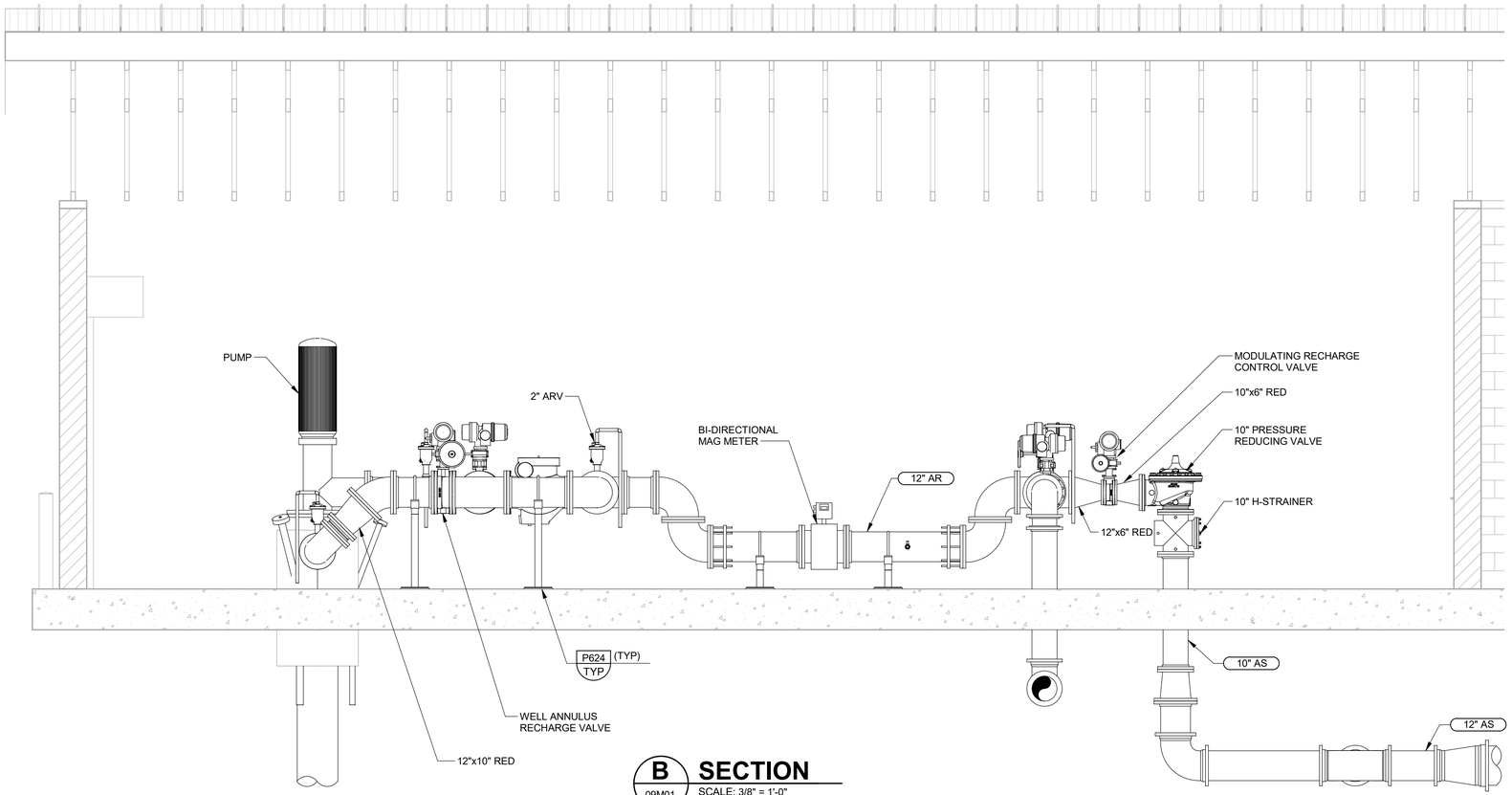

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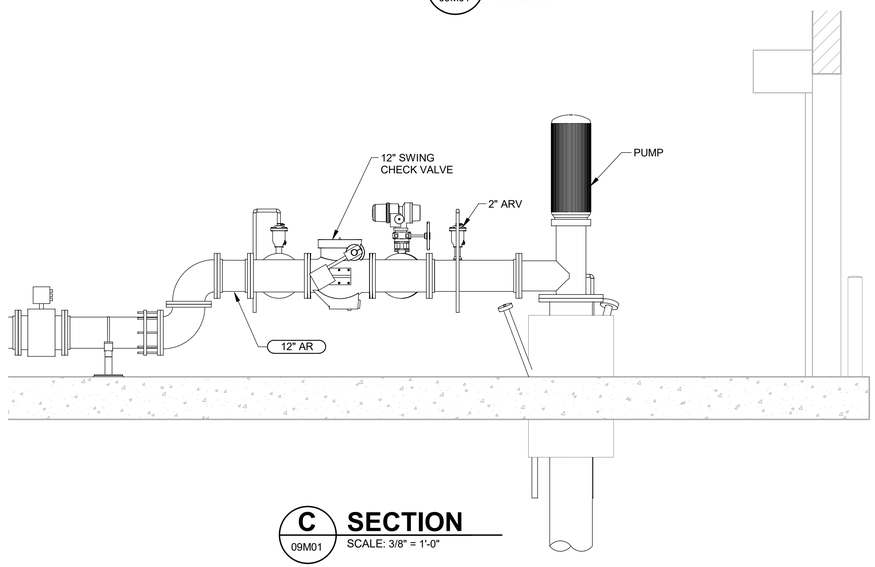

C 09M01 **SECTION**
SCALE: 3/8" = 1'-0"

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SHEET NO. OF XX

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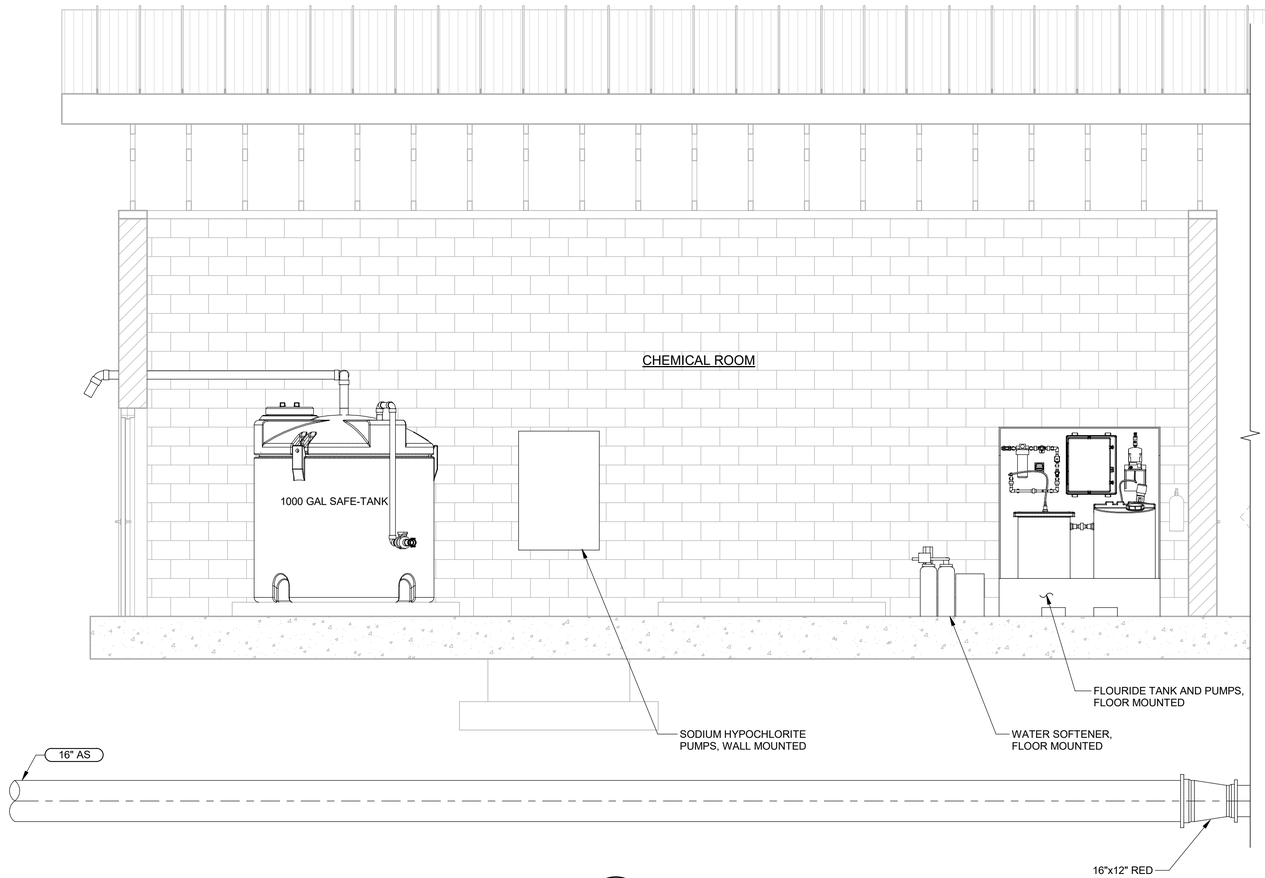

D 09M01 **SECTION**
SCALE: 3/8" = 1'-0"

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WATER HEATER SCHEDULE									
EQUIPMENT TAG	**AREA SERVED**	**FLOW CAPACITY (GPM)**	**TEMP. RISE (°F)**	**ELEMENT (kW)**	**MCA (Amps)**	**VOLTAGE**	**PHASE**	**BASIS OF DESIGN**	**NOTES**
WD05-HXGR-28401	RESTROOM	.3	56	4.1	20	208	1	EEMAX EX4208T	-
WD37-HXGR-28401	CHEMICAL ROOM	23	21	72	87	480	3	HAWS 9327	1

NOTES:

1 PROVIDE NEMA TYPE 4X CONTROL PANEL.

PLUMBING ROUGH IN SCHEDULE					
TAG NO.	PW (IN.)	HW (IN.)	D/SS (IN.)	VENT (IN.)	FIXTURE DESCRIPTION
WC	1-1/4"	N/A	4"	2"	WATER CLOSET (ADA ACCESSIBLE)
LAV	1/2"	1/2"	1-1/4"	1-1/2"	LAVATORY (ADA ACCESSIBLE)
ALP	1-1/4"	N/A	N/A	N/A	TANKLESS WATER HEATER (HB&ESEW)
TWH	3/4"	N/A	N/A	N/A	TANKLESS WATER HEATER (SINK)

WATER HAMMER ARRESTOR SCHEDULE		
SMITH MODEL *	PDI SYMBOL **	FIXTURE UNIT RATING
5005	A	1-11
5010	B	12-32
5020	C	33-60
5030	D	61-113
5040	E	114-154
5050	F	155-330

* SMITH OR EQUAL
** PLUMBING DRAINAGE INSTITUTE
"STANDARD PDI WH-201"

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REGISTERED PROFESSIONAL ENGINEER
CHAD GREEN
No. 37915
MECHANICAL
STATE OF CALIFORNIA

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MECHANICAL
WESTBROOK ASR WELL
PLUMBING SCHEDULES

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AIR CONDITIONING / HEAT PUMP SCHEDULE

EQUIPMENT TAG	AREA SERVED	AIRFLOW (CFM)	ESP (IN. W.C.)	COOLING DATA				FILTER DATA		ELECTRICAL DATA			BASIS OF DESIGN	NOTES
				OA DB/WB (°F)	EAT DB/WB (°F)	LAT DB/WB (°F)	TOTAL / SENSIBLE CAPACITY (MBH)	EFFICIENCY	THICKNESS (IN.)	VOLTAGE	PHASE	MCA (AMPS)		
WD37-HVAC-28101	ELECTRICAL ROOM	4000	1	102/70	90/67	64/58	116/113	MERV 13	2	460	3	22	TRANE THC120F4	1, 2, 3, 4, 5, 6, 7, 8

NOTES:

1 SIDE SUPPLY DISCHARGE CONNECTION.
2 SIDE RETURN CONNECTION
3 PROVIDE 120 VOLT CONTROL VOLTAGE.
4 THERMOSTAT PROVIDED BY AC UNIT MANUFACTURER.
5 CONTROL SYSTEM SPECIFIED IN SECTION 15936 - INSTRUMENTATION AND CONTROL DEVICES FOR HVAC.
6 INCLUDE SERVICE OPTION WITH SUPPLY-AIR SMOKE DETECTOR TO BE WIRED IN FIELD TO SHUT DOWN UPON DETECTION OF SMOKE.
7 GRADE MOUNTED SINGLE PACKAGE UNIT.
8 PROVIDE WITH DRY BULB ECONOMIZER.

FAN SCHEDULE

EQUIPMENT TAG	AREA SERVED	FAN TYPE	AIR FLOW (CFM)	ESP (IN. W.C.)	FAN RPM	NOISE (SONES)	MOTOR				DRIVE TYPE	BASIS OF DESIGN	NOTES
							HP	RPM	V/PH/HZ	ENCLOSURE			
WD05-FANx-28303	RESTROOM	TYPE 5	140	0.7	1050	4.5	0.128 (kW)	1050	115/60/1	ODP	DIRECT	GREENHECK SP-B150	5
WD37-FANx-28301	PUMP ROOM	TYPE 4	701	0.35	1160	12.2	1/4	1160	460/60/3	TEFC	DIRECT	GREENHECK AER-E20C-603-B3	1, 2, 3, 4, 7
WD37-FANx-28302	CHEMICAL ROOM	TYPE 4	701	0.35	1160	12.2	1/4	1160	460/60/3	TEFC	DIRECT	GREENHECK AER-E20C-603-B3	1, 2, 3, 6, 7

NOTES:

1 PROVIDE BIRD SCREEN.
2 PROVIDE BACKDRAFT DAMPER BDD-3, COUNTERBALANCED FOR MINIMUM PRESSURE LOSS.
3 PROVIDE DISCONNECT SWITCH AT FAN, NEMA TYPE 4X.
4 PROVIDE THERMOSTAT AS SPECIFIED IN SECTION 15936.
5 FAN SHALL BE INTERLOCKED WITH LIGHT SWITCH.
6 PROVIDE HI-PRO POLYESTER COATING.
7 PROVIDE ACOUSTICAL LOUVER L-3 AS SPECIFIED IN SECTION 10910.

ELECTRIC UNIT HEATER SCHEDULE

EQUIPMENT TAG	AREA SERVED	HEATING CAPACITY (kW)	AIRFLOW (CFM)	MCA (Amps)	VOLTAGE	PHASE	BASIS OF DESIGN	NOTES
WD37-HEAT-28201	PUMP ROOM	3	700	5	480	3	TRAID 234-U11N-0030U	1, 2, 3, 4
WD37-HEAT-28202	PUMP ROOM	3	700	5	480	3	TRAID 234-U11N-0030U	1, 2, 3, 4
WD37-HEAT-28203	CHEMICAL ROOM	5	700	8	480	3	TRAID 234-U11N-0050U	1, 2, 3, 4
WD37-HEAT-28204	ELECTRICAL ROOM	3	700	5	480	3	TRAID 234-U11N-0030U	1, 2, 3, 4

NOTES:

1 THERMOSTAT PROVIDED BY HEATER MANUFACTURER.
2 WALL MOUNTED.
3 120-VOLT CONTROL VOLTAGE.
4 SIDE AIR DISCHARGE.

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REGISTERED PROFESSIONAL ENGINEER CHAD GREEN No. 37915 MECHANICAL STATE OF CALIFORNIA

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CITY OF ROSEVILLE CALIFORNIA

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AQUIFER STORAGE AND RECOVERY WELLS PROJECT
MECHANICAL
WESTBROOK ASR WELL
HVAC SCHEDULES

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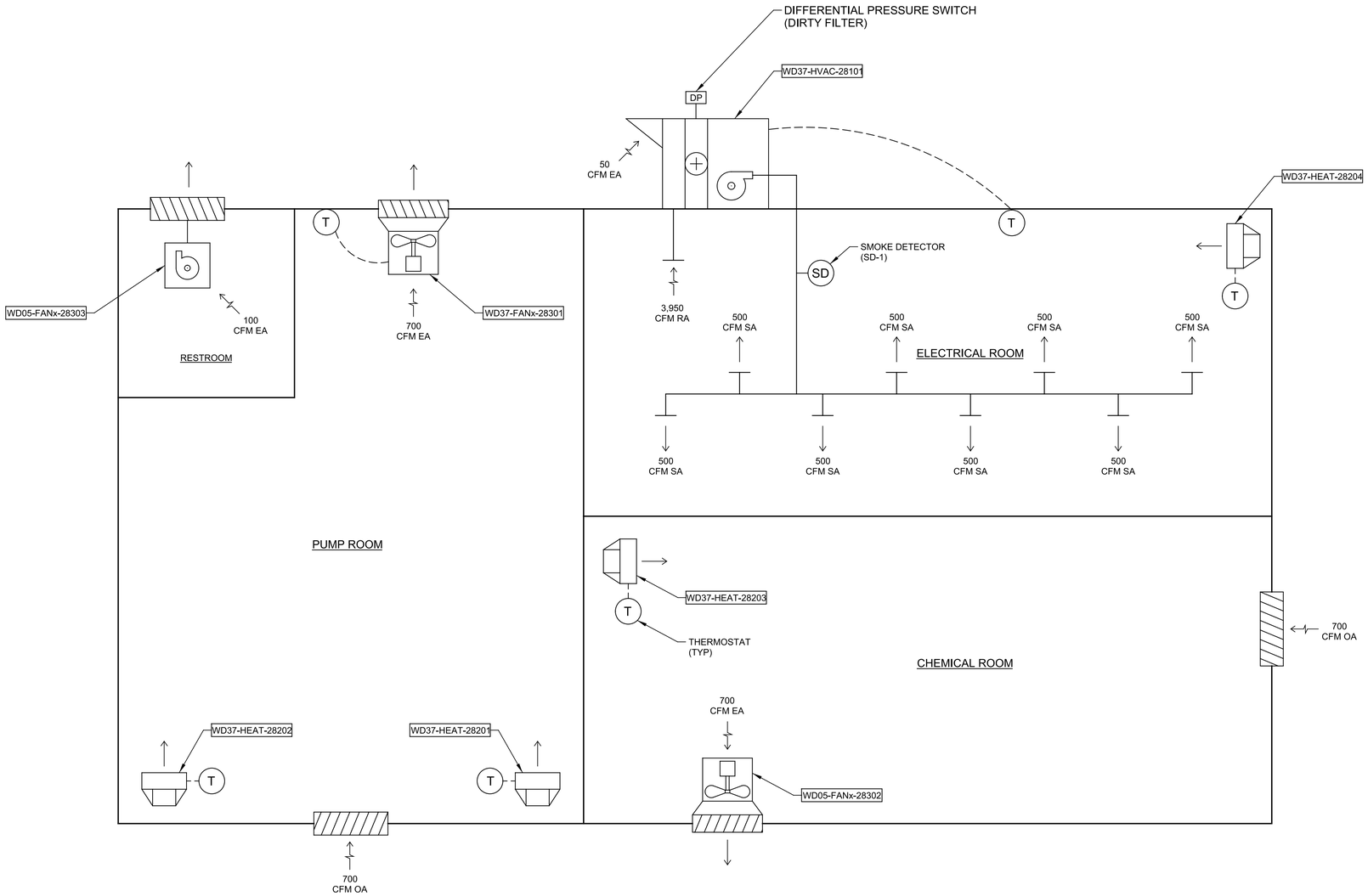

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REGISTERED PROFESSIONAL ENGINEER — CHAD GREEN — No. 37915 — MECHANICAL — STATE OF CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
HVAC
WESTBROOK ASR WELL
HVAC AIRFLOW SCHEMATIC

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DRAWING NO. 09M09
SHEET NO. OF 9X

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1009M009.dgn

ELECTRICAL PLAN SYMBOLS

IDENTIFICATION SYMBOLS

EQUIP # — EQUIPMENT AND INSTRUMENT IDENTIFICATION

EQUIPMENT/INSTRUMENT LOCATOR

LUMINAIRE IDENTIFICATION
a = CIRCUIT DESIGNATION
b = DEVICE SWITCHED FROM
c = MOUNTING HEIGHT IN FEET TO BOTTOM OF FIXTURE
X = LUMINAIRE TYPE, REFER TO THE LUMINAIRE SCHEDULE

XXXX — CONDUIT IDENTIFICATION
XXXX = CONDUIT NUMBER,
REFER TO CONDUIT SCHEDULE
UNLESS OTHERWISE NOTED, GROUPED CONDUITS ARE LABELED LEFT TO RIGHT OR TOP TO BOTTOM.

INDICATES KEYNOTE X
(PERTAINS ONLY TO SHEET WHERE NOTE IS FOUND)

DISCONNECT SWITCH
A = TYPE, REFER TO DISCONNECT SCHEDULE

LUMINAIRES

LINEAR FIXTURE

2' X 2' LAY-IN TROFFER

2' X 4' LAY-IN TROFFER

LUMINAIRE POLE MOUNTED

GO/NO-GO PANEL - STROBE AND HORN
R = RED LIGHT
G = GREEN LIGHT
H = HORN

GO/NO-GO PANEL - SOLID

GO/NO-GO PANEL - STROBE

LUMINAIRE, EMERGENCY BATTERY-POWERED

LUMINAIRE, EMERGENCY/EXIT BATTERY-POWERED

LUMINAIRE, EMERGENCY BATTERY-POWERED REMOTE

LUMINAIRE, SURFACE OR PENDANT MOUNTED

LUMINAIRE, WALL MOUNTED

LUMINAIRE, FLOOD/SPOT

LUMINAIRE, EXIT ONE OR TWO FACES AS INDICATED. ARROW POINTS IN DIRECTION OF EGRESS.

SWITCHES/RECEPTACLES

SINGLE POLE SWITCH
a = CIRCUIT DESIGNATION
b = DEVICE SWITCHED DESIGNATION
c = TYPE
2 = DOUBLE POLE SWITCH
3 = THREE-WAY SWITCH
3P = THREE POSITION SWITCH
4 = FOUR-WAY SWITCH
K = KEY OPERATED SWITCH
F = SWITCH AND FUSESTAT HOLDER
P = SWITCH AND PILOT LIGHT
T = THERMOSTAT
D = DIMMER SWITCH
L = LOW VOLTAGE LIGHT SWITCH
M = MANUAL MOTOR STARTER
N = NETWORKED SINGLE OR MULTIPLE SWITCH LOCATIONS

REFER TO ABBREVIATIONS LEGEND FOR ALL OTHER DESIGNATIONS.

OCCUPANCY SENSOR
X = REFERENCE LIGHTING CONTROL COMPONENT SCHEDULE
a = CIRCUIT DESIGNATION
b = DEVICE SWITCHED DESIGNATION
c = MOUNTING HEIGHT IN FEET TO BOTTOM OF SENSOR

PE — PHOTOCELL

SWITCH AND SINGLE RECEPTACLE
a = CIRCUIT DESIGNATION
b = DEVICE TYPE DESIGNATION

DUPLEX RECEPTACLE

QUADRUPLEX RECEPTACLE

IN FLOOR DUPLEX RECEPTACLE

IN FLOOR QUADRUPLEX RECEPTACLE

DUPLEX RECEPTACLE w/SPLIT WIRE

APPLIANCE RECEPTACLE

SPECIAL PURPOSE RECEPTACLE

WELDING RECEPTACLE
a = CIRCUIT DESIGNATION
b = DISCONNECT TYPE

TWIST LOCK RECEPTACLE
a = AMP RATING

TELEPHONE OUTLET
a = CIRCUIT DESIGNATION
b = MOUNTING HEIGHT

DATA COMMUNICATIONS OUTLET
a = CIRCUIT DESIGNATION
b = MOUNTING HEIGHT

FIRE ALARM

SMOKE DETECTOR
a = TYPE
I = IONIZATION
P = PHOTOELECTRIC
d = DUCT DETECTOR

FACP — FIRE ALARM CONTROL PANEL

F — FIRE ALARM PULL STATION

FIRE ALARM HORN/STROBE COMBINATION

FIRE ALARM STROBE

FIRE SPRINKLER
F = FLOW SWITCH
T = TAMPER SWITCH

RACEWAY

EXPOSED CONDUIT

BREAK AND CONTINUATION IN CONDUIT RUN

EXPOSED CONDUIT HIDDEN BEHIND WALLS, FLOORS OR OTHER STRUCTURES

UNDERGROUND CONDUIT, DIRECT BURIED OR IN DUCT BANK

CONDUIT IN SLAB

CONDUIT VERTICAL CHANGE IN DIRECTION

CONDUIT CAP

J — JUNCTION BOX

CONDUIT SEAL

CONDUIT TEE

DUCT BANK
APPROXIMATE DIMENSIONS SHOWN ON DUCT BANK SECTIONS

CONDUIT SIZE AND CONDUCTORS

INDIVIDUAL CONDUCTORS

W"C-(3-X (Ø), 1-Y (N) & 1-Z (G))

W"C (WHERE INDICATED): W = CONDUIT TRADE SIZE

3-X (Ø):
3 = QUANTITY
X = SIZE OF CONDUCTORS
(Ø) = DESIGNATES PHASE CONDUCTORS

1-Y (N)(WHERE INDICATED):
1 = QUANTITY
Y = SIZE OF CONDUCTORS
(N) = DESIGNATES NEUTRAL CONDUCTORS

1-Z (G)(WHERE INDICATED):
1 = QUANTITY
Z = SIZE OF CONDUCTORS
(G) = DESIGNATES GROUND CONDUCTORS

U{3-X (Ø) & 1-X (G)}
U = NUMBER OF PARALLEL RUNS

MULTI CONDUCTOR CABLES

K/2/C#16S
K (WHERE INDICATED) = NUMBER OF PAIRS
2/C#16S = TWO CONDUCTOR, 16 GAUGE, TWISTED SHIELDED PAIR

K/3/C#16S
K (WHERE INDICATED) = NUMBER OF TRIPLETS
3/C#16S = THREE CONDUCTOR, 16 GAUGE, TWISTED SHIELDED TRIPLETS

N/CX
N = NUMBER OF CONDUCTORS IN THE CABLE
X = SIZE OF CONDUCTORS

FIBER OPTIC CABLES

FO/N
N = NUMBER OF INDIVIDUAL FIBERS

GROUNDING

UNDERGROUND GROUND CABLE
#4/0 SDBC UNLESS OTHERWISE NOTED

GROUND ROD

GROUND ROD AND GROUND WELL

ELECTRICAL ONE-LINE SYMBOLS

MEDIUM VOLTAGE

52 — CIRCUIT BREAKER, MEDIUM VOLTAGE
a = CIRCUIT BREAKER NUMBER
b = FRAME SIZE

ANSI RELAY DEVICE
a = ANSI DEVICE FUNCTION
b = QUANTITY

MEDIUM VOLTAGE DISCONNECT SWITCH NON-FUSED CUT OUT

MEDIUM VOLTAGE DISCONNECTING FUSE SINGLE FUSE CUT OUT

MEDIUM VOLTAGE DISCONNECTING FUSE DOUBLE FUSE CUT OUT

MEDIUM VOLTAGE SINGLE FUSE

MEDIUM VOLTAGE DOUBLE FUSE

MEDIUM VOLTAGE LIVE FRONT TERMINATOR

MEDIUM VOLTAGE ELBOW

MEDIUM VOLTAGE TEE

MEDIUM VOLTAGE CONTACTOR

MEDIUM VOLTAGE STARTER

MOV-ELBOW ARRESTER

LOW VOLTAGE

LOW VOLTAGE CIRCUIT BREAKER
a = TYPE
MCP = MOTOR CIRCUIT PROTECTOR
TM = THERMAL MAGNETIC
SS = SOLID STATE
b = FRAME SIZE (MANUFACTURER TO DETERMINE FRAME SIZE UNLESS INDICATED)
c = NUMBER OF POLES
d = TRIP SETTING (AT = AMP TRIP) (AC = MCP CONTINUOUS RATING)
e = DESIGNATION
f = INTERRUPTING RATING

LOW VOLTAGE CIRCUIT BREAKER AUXILIARY OPERATOR
* = S = SHUNT TRIP
= G = GROUND FAULT INTERRUPTER
= V = SOLENOID KEY RELEASE

DISCONNECT SWITCH
A = TYPE, REFER TO DISCONNECT SCHEDULE

FUSED DISCONNECT SWITCH
B = TYPE, REFER TO DISCONNECT SCHEDULE
b = FUSE RATING

FUSE

COMBINATION STARTER WITH CONTROL POWER TRANSFORMER
a = CIRCUIT BREAKER DISCONNECT, TYPE AS NOTED
b = STARTER TYPE REFER TO THE SPECIFICATIONS FOR STARTER DEFINITIONS.
c = NEMA STARTER SIZE
d = OVERLOAD

MOTOR STARTER/DRIVES:
a = DEVICE TYPE
VFD-6 = 6-PULSE VFD
VFD-18 = 18-PULSE VFD
RVSS = REDUCED VOLTAGE SOLID STATE STARTER
RVAT = REDUCED VOLTAGE AUTO TRANSFORMER
a/B = DEVICE WITH BYPASS STARTER. REFER TO THE SPECIFICATIONS

b = INPUT OPTIONS
LL = LINE REACTOR
PHF = PASSIVE HARMONIC FILTER

c = OUTPUT OPTIONS
LR = LOAD REACTOR
DV/DT = Dv/dt FILTER
SWF = SINE WAVE FILTER

EQUIPMENT ENCLOSURE

MISCELLANEOUS

HP — MOTOR
HP = HORSEPOWER RATING
FULL LOAD AMPS AS NOTED

PACKAGED EQUIPMENT
LOAD RATING AS INDICATED
a = RATED LOAD
b = UNIT(HP, KW, KVA) AS INDICATED

TRANSFORMER
a = DEVICE I.D.
b = KVA RATING
c = NUMBER OF PHASES
d = PRIMARY VOLTAGE
e = SECONDARY VOLTAGE
f,g = CONNECTION TYPE SYMBOL
h = IMPEDANCE

GROUNDED WYE CONNECTION

DELTA CONNECTION

G — ENGINE-GENERATOR RATINGS AS INDICATED ON THE DRAWINGS
a = KVA/KW
b = VOLTAGE/CONNECTION
c = PHASE
d = WIRE
e = PF

CURRENT TRANSFORMER WITH SHORTING TERMINAL BLOCK
a = QUANTITY
b = RATIO

POTENTIAL TRANSFORMER
a = QUANTITY
b = RATIO
c,d = CONNECTION TYPE SYMBOL

SSM — SOLID STATE MULTIFUNCTION METER

ATP — AMPERE TEST POINT

VTP — VOLTAGE TEST POINT

UTILITY METER

LIGHTNING ARRESTER

SPD — SURGE PROTECTIVE DEVICE

DRAWOUT CONNECTION

GROUND

CAPACITOR

BATTERY

K — KIRK KEY INTERLOCK

LOAD BANK

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REGISTERED PROFESSIONAL ENGINEER — CHRISTOPHER ALAN CARLATO — No. 20740 — ELECTRICAL — STATE OF CALIFORNIA

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CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ELECTRICAL
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ELECTRICAL LEGEND

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ABBREVIATIONS

A	AMP
ABS	ABSOLUTE
AC	ALTERNATING CURRENT
ACK	ACKNOWLEDGE
ACTR	ACTUATOR
AF	AMP FRAME
AFC	AUTOMATIC FREQUENCY CONTROL
AIC	AMP INTERRUPTING CAPACITY
AM	AMMETER
ANN	ANNUNCIATOR
ANT	ANTENNA
APU	AUXILIARY POWER UNIT
ARM	ARMORED CABLE
AS	AMMETER SWITCH
ASYM	ASYMMETRICAL
AT	AMP TRIP
ATO	AUTOMATIC THROW OVER
ATP	AMMETER TEST POINT
ATS	AUTOMATIC TRANSFER SWITCH
AUTO XFMR	AUTOMATIC TRANSFORMER
AUX	AUXILIARY
AWG	AMERICAN WIRE GAGE
B	BELL
BAT	BATTERY
BFG	BELOW FINISHED GRADE
BHP	BRAKE HORSEPOWER
BKR	BREAKER
BRF	BELOW RAISED FLOOR
C	CONDUIT / CONTINUOUS LOAD
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CCW	COUNTER CLOCKWISE
CKT	CIRCUIT
COAX	COAXIAL CABLE
COM	COMMON
COMM	COMMUNICATION
CPT	CONTROL POWER TRANSFORMER
CR	CONTROLLED RECEPTACLE
CS	CONTROL SWITCH
CT	CURRENT TRANSFORMER
CV	CONTROL VALVE
CW	CLOCKWISE / COOL WHITE
DC	DIRECT CURRENT
DCS	DISTRIBUTED CONTROL SYSTEM
DCU - X	DISTRIBUTED CONTROL UNIT NO. X
DEMO	DEMOLITION
DISC	DISCONNECT SWITCH
DM	DEMAND METER
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DS	DOOR SWITCH
E/G	EMERGENCY GENERATOR
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
ENG	ENGINE
ENT	ELECTRICAL NON-METALLIC TUBING
EP	EXPLOSION PROOF
ETM	ELAPSED TIME METER
F	SUB-FED
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FDR	FEEDER
FLA	FULL LOAD AMPS
FLX	FLEXIBLE CONDUIT
FO	FIBER OPTIC
FRC	FIBERGLASS RIGID CONDUIT
FREQ	FREQUENCY
FU	FUSE
FU	SW FUSED SWITCH
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
FWD	FORWARD
G	GROUND / EQUIPMENT GROUND / GROUND FAULT
GEN	GENERATOR
GRC	GALVANIZED STEEL RIGID CONDUIT
GFCI	GROUND FAULT CIRCUIT INTERRUPTER (RECEPTACLE)
GFI	GROUND FAULT INTERRUPTER (BREAKER)
GFR	GROUND FAULT RELAY
H	HOT-LEG
HF	HIGH FREQUENCY
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HR	HOUR
HSTAT	HUMIDISTAT
HV	HIGH VOLTAGE
HVAC	HEATING/VENTILATION/AIR CONDITIONING
HZ	HERTZ
I	INSTANTANEOUS / INTERMITTENT LOAD
IC	INTERRUPTING CAPACITY
IJB	INSTRUMENT JUNCTION BOX
IMC	INTERMEDIATE METAL CONDUIT
INST	INSTANTANEOUS
INT	INTERLOCK
INTERCOM	INTERCOMMUNICATION
J	JUNCTION BOX
K	KEY INTERLOCK
KA	KILOAMP
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KVAR	KILOVAR (REACTANCE)
KW	KILOWATT
KWD	KILOWATT DEMAND
KWH	KILOWATT HOUR
L	LONG-TIME
L-B	LINE-BUS
L-G	LINE-GROUND
LA	LIGHTNING ARRESTOR
LBL	LABEL
LC	LIGHTING CONTACT OR
LCP- X	LOCAL CONTROL PANEL NO. X
LL	LEAD-LAG LOAD REACTOR
LP	LIGHT POLE
LP - X	LIGHTING PANEL NO. X
LTG	LIGHTING
LV	LOW VOLTAGE
LVL	LEVEL
M-X	MOTOR CONTROLLER NO. X
MA	MILLIAMPERE
MCA	MOTOR CIRCUIT AMPS
MCC - X	MOTOR CONTROL CENTER NO. X
MCP	MOTOR CIRCUIT PROTECTOR
MH	MANHOLE / MOUNTING HEIGHT
MLO	MAIN LUGS ONLY
MOD	MOTOR OPERATED DAMPER
MOV	METAL OXIDE VARISTOR
MPR	MOTOR PROTECTION RELAY
MS-X	MOTOR STARTER NO. X
MSP	MOTOR STARTING PANEL
MTO	MANUAL THROW OVER
MTR-X	MOTOR NO. X
MTS	MANUAL TRANSFER SWITCH
MV	MEGAVOLT
MVA	MEGAVOLT-AMPERES
MVS	MEDIUM VOLTAGE SWITCH
MW	MEGAWATT
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NFC	NONMETALLIC FLEXIBLE CONDUIT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NP	NAMEPLATE
O	OPEN OR OPENED
OH	OVERHEAD
OL	OVERLOAD RELAY
P	POLE
PA	PUBLIC ADDRESS
PB	PUSHBUTTON / PULL BOX
PCS	PVC COATED GALVANIZED STEEL CONDUIT
PCM	PROCESS CONTROL MODULE
PE	PHOTOCELL
PF	POWER FACTOR
PFCC	POWER FACTOR CORRECTION CAPACITOR
PFR	PHASE FAILURE RELAY
PH	PHASE
PNL	PANEL
PPX	POWER PANEL NO. X
PRI	PRIMARY
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE RIGID PLASTIC CONDUIT
PWR	POWER
RAC	RIGID ALUMINUM CONDUIT
RECPT	RECEPTACLE
REV	REVERSE
RF	RADIO FREQUENCY
RMS	ROOT MEAN SQUARED
RVAT	REDUCED VOLTAGE AUTO TRANSFORMER
RVNR	REDUCED VOLTAGE NON-REVERSING
RVSS	REDUCED VOLTAGE SOLID STATE
S	SHIELD / SHORT-TIME
SA	SURGE ARRESTER
SC	SHORT CIRCUIT
SDBC	SOFT DRAWN BARE COPPER
SFL	SUB FEED LUGS
SLT	SEALTIGHT LIQUIDTIGHT FLEXIBLE CONDUIT
SM	SURFACE MOUNTED
SP	SINGLE POLE
SPD	SURGE PROTECTIVE DEVICE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SPKR	SPEAKER
SS	SOLID STATE
STB	SHORTING TERMINAL BLOCK
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SYM	SYMMETRICAL
TACH	TACHOMETER
TB - X	TERMINAL BLOCK - UNIT X
TC	THERMOCOUPLE / TIME CLOCK / TRAY CABLE
TD	TEMPERATURE DETECTOR RELAY
TE	TOTALLY ENCLOSED
TEFC	TOTALLY ENCLOSED FAN COOLED
TENV	TOTALLY ENCLOSED NON-VENTILATED
TERM	TERMINAL
TJB	TERMINAL JUNCTION BOX
TM	THERMAL MAGNETIC
TP	TWISTED PAIR
TS	TEMPERATURE SWITCH
TS1W	TWO SPEED CONSEQUENT POLE, ONE WINDING
TS2W	TWO SPEED SEPARATE WINDING
TSTAT	THERMOSTAT
UHF	ULTRA HIGH FREQUENCY
UNG	UNGROUNDED
UPS	UNINTERRUPTIBLE POWER SUPPLY
UVR	UNDER VOLTAGE RELAY
V	VOLT
VA	VOLT AMPERE
VAR	VARMETER
VCP	VENDOR CONTROL PANEL
VFD	VARIABLE FREQUENCY DRIVE
VHF	VERY HIGH FREQUENCY
VM	VOLTMETER
VP	VAPORPROOF
VR	VOLTAGE REGULATOR
VS	VOLTAGE SWITCH
VT	VOLTAGE TRANSFORMER
VTP	VOLTAGE TEST POINT
W	WATT / WEST
WT	WATER TIGHT
WP	WEATHER PROOF
XFMR	TRANSFORMER

NOTES:

1. REFER TO SPECIFICATIONS AND OTHER DRAWINGS FOR ADDITIONAL ABBREVIATIONS.

POWER DEVICE FUNCTION NUMBERS

1	MASTER ELEMENT
2	TIME-DELAY STARTING OR CLOSING RELAY
3	CHECKING OR INTERLOCKING RELAY
4	MASTER CONTACTOR
5	STOPPING DEVICE
6	STARTING CIRCUIT BREAKER
7	ANODE CIRCUIT BREAKER
8	CONTROL POWER DISCONNECTING DEVICE
9	REVERSING DEVICE
10	UNIT SEQUENCE SWITCH
11	MULTIFUNCTION DEVICE
12	OVER-SPEED DEVICE
13	SYNCHRONOUS-SPEED DEVICE
14	UNDER-SPEED DEVICE
15	SPEED OR FREQUENCY MATCHING DEVICE
16	DATA COMMUNICATIONS DEVICE
17	SHUNTING OR DISCHARGE SWITCH
18	ACCELERATING OR DECELERATING DEVICE
19	STARTING-TO-RUNNING TRANSITION CONTACTOR
20	ELECTRICALLY OPERATED VALVE
21	DISTANCE RELAY
22	EQUALIZER CIRCUIT BREAKER
23	TEMPERATURE CONTROL DEVICE
24	VOLTS PER HERTZ RELAY
25	SYNCHRONIZING OR SYNCHRONISM-CHECK DEVICE
26	APPARATUS THERMAL DEVICE
27	UNDERVOLTAGE RELAY
27N	GROUND FAULT UNDERVOLTAGE RELAY
28	FLAME DETECTOR
29	ISOLATING CONTACTOR
30	ANNUNCIATOR RELAY
31	SEPARATE EXCITATION DEVICE
32	DIRECTIONAL POWER RELAY
33	POSITION SWITCH
34	MASTER SEQUENCE DEVICE
35	BRUSH-OPERATING OR SLIP-RING SHORT-CIRCUITING DEVICE
36	POLARITY DEVICE
37	UNDERCURRENT OR UNDERPOWER RELAY
38	BEARING PROTECTIVE DEVICE
39	MECHANICAL CONDITION MONITOR
40	FIELD RELAY
41	FIELD CIRCUIT BREAKER
42	RUNNING CIRCUIT BREAKER
43	MANUAL TRANSFER OR SELECTOR DEVICE
44	UNIT SEQUENCE STARTING RELAY
45	ABNORMAL ATMOSPHERIC CONDITION MONITOR
46	REVERSE-PHASE OR BALANCE CURRENT RELAY
47	PHASE-BALANCE OR PHASE-SEQUENCE VOLTAGE RELAY
48	INCOMPLETE SEQUENCE RELAY
49	MACHINE OR TRANSFORMER THERMAL RELAY
50	INSTANTANEOUS OVERCURRENT RELAY
51	AC TIME OVERCURRENT RELAY
52	AC CIRCUIT BREAKER
53	FIELD EXCITATION RELAY
54	TURNING GEAR ENGAGING DEVICE
55	POWER FACTOR RELAY
56	FIELD APPLICATION RELAY
57	SHORT-CIRCUITING OR GROUNDING DEVICE
58	RECTIFICATION FAILURE RELAY
59	OVERVOLTAGE RELAY
60	VOLTAGE OR CURRENT BALANCE RELAY
61	DENSITY SWITCH OR SENSOR
62	TIME-DELAY STOPPING OR OPENING RELAY
63	PRESSURE SWITCH
64	GROUND DETECTOR RELAY
65	GOVERNOR
66	NOTCHING OR JOGGING DEVICE
67	AC DIRECTIONAL OVERCURRENT RELAY
68	BLOCKING OR OUT OF STEP RELAY
69	PERMISSIVE CONTROL DEVICE
70	RHEOSTAT
71	LIQUID LEVEL SWITCH
72	DC CIRCUIT BREAKER
73	LOAD-RESISTOR CONTACTOR
74	ALARM RELAY
75	POSITION CHANGING MECHANISM
76	DC OVERCURRENT RELAY
77	TELEMETERING DEVICE
78	PHASE-ANGLE MEASURING RELAY
79	AC RECLOSING RELAY
80	FLOW SWITCH
81	FREQUENCY RELAY
82	DC LOAD MEASURING RECLOSING RELAY
83	AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY
84	OPERATING MECHANISM
85	PILOT COMMUNICATIONS, CARRIER OR PILOT-WIRE RELAY
86	LOCKOUT RELAY
87	DIFFERENTIAL PROTECTIVE RELAY
88	AUXILIARY MOTOR OR MOTOR GENERATOR
89	LINE SWITCH
90	REGULATING DEVICE
91	VOLTAGE DIRECTIONAL RELAY
92	VOLTAGE AND POWER DIRECTIONAL RELAY
93	FIELD-CHANGING CONTACTOR
94	TRIPPING OR TRIP-FREE RELAY

COMMONLY USED SUFFIX LETTERS APPLIED TO POWER DEVICE FUNCTION NUMBERS

A	ALARM ONLY
B	BUS PROTECTION
G	GROUND FAULT PROTECTION (RELAY CT IN A SYSTEM NEUTRAL CIRCUIT OR GENERATOR PROTECTION)
GS	GROUND FAULT PROTECTION (RELAY CT IN TOROIDAL OR GROUND SENSOR TYPE)
L	LINE PROTECTION
M	MOTOR PROTECTION
N	GROUND FAULT PROTECTION (RELAY COIL CONNECTED IN RESIDUAL CT CIRCUIT)
T	TRANSFORMER PROTECTION
V	VOLTAGE
P	PHASE PROTECTION

ABBREVIATIONS

AFD	- ARC FLASH DETECTOR
CLK	- CLOCK OR TIMING SOURCE
DDR	- DYNAMIC DISTURBANCE RECORDER
DFR	- DIGITAL FAULT RECORDER
ENV	- ENVIRONMENTAL DATA
HIZ	- HIGH IMPEDANCE FAULT DETECTOR
HMI	- HUMAN MACHINE INTERFACE
HST	- HISTORIAN
LGC	- SCHEME LOGIC
MET	- SUBSTATION METERING
PDC	- PHASOR DATA CONCENTRATOR
PMU	- PHASOR MEASUREMENT UNIT
PQM	- POWER QUALITY MONITOR
RIO	- REMOTE I/O DEVICE
RTU	- REMOTE TELEMETRY UNIT/REMOTE TERMINAL UNIT
SER	- SEQUENCE OF EVENTS RECORDER
TCM	- TRIP CIRCUIT MONITOR

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ELECTRICAL ABBREVIATIONS

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PROCESS SWITCHES

- FLOAT SWITCH CLOSE ON RISING LEVEL
- FLOAT SWITCH OPEN ON RISING LEVEL
- PRESSURE SWITCH CLOSE ON RISING PRESSURE
- PRESSURE SWITCH OPEN ON RISING PRESSURE
- TEMPERATURE SWITCH CLOSE ON RISING TEMPERATURE
- TEMPERATURE SWITCH OPEN ON RISING TEMPERATURE
- FLOW SWITCH CLOSE ON INCREASE IN FLOW
- FLOW SWITCH OPEN ON INCREASE IN FLOW
- VIBRATION SWITCH OPEN ON RISING VIBRATION
- VIBRATION SWITCH CLOSE ON RISING VIBRATION
- TORQUE SWITCH OPEN ON HIGH TORQUE
- TORQUE SWITCH CLOSE ON HIGH TORQUE
- NORMALLY CLOSED LIMIT SWITCH
- NORMALLY CLOSED HELD OPEN LIMIT SWITCH
- NORMALLY OPEN LIMIT SWITCH
- NORMALLY OPEN HELD CLOSED LIMIT SWITCH

HAND SWITCHES

- NORMALLY OPEN MOMENTARY PUSHBUTTON
- NORMALLY CLOSED MOMENTARY PUSHBUTTON
- THREE POSITION SELECTOR SWITCH (xoo)
  x - DENOTES POSITION CONTACTS CLOSED IN
- TWO POSITION SELECTOR SWITCH (xo)
  x - DENOTES POSITION CONTACTS CLOSED IN
- MUSHROOM HEAD PUSHBUTTON
- PUSH-PULL PUSHBUTTON MAINTAINED CONTACT
- PADLOCK SWITCH (xox)
  x - DENOTES POSITION CONTACTS CLOSED IN
- PULL CORD SWITCH
- STOP-LOCKOUT PUSHBUTTON
- SPRING-RETURN (xoo)
  x - DENOTES POSITION CONTACTS CLOSED IN

INDICATORS

- PILOT LIGHT
  a = LENS COLOR
  R = RED
  G = GREEN
  W = WHITE
  A = AMBER
  B = BLUE
  Y = YELLOW
  C = CLEAR
- BEACON
  a = LENS COLOR
  R = RED
  G = GREEN
  W = WHITE
  A = AMBER
  B = BLUE
  M = MAGENTA
  C = CLEAR
- HORN

RELAYS

- RELAY COIL
  a = TYPE
  CR - CONTROL RELAY
  TD - TIME DELAY RELAY
  M - MOTOR STARTER COIL
  L - MOTOR STARTER COIL - LOW SPEED
  H - MOTOR STARTER COIL - HIGH SPEED
  F - MOTOR STARTER COIL - FORWARD
  R - MOTOR STARTER COIL - REVERSE
  b = TDON - TIME DELAY ON ENERGIZATION
  TDOFF - TIME DELAY ON DEENERGIZATION
  c = TIMING RANGE/SETTING
  d = DESCRIPTION
- NORMALLY OPEN CONTROL CONTACT
- NORMALLY CLOSED CONTROL CONTACT
- NOTC TIME DELAY CONTACT NORMALLY OPEN TIMED CLOSING
- NCTO TIME DELAY CONTACT NORMALLY CLOSED TIMED OPENING
- NOTO TIME DELAY CONTACT NORMALLY OPEN TIMED OPENING
- NCTC TIME DELAY CONTACT NORMALLY CLOSED TIMED CLOSING

TERMINAL BLOCKS

- TERMINAL IN PLC/PCM PANEL
- TERMINAL IN MOTOR CONTROL CENTER
- TERMINAL IN LOCAL STARTER CONTROL PANEL
- TERMINAL AT FIELD DEVICE
- TERMINAL IN RTU
- TERMINAL IN FIELD PANEL
- TERMINAL IN (USER CHOICE)
- DIGITAL BUS CONNECTOR
  * = D - DEVICENET
  * = PA - PROFIBUS PA
  * = DP - PROFIBUS DP
  * = H1 - FOUNDATION FIELDBUS H1
  * = H2 - FOUNDATION FIELDBUS H2
  * = E - ETHERNET

I/O

- PLC DISCRETE (a)
  a = INPUT OR OUTPUT AS INDICATED
- PLC ANALOG (ANALOG / a)
  a = INPUT OR OUTPUT AS INDICATED
- DIGITAL BUS (DIGITAL / BUS)

MISC

- SOLENOID
- METER UNIT (M)
  M = TYPE
- MOTOR (HP)
- CIRCUIT BREAKER
- DISCONNECT
- FUSE
- TRANSIENT SURGE PROTECTION
- MOTOR WINDING HEATER (MWH-*)
  * - MOTOR TAG I.D.
- SPACE HEATER
- VARISTOR
- CAPACITOR
- RESISTOR
- BATTERY
- DIODE
- MOTOR OVERLOAD HEATERS
- OVERLOAD CONTACT
- DRAWOUT CONNECTION
- GROUND
- LIGHTNING ARRESTOR
- CONTROL POWER TRANSFORMER (H1, H3, H2, H4, X1, X2)
- ELAPSED TIME METER (KI-* / ETM)

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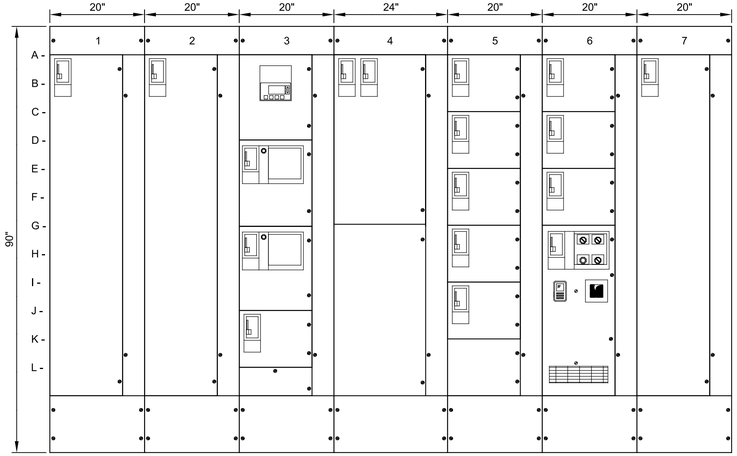

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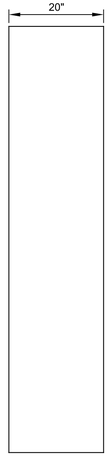

SIDE VIEW

SCALE: 3/4"=1'-0"
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1A- WD31-BKRX-28105 MAIN BREAKER

2A- GENERATOR CONNECTION

3A- WD31-SPDX-28106 SPD

3D- WD37-FANX-28302 CHEMICAL ROOM EXHAUST FAN

3G- WD37-FANX-28301 PUMP ROOM EXHAUST FAN

3J- WD34-MOVX-28160 AQUIFER FLUSH VALVE

3L- SPACE

4A- WD31-XFMR-28107 WD31-LPXX-28108 WESTBROOK LIGHTING PANEL

5A- WD37-HEAT-28203 CHEMICAL ROOM UNIT HEATER

5C- WD37-HVAC-28101 ELECTRICAL ROOM AC UNIT

5E- WD37-HEAT-28201 PUMP ROOM HEATER NO. 1

5G- WD37-HEAT-28202 PUMP ROOM HEATER NO. 2

5I- WD34-MOVX-28130 PUMP COLUMN RECHARGE VALVE

5K- WD34-MOVX-28120 WELL ANNULUS RECHARGE VALVE

6A- WD34-MOVX-28140 RECOVERY VALVE

6C- SPARE

6E- SPARE

6G- WD33-PUMP-28410 SAMPLE PUMP

7A- WD37-PUMP-28101 ASR PUMP

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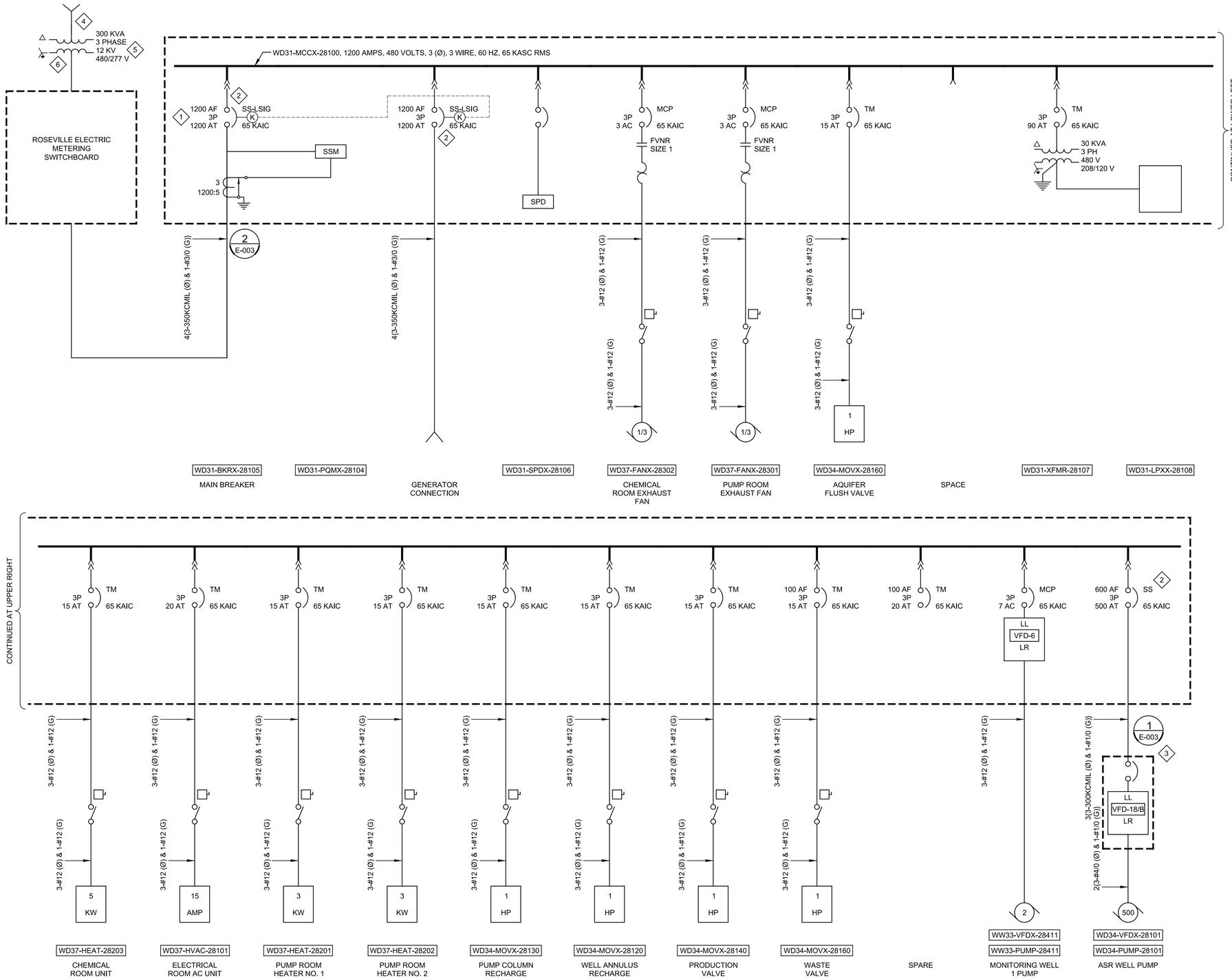

GENERAL NOTES:

1. ALL WORK ON THE INCOMING SERVICE SHALL CONFORM TO ROSEVILLE ELECTRIC STANDARDS.

KEY NOTES:

1. PROVIDE THE MAIN BREAKER WITH A MOTOR OPERATOR ALLOWING FOR REMOTE OPEN, CLOSE AND RESET.
2. THE SOLID STATE CIRCUIT BREAKER TRIP UNITS SHALL INCLUDE MAINTENANCE MODE SETTINGS.
3. 18-PULSE VFD WITH FULL VOLTAGE, NON-REVERSING BYPASS STARTER.
4. PROVIDE A 4" DIRECT BURIED PVC CONDUIT FROM THE TRANSFORMER TO THE ROSEVILLE ELECTRIC VAULT AT THE LOCATION SHOWN ON THE ELECTRICAL SITE PLAN. THE PRIMARY CONDUCTORS ARE PROVIDED BY ROSEVILLE ELECTRIC
5. PROVIDE A THE TRANSFORMER PAD PER ROSEVILLE ELECTRIC STANDARDS. THE TRANSFORMER IS PROVIDED BY ROSEVILLE ELECTRIC.
6. PROVIDE THE SECONDARY CONDUIT AND CONDUCTORS AS SHOWN ON THE ELECTRICAL PLANS AND THE CONDUIT SCHEDULE

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WESTBROOK ASR WELL
WD31-MCCX-28100 ONE-LINE DIAGRAM

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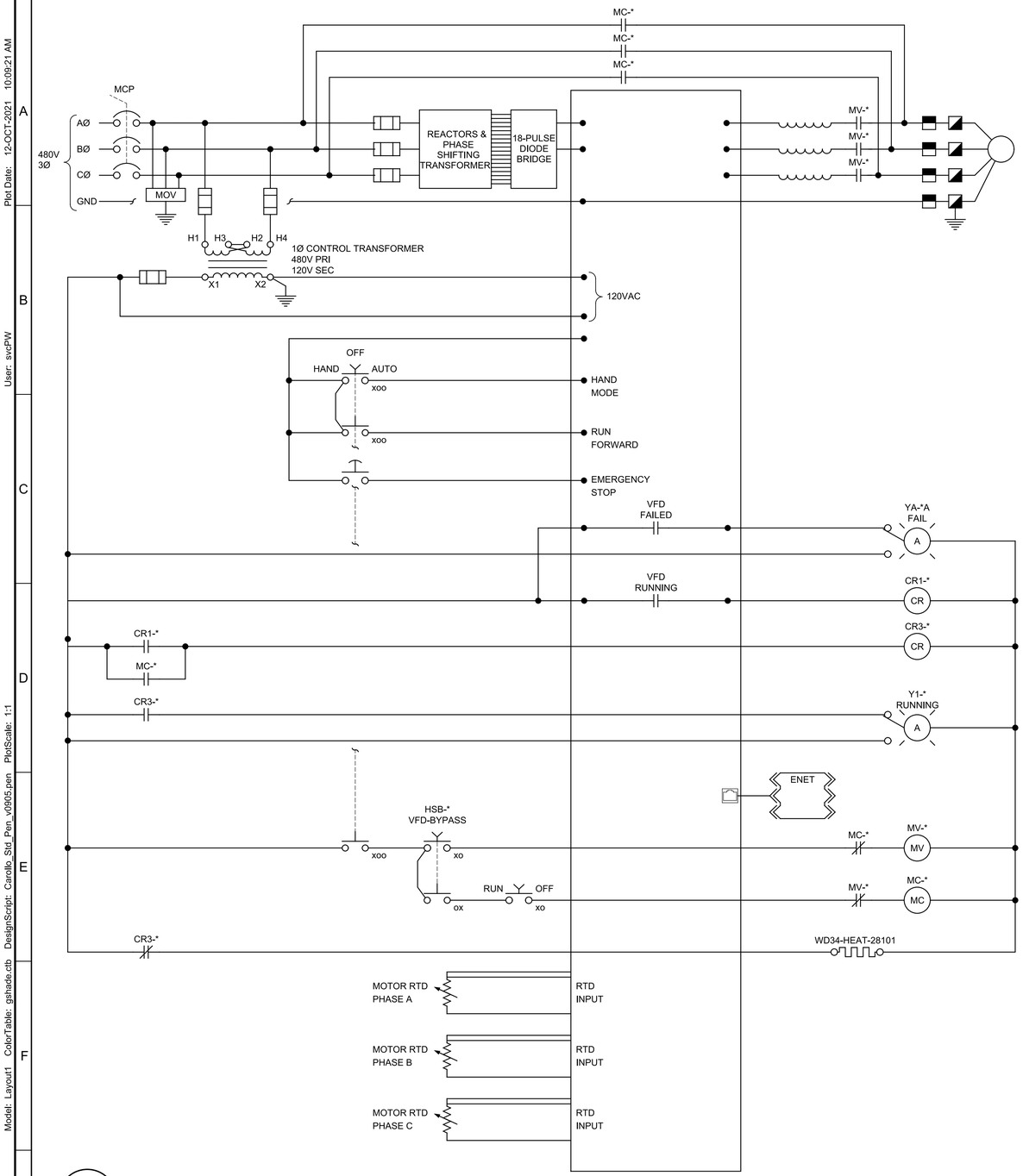
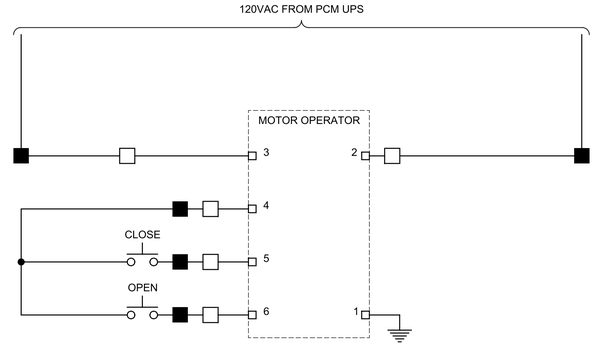
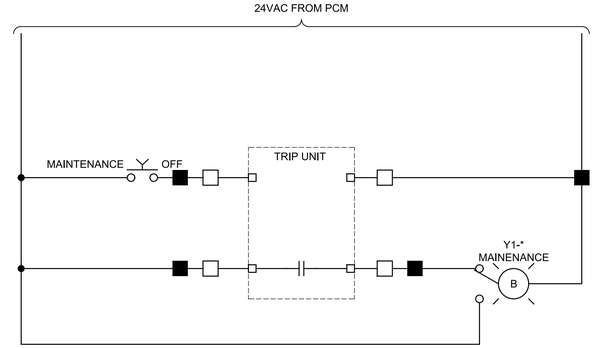


1 WELL PUMP WD34-PUMP-28101
E-002, I-001

GENERAL NOTES:

1. TO RESET THE BREAKER, PRESS THE OPEN BUTTON AND THEN THE CLOSE BUTTON.





2 MAIN BREAKER WD31-BKRX-28105
E-002

REV	DATE	BY	DESCRIPTION
			INTERMEDIATE DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED CAC
DRAWN EYJ
CHECKED
DATE SEPT 2021

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER ALAN CARLSON No. 20740 ELECTRICAL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ELECTRICAL
WESTBROOK ASR WELL
CONTROL SCHEMATICS - 1

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 09E03
SHEET NO. XX OF ~~XX~~

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1009E03.dgn

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Model: Layout1
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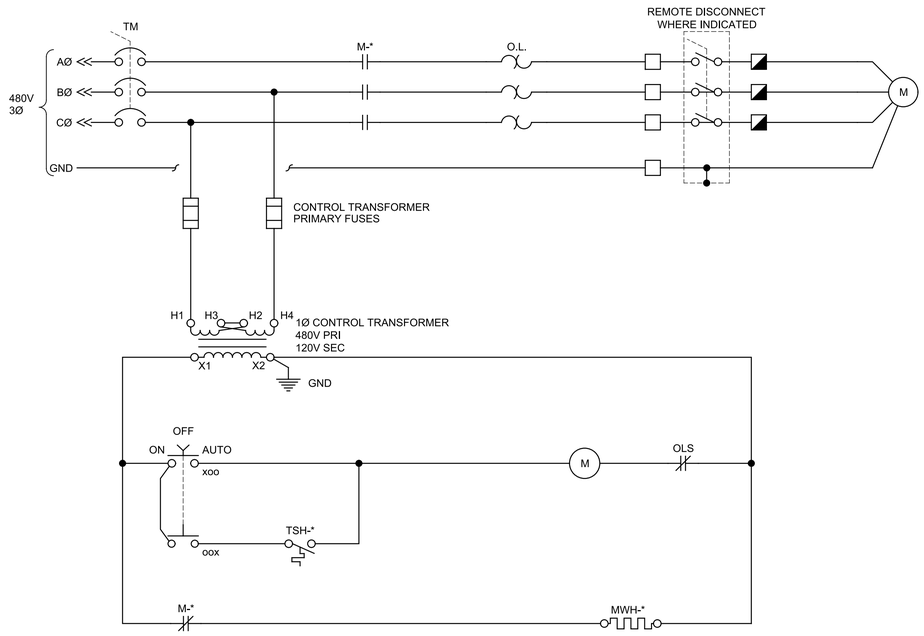

3 FANS

REV	DATE	BY	DESCRIPTION

INTERMEDIATE DESIGN
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DESIGNED CAC
DRAWN EYJ
CHECKED
DATE SEPT 2021

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER ALAN CARULLO
No. 20740
ELECTRICAL
STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
ELECTRICAL
WESTBROOK ASR WELL
CONTROL SCHEMATICS - 2

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 09E04
SHEET NO. XX OF ~~XX~~

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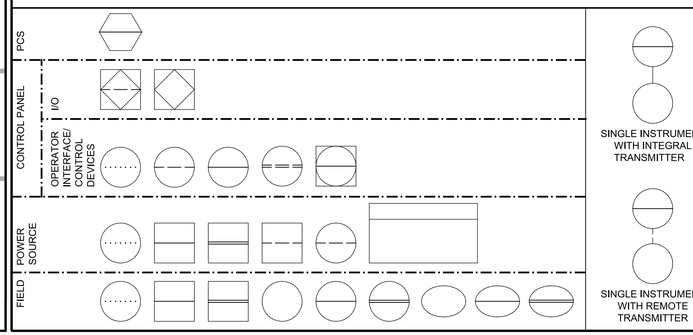
LAST SAVED BY: AHendricks

SYMBOL	DRAWING VISIBLE FIELDS	FIELD - 1	FIELD - 2	FIELD - 3	FIELD - 4	FIELD - 5	FIELD - 6
HMI/SCADA SYSTEM OPERATOR INTERFACE TERMINAL	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - DESCRIPTION 6 - EXISTING/FUTURE	REFER ◇1 ◇2	REFER ◇3	ACTION ALARM NUM - NUMERIC SP - SET POINT STATUS TREND	DESCRIPTION ◇2 ◇5	DESCRIPTION	E - EXISTING F - FUTURE
HARDWIRED I/O POINT	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - LOCATION 6 - EXISTING/FUTURE	REFER ◇1 ◇2 ◇4	REFER ◇3	AI - ANALOG INPUT AO - ANALOG OUTPUT DI - DISCRETE INPUT DO - DISCRETE OUTPUT HSC - HIGH SPEED COUNTER INPUT RTD - RTD INPUT	DESCRIPTION	PAC - PROGRAMMABLE AUTOMATION CONTROLLER NO. PLC - PROGRAMMABLE LOGIC CONTROLLER NO. RIO - REMOTE I/O VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
NETWORK / SOFTI/O	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - LOCATION 6 - EXISTING/FUTURE 7 - DIGITAL NETWORK TABLE	REFER ◇1 ◇2	REFER ◇3	BUS ID CNET - CONTROLNET DNET - DEVICENET ENET - ETHERNET/IP FF - FOUNDATION FIELDBUS MB - MODBUS RTU MB+ - MODBUS PLUS MBTCP - MODBUS TCP DP - PROFIBUS DP PA - PROFIBUS PA PNET - PROFINET SERIAL - PROPRIETARY PROTOCOL	DESCRIPTION	PAC - PROGRAMMABLE AUTOMATION CONTROLLER NO. PLC - PROGRAMMABLE LOGIC CONTROLLER NO. RIO - REMOTE I/O VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
LOCAL OPERATOR INTERFACE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - LOCATION 6 - EXISTING/FUTURE	REFER ◇1 ◇2	REFER ◇3	ACTION ALARM NUM - NUMERIC SP - SET POINT STATUS	DESCRIPTION ◇2 ◇5	LOI - LOCAL OPERATOR INTERFACE NO. LCP - LOCAL CONTROL PANEL NO. PCM - PROCESS CONTROL MODULE NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
PILOT DEVICE OPERATOR INTERFACE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - LOCATION 6 - EXISTING/FUTURE	REFER ◇1 ◇2	REFER ◇3	AM - AUTO/MANUAL BYPASS - BYPASS CL - CLOSE E-STOP - EMERGENCY STOP FRLR - FIXED RATE/LEVEL RATE HOA - HAND /OFF/AUTO JOHC - JOG OPEN/HOLD/CLOSE JOJC - JOG OPEN/JOG CLOSE LH - LOW/HIGH LOR - LOCAL/OFF/REMOTE LOS - LOCK OUT STOP LS - LEAD/STANDBY LSR - LOCAL/STOP/REMOTE NOOT - NO OFFLINE/OFFLINE TRANSITION OC - OPEN/CLOSE OLOL - ON LINE/OFF LINE OO - OFF/ON OP - OPEN OSC - OPEN/STOP/CLOSE RST - RESET SAAM - SEMI AUTO/AUTO/MANUAL SEL - SELECT SP - STOP SPD - SPEED SS - START/STOP ST - START	DESCRIPTION	LCP - LOCAL CONTROL PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. RVSS - REDUCED VOLTAGE SOLID STARTER NO. VCP - VENDOR CONTROL PANEL NO. VFD - VARIABLE FREQUENCY DRIVE NO.	E - EXISTING F - FUTURE
POWER DEVICE PRIMARY FUNCTION OPERATOR ACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - VOLTAGE-POLE 5 - LOCATION 6 - EXISTING/FUTURE	CB - CIRCUIT BREAKER DISC - DISCONNECT FU - FUSE	REFER ◇3	TM - THERMAL MAGNETIC CIRCUIT BREAKER	24VDC - 1P 120VAC - 1P 208VAC - 2P 208VAC - 3P 240VAC - 3P 240VAC - 2P 480VAC - 3P 2400VAC - 3P 4160VAC - 3P	DP - DISTRIBUTION PANEL NO. LCP - LOCAL CONTROL PANEL NO. LP - LIGHTING PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. PP - POWER PANEL NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
POWER DEVICE AUXILIARY FUNCTION FOR OPERATOR ACCESSIBLE DEVICES	1 - TAG 2 - LOOP NUMBER 3 - DESCRIPTION 4 - DESCRIPTION 5 - DESCRIPTION 6 - EXISTING/FUTURE	DISC - DISCONNECT	REFER ◇3	DESCRIPTION	DESCRIPTION	DESCRIPTION	E - EXISTING F - FUTURE
POWER DEVICE PRIMARY FUNCTION OPERATOR INACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - VOLTAGE-POLE 5 - LOCATION 6 - EXISTING/FUTURE	CB - CIRCUIT BREAKER FU - FUSE	REFER ◇3	MCP - MOTOR CIRCUIT PROTECTOR SS - SOLID STATE CIRCUIT BREAKER TM - THERMAL MAGNETIC CIRCUIT BREAKER	24VDC - 1P 120VAC - 1P 208VAC - 2P 208VAC - 3P 240VAC - 2P 240VAC - 3P 480VAC - 3P 2400VAC - 3P 4160VAC - 3P	DP - DISTRIBUTION PANEL NO. LCP - LOCAL CONTROL PANEL NO. LP - LIGHTING PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. PP - POWER PANEL NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE

SYMBOL	DRAWING VISIBLE FIELDS	FIELD - 1	FIELD - 2	FIELD - 3	FIELD - 4	FIELD - 5	FIELD - 6
INSTRUMENT PRIMARY ELEMENT	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER ◇3	REFER ◇3	DESCRIPTION ◇5	DESCRIPTION ◇6	AREA NO. BUILDING NO. ROOM NO.	E - EXISTING F - FUTURE
INSTRUMENT/CONTROL ELEMENT PRIMARY FUNCTION OPERATOR ACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - DESCRIPTION 6 - EXISTING/FUTURE	REFER ◇1	REFER ◇3	DESCRIPTION ◇5	DESCRIPTION ◇6	DESCRIPTION	E - EXISTING F - FUTURE
INSTRUMENT/CONTROL ELEMENT AUXILIARY FUNCTION OPERATOR ACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - DESCRIPTION 6 - EXISTING/FUTURE	REFER ◇1	REFER ◇3	DESCRIPTION	DESCRIPTION ◇6	DESCRIPTION	E - EXISTING F - FUTURE
INSTRUMENT/CONTROL ELEMENT PRIMARY FUNCTION OPERATOR INACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER ◇1 ◇3 XR - PROTECTION RELAY CR - CONTROL RELAY IR - INTERPOSING RELAY	REFER ◇3	DESCRIPTION	DESCRIPTION ◇6	LCP - LOCAL CONTROL PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
INSTRUMENT/CONTROL ELEMENT AUXILIARY FUNCTION OPERATOR INACCESSIBLE	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER ◇1 ◇3 XR - PROTECTION RELAY CR - CONTROL RELAY IR - INTERPOSING RELAY	REFER ◇3	DESCRIPTION	DESCRIPTION ◇6	LCP - LOCAL CONTROL PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE
FIELD EQUIPMENT NON-POWERED	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION/SIZE 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER ◇3	REFER ◇3	DESCRIPTION	DESCRIPTION ◇6	AREA NO. BUILDING NO. ROOM NO.	E - EXISTING F - FUTURE
FIELD EQUIPMENT PRIMARY FUNCTION POWERED	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER ◇3	REFER ◇3	DESCRIPTION	DESCRIPTION ◇6	AREA NO. BUILDING NO. ROOM NO.	E - EXISTING F - FUTURE
FIELD EQUIPMENT AUXILIARY FUNCTION POWERED	1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - DESCRIPTION 6 - EXISTING/FUTURE	MWH - MOTOR WINDING HEATER TSH - TEMPERATURE SWITCH XSH - TORQUE SWITCH	REFER ◇3	DESCRIPTION	DESCRIPTION ◇6	DESCRIPTION	E - EXISTING F - FUTURE
FIELD EQUIPMENT STARTER/DRIVE CUBICLE/CABINET	1 - TAG 2 - LOOP NUMBER 3 - TYPE 4 - VOLTAGE-POLE 5 - POWER SOURCE 6 - EXISTING/FUTURE	MS - MOTOR STARTER RVAT - REDUCED VOLTAGE AUTO TRANSFORMER STARTER RVSS - REDUCED VOLTAGE SOLID STATE STARTER VFD - VARIABLE FREQUENCY DRIVE	REFER ◇3	FVNR - FULL VOLTAGE NON-REVERSING STARTER FVR - FULL VOLTAGE REVERSING STARTER PWS - PART-WINDING STARTER RVAT - REDUCED VOLTAGE AUTO TRANSFORMER STARTER RVSS - REDUCED VOLTAGE SOLID STATE STARTER TS1W - TWO SPEED SINGLE WINDING TS2W - TWO SPEED TWO WINDINGS VFD - VARIABLE FREQUENCY DRIVE	120VAC - 1P 208VAC - 2P 208VAC - 3P 240VAC - 2P 240VAC - 3P 480VAC - 3P 2400VAC - 3P 4160VAC - 3P	LCP - LOCAL CONTROL PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE

INSTRUMENT BUBBLE LOCATIONS



NOTES

1. INSTRUMENT TAG IDENTIFICATION LETTERS TABLE
2. OPERATOR PILOT DEVICE LEGEND
3. EQUIPMENT TAGGING TABLE
4. I/O TYPE DESIGNATIONS TABLE
5. INSTRUMENT TYPE DESIGNATIONS TABLE
6. FURNISHED BY: FBO FURNISHED BY OWNER
FBV FURNISHED BY VENDOR

50% DESIGN SUBMITTAL
NOT FOR CONSTRUCTION

REV	DATE	BY	DESCRIPTION

DESIGNED JLH
DRAWN SGS
CHECKED DEB
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — DANIEL ROBINSON — No. 20405 — ELECTRICAL — STATE OF CALIFORNIA

carollo®

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
INSTRUMENTATION
WESTBROOK ASR WELL
SYMBOLS AND ABBREVIATIONS 1

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 — 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. GI01
SHEET NO. XX OF XX

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ColorTable: gshade.ctb
Model: Layout1
LAST SAVED BY: CYoung

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1009GI001.dgn

INSTRUMENT TAG IDENTIFICATION LETTERS

	MEASURED VARIABLE / INSTRUMENT FUNCTION	ELEMENT	TRANSMITTER	INDICATING TRANSMITTER	CONVERTER TRANSDUCER, RELAY SPECIAL DEVICES	INDICATOR	RECORDER	CONTROLLER	INDICATING CONTROLLER	RECORDING CONTROLLER	SWITCH	SWITCH LOW LOW	SWITCH LOW	SWITCH HIGH	SWITCH HIGH HIGH	SWITCH COMBINATION HIGH LOW	ACTION	ALARM LOW LOW	ALARM LOW	ALARM HIGH	ALARM HIGH HIGH	TOTALIZE INDICATOR TRANSMITTER	VALVE	GAUGE	LIGHT	SPEED SETTING
A	ANALYSIS	AE	AT	AIT	AY	AI	AR	AC	AIC	ARC	AS	ASLL	ASL	ASH	ASHH	ASHL		AALL	AAL	AAH	AAHH				AL	
B	BURNER FLAME	BE	BT	BIT	BY	BI	BR	BC	BIC	BRC	BS	BSLL	BSL	BSH	BSHH			BALL	BAL	BAH	BAHH				BL	
C	CONDUCTIVITY	CE	CT	CIT	CY	CI	CR	CC	CIC	CRC	CS	CSLL	CSL	CSH	CSHH	CSHL		CALL	CAL	CAH	CAHH				CL	
D	DENSITY	DE	DT	DIT	DY	DI	DR	DC	DIC	DRC	DS	DSLL	DSL	DSH	DSHH	DSHL		DALL	DAL	DAH	DAHH				DL	
E																										
F	FLOW	FE	FT	FIT	FY	FI	FR	FC	FIC	FRC	FS	FSLL	FSL	FSH	FSHH	FSHL		FALL	FAL	FAH	FAHH	FQI	FCV	FG	FL	
FF	FLOW RATIO				FFY	FFI		FFC	FFIC		FFS														FFL	
G	GAUGING (DIMENSION)																									
H	HAND (MANUAL)*							HC			HS*						HA*						HV		HL	HSS
I	CURRENT		IT	IIT	IY	II	IR	IC	IIC	IRC	IS	ISLL	ISL	ISH	ISHH			IALL	IAL	IAH	IAHH				IL	
J	POWER																									
K	TIME				KY	KI	KR	KC	KIC	KRC	KS	KSLL	KSL	KSH	KSHH			KALL	KAL	KAH	KAHH		KV		KL	
L	LEVEL	LE	LT	LIT	LY	LI	LR	LC	LIC	LRC	LS	LSLL	LSL	LSH	LSHH	LSHL		LALL	LAL	LAH	LAHH		LCV	LG	LL	
M	MOISTURE OR HUMIDITY	ME	MT	MIT	MY	MI	MR	MC	MIC	MRC	MS	MSLL	MSL	MSH	MSHH			MALL	MAL	MAH	MAHH				ML	
N	EMERGENCY SHUTDOWN																									
O																										
P	PRESSURE OR VACUUM	PE	PT	PIT	PY	PI***	PR	PC	PIC	PRC	PS****	PSLL	PSL	PSH	PSHH	PSHL		PALL	PAL	PAH	PAHH		PCV		PL	
PD	DIFFERENTIAL PRESSURE		PDT	PDIT	PDY	PDI	PDR	PDC	PDIC	PDRC	PDS	PDSLL	PDSL	PDSH	PDSHH			PDALL	PDAL	PDAH	PDAHH		PDCV		PDL	
Q	QUANTITY	QE	QT	QIT	QY	QI	QR				QS	QSLL	QSL	QSH	QSHH			QALL	QAL	QAH	QAHH					
R	RADIOACTIVITY																									
S	SPEED	SE	ST	SIT	SY	SI	SR	SC	SIC	SRC	SS	SSLL	SSL	SSH	SSHH			SALL	SAL	SAH	SAHH					
T	TEMPERATURE	TE	TT	TIT	TY	TI	TR	TC	TIC	TRC	TS	TSLL	TSL	TSH	TSHH	TSHL		TALL	TAL	TAH	TAHH		TCV		TL	
TD	DIFFERENTIAL TEMPERATURE		TDT	TDIT	TDY	TDI	TDR	TDC	TDIC	TDRC	TDS	TDSLL	TDSL	TDSH	TDSHH			TDALL	TDAL	TDAH	TDAHH		TDCV		TDL	
U	MULTIVARIABLE					UI	UR	UC	UIC	URC	US														UL	
V	VISCOSITY	VE	VT	VIT	VY	VI	VR	VC	VIC	VRC	VS	VSLL	VSL	VSH	VSHH			VALL	VAL	VAH	VAHH				VL	
W	WEIGHT	WE	WT	WIT	WY	WI	WR				WS	WSLL	WSL	WSH	WSHH			WALL	WAL	WAH	WAHH					
X	UNCLASSIFIED	XE	XT	XIT	XY	XI	XR	XC	XIC	XRC	XS	XSLL	XSL	XSH	XSHH			XALL	XAL	XAH	XAHH		XCV	XG	XL	
XV	VIBRATION	XVE	XVT		XVY	XVI	XVR				XVS			XVSH	XVSHH					XVAH	XVAHH				XVL	
Y	STATUS***					YI***																			YL	
Z	POSITION	ZE	ZT	ZIT	ZY	ZI					ZS**												ZV		ZL**	

* REFER TO OPERATOR PILOT DEVICE LEGEND
** LETTER INDICATES POSITION (O=OPEN, C=CLOSED, R=RAISE, L=LOWER, ETC)
*** PI# # = 1,2,3 ETC. AND REPRESENTS A UNIQUE IDENTIFIER AND IS APPLICABLE TO ALL ITEMS IN THE TABLE ABOVE
**** COULD ALSO BE PIS - FOR PRESSURE INDICATING SWITCH

OPERATOR PILOT DEVICE LEGEND

PILOT DEVICE FUNCTION / DEVICE TYPE	LOCAL-OFF-REMOTE (LOR) OR LOCAL-STOP-REMOTE (LSR)	STOP (SP)	START (ST)	HAND-OFF-AUTO (HOA)	OFF-ON (OO)	SELECT (SEL)	OPEN-STOP-CLOSE (OSC)	JOG OPEN-HOLD-CLOSE (JOHC)	SEMIAUTO-AUTO-MANUAL (SAAM)	LEAD-LAG-STANDBY (LLGS)	JOG OPEN-JOG CLOSE (JOJC)	ONLINE-OFFLINE (OLOF)	AUTO-MANUAL (AM)	FIXED RATE-LEVEL RATE (FRLR)	OPEN-CLOSE (OC)	NO OFFLINE-OFFLINE TRANSITION (NOOT)	LOW-HIGH (LH)	RESET (RST)	SPEED (SPD)	START-STOP (STSP)	E-STOP (E-SP)	BYPASS (BYP)			SILENCE	POSITION (POS)
PILOT DEVICE TAG (HAND SWITCHES)	HSA*	HSB	HSC	HSD*	HSE	HSF	HSG*	HSH*	HSI	HSJ*	HSK*	HSL*	HSM*	HSN	HSO*	HSP	HSQ*	HSR	HSS	HST*	HSU	HSV	HSW	HSX	HSY	HSZ
SCADA/HMI TAG (HAND ACTION)	HAA	HAB	HAC	HAD	HAE	HAF	HAG	HAH	HAI	HAJ	HAK	HAL	HAM	HAN	HAO	HAP	HAQ	HAR	HAS	HAT	HAU	HAV	HAW	HAX	HAY	HAZ

HSA* SELECTOR SWITCH POSITION EG: HSA(R) R = REMOTE, HSD(A) A = AUTO, ETC

I/O TYPE DESIGNATIONS

AUX1	RUNNING	MSL	MOTOR START LOW
AUX2	FAILED/FAULT	MSM	VALVE MODULATE
AUXF1	RUNNING FORWARD	MSP	MOTOR STOP
AUXH1	RUNNING HIGH	MSR	MOTOR START REVERSE
AUXL1	RUNNING LOW	MST	MOTOR START
AUXR1	RUNNING REVERSE	SS	SPEED SIGNAL
SVC	SOLENOID VALVE CLOSE	ZC	POSITION COMMAND
SVO	SOLENOID VALVE OPEN	ZCC	POSITION COMMAND CLOSE
MS	RUN	ZCO	POSITION COMMAND OPEN
MSF	MOTOR START FORWARD		
MSH	MOTOR START HIGH		

INSTRUMENT TYPE DESIGNATIONS

AM	AMMONIA	O3	OZONE	SH	SODIUM HYPOCHLORITE
CAP	CAPACITANCE	ORP	OXIDATION REDUCTION POTENTIAL	TDR	TIME DOMAIN REFLECTOMETRY
CGD	COMBUSTIBLE GAS DETECTOR	P	PRESSURE	TH	THERMAL
CL	CHLORINE	P-SUB	PRESSURE SUBMERSIBLE	TSS	TOTAL SUSPENDED SOLIDS
COND	CONDUCTIVITY	PC	PARTICLE COUNTER	TURB	TURBIDITY
DO	DISSOLVED OXYGEN	PO	PHOSPHOROUS	US	ULTRASONIC
FMCW	FREQ. MODULATED CONT. WAVE	PTOF	PULSE TIME OF FLIGHT	UVI	UV INTENSITY
HSF	FLUORIDE	R/I	RESISTANCE TO CURRENT	UVT	UV TRANSMITTANCE
IS	INTRINSIC SAFETY BARRIER	ROT	ROTAMETER	VAC	VACUUM
LEL	LOWER EXPLOSIVE LIMIT	RTD	RESISTANCE TEMP DETECTOR		
MAG	MAGNETIC	SC	STREAMING CURRENT		

SPECIFIC ABBREVIATIONS

APH	A PHASE	MWH	MOTOR WINDING HEATER
BPH	B PHASE	SSG	SECONDARY SWITCHGEAR
BRB	BEARING BOTTOM	SV*	SOLENOID VALVE
BRT	BEARING TOP	SPD	SURGE PROTECTIVE DEVICE
BTFLY	BUTTERFLY	UPS	UNINTERRUPTIBLE POWER SUPPLY
CPH	C PHASE	YA	STATUS AUTO
CC*	CALIBRATION COLUMN	YR	STATUS REMOTE
HTR	HEATER	Y1	STATUS RUNNING
HTU	HEAT TRACE UNIT	Y2	ALARM FAILED/FAULT

* CC# AND SV# # = 1, 2, 3 ETC. AND REPRESENTS A UNIQUE IDENTIFIER

INSTRUMENT LINE SYMBOLS

INSTRUMENT OR CONNECTION TO PROCESS
PNEUMATIC SIGNAL
ELECTRIC SIGNAL
HYDRAULIC SIGNAL — L L L L L
CAPILLARY TUBE — X X X X X X
ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
ELECTROMAGNETIC OR SONIC SIGNAL (NOT GUIDED)
INTERNAL SYSTEM LINK (SOFTWARE OR DATA LINK) — o o o o o o
COPPER ETHERNET — C C C C C
FIBER OPTIC ETHERNET — F F F F F
WIRELESS ETHERNET — W W W W W
PROFIBUS DP — PBD PBD PBD PBD PBD
PROFIBUS PA — PBA PBA PBA PBA PBA
DEVICENET — DN DN DN DN DN
FOUNDATION FIELDBUS — FF FF FF FF FF

PROCESS LINE SYMBOLS

PRIMARY PROCESS FLOW IN PIPE
SECONDARY PROCESS FLOW IN PIPE
PRIMARY PROCESS FLOW IN CHANNEL
SECONDARY PROCESS FLOW IN CHANNEL

DESIGNATIONS

EQUIPMENT ENCLOSURE
EXISTING
FUTURE — FUTURE

MISCELLANEOUS P&ID SYMBOLS

CONTINUATION TAG — DESC 2, DESC 1, #, A, B; CONTINUATION FROM SHEET; CONTINUATION TO SHEET; UNIQUE IDENTIFIER
PIPE CALLOUT — PIPE TAG, UNIQUE ID
SIGNAL CONTINUATION — TO DRAWING — FROM DRAWING

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED JLH
DRAWN SGS
CHECKED DEB
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — DANIEL ROBINSON — No. 20405 — ELECTRICAL — STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
INSTRUMENTATION
WESTBROOK ASR WELL
SYMBOLS AND ABBREVIATIONS 2

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. GI02
SHEET NO. XX OF XX

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Model: Layout1
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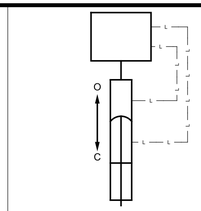
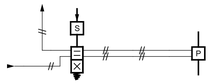
ACTUATORS

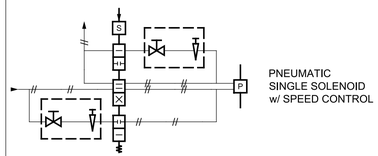
- DIAPHRAGM
- ELECTRIC DISCRETE
- ELECTRIC MODULATING
- ELECTRIC HYDRAULIC
- HAND
- HYDRAULIC
- PNEUMATIC
- SOLENOID



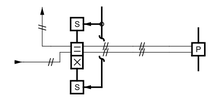
HYDRAULIC MODULATING



PNEUMATIC SINGLE SOLENOID OPEN/CLOSE



PNEUMATIC SINGLE SOLENOID w/ SPEED CONTROL



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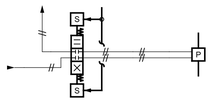

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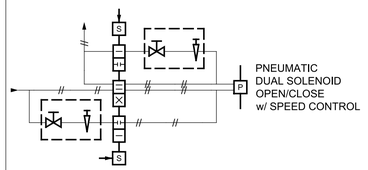
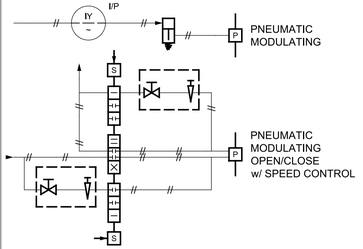


PNEUMATIC DUAL SOLENOID OPEN/CLOSE w/ SPEED CONTROL



PNEUMATIC MODULATING

PNEUMATIC MODULATING OPEN/CLOSE w/ SPEED CONTROL

PIPING

- AIR GAP
- BLIND FLANGE
- CAPPED OR PLUGGED
- CONCENTRIC INCREASER
- CONCENTRIC REDUCER
- DRAIN
- ECCENTRIC INCREASER
- TEE
- UNION
- ECCENTRIC REDUCER
- EXPANSION COUPLING
- EXPANSION JOINT VIBRATION CENTER
- FLEXIBLE CONNECTION
- QUICK DISCONNECT

PUMPS

- AIR DRIVEN
- CENTRIFUGAL
- CHEMICAL FEED DIAPHRAGM
- DIAPHRAGM
- GEAR
- PERISTALTIC OR HOSE
- PISTON
- PROGRESSIVE CAVITY
- OR SUBMERSIBLE
- VERTICAL TURBINE
- VERTICAL CHOPPER
- WATER CHAMP

BLOWERS/ COMPRESSORS

- CENTRIFUGAL SINGLE STAGE BLOWER
- CENTRIFUGAL MULTI STAGE BLOWER
- RECIPROCATING COMPRESSOR
- SCREW COMPRESSOR
- FAN
- LIQUID RING COMPRESSOR
- ROTARY LOBE BLOWER

CHECK VALVES

- BACK FLOW PREVENTER
- BALL
- DIAPHRAGM CHECK
- DOUBLE FLAP
- FLAPPER
- SPRING LOADED GENERAL
- SPRING LOADED SWING
- SWING

PRESSURE VALVES

- BACKPRESSURE REGULATING SELF CONTAINED
- BACKPRESSURE REGULATING EXTERNAL TAP
- PRESSURE REDUCING SELF CONTAINED
- PRESSURE REDUCING EXTERNAL PRESSURE TAP
- REGULATING
- PRESSURE RELIEF
- VACUUM RELIEF

VALVES

- 3-WAY
- 3-WAY PLUG
- 4-WAY
- AIR-RELIEF
- ANGLE
- BALL
- BALL V-NOTCH
- BUTTERFLY
- BUTTERFLY-BURIED VALVE BOX
- CONE
- DIAPHRAGM
- GATE
- GATE-BURIED VALVE BOX
- GLOBE
- HOSE
- MUD
- NEEDLE
- PINCH
- PLUG ECCENTRIC
- PLUG ECCENTRIC w-VALVE BOX
- PLUG ECCENTRIC LUBRICATED
- PLUG ECCENTRIC LUBRICATED BURIED VALVE BOX
- PLUG CONCENTRIC
- PLUG CONCENTRIC -BURIED VALVE BOX
- PLUG CONCENTRIC LUBRICATED
- PLUG CONCENTRIC LUBRICATED BURIED VALVE BOX
- PUMP DISCHARGE
- TELESCOPING

VALVE DESIGNATIONS	
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
FO	FAIL OPEN
FC	FAIL CLOSE
FLP	FAIL LAST POSITION

MISC

- AIR DAMPER
- AIR / CHEMICAL DIFFUSER
- BASKET STRAINER
- BLOW-OFF SILENCER
- CALIBRATION COLUMN
- COALESCER
- DESICCANT DRYER
- EDUCTOR/EJECTOR
- EQUIPMENT/INSTRUMENT LOCATOR
- EXHAUST FAN
- EYEWASH
- FILTER
- FILTER SEPARATOR
- FINE FILTER
- FIRE ALARM/SENSOR
- FLAME ARRESTER
- FLAME ARRESTER w/THERMALLY OPERATED VALVE
- FLOW CONDITIONER
- GAS CANNON
- GRINDER
- HEAT EXCHANGER
- HOIST
- HORIZONTAL MIXER
- HOSE CONNECTION
- INLET STRAINER
- INLINE STATIC MIXER
- MATERIAL CHANGE
- MIXER
- MOTOR
- NOZZLE
- ORIFICE RESTRICTION
- PERISTALTIC COMPOSITE SAMPLER
- OR PULSATION DAMPENER
- REFRIGERATED DRYER
- RUPTURE DISK
- SAMPLE PORT
- SIGHT TUBE
- SMOKE DETECTOR
- STRAINER - MECHANICALLY CLEANED
- STRAINER WITH BLOW OFF
- STRAINER WYE TYPE
- VAPOR HEATER
- VAPORIZER
- VENT
- VENT TO ATMOSPHERE

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED JLH
DRAWN SGS
CHECKED DEB
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER DANIEL ROBINSON No. 20405 ELECTRICAL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE
AQUIFER STORAGE AND RECOVERY WELLS PROJECT
INSTRUMENTATION
WESTBROOK ASR WELL
SYMBOLS AND ABBREVIATIONS 3

VERIFY SCALES
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0 1"
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JOB NO. 11843A.10
DRAWING NO. GI03
SHEET NO. XX OF XX

Plot Date: 08-OCT-2021 1:39:48 PM
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PROJECT NO. 11843A10_P2 FILE NAME: 11843A1009GI003.dgn

FLOW

- BATCH
- CORIOLIS
- MAGNETIC
- ORIFICE
- PADDLE WHEEL
- PISTON
- ANNUBAR
- PITOT TUBE
- POSITIVE-DISPLACEMENT
- PROPELLER-TURBINE
- ROTAMETER
- THERMAL
- ULTRASONIC
- ULTRASONIC BIOGAS
- V-CONE
- VENTURI TUBE OR FLOW NOZZLE
- VORTEX

FLUMES

- LEOPOLD-LAGCO
- PALMER-BOWLUS
- PARSHALL
- REGULAR CUTTHROAT
- TRAPEZOIDAL

GATES

SIDE VIEW	PLAN VIEW
SLIDE	FLAP
SLUICE	KNIFE
STOP	SLIDE
	SLUICE
	STOP
	WEIR
	BUTTERFLY

LEVEL

- BUBBLER
- CAPACITANCE
- DIFFERENTIAL PRESSURE (TANK, PDE, LDIT)
- ELECTRODE
- FLOAT
- INVERTED COLUMN
- PROBE
- RADAR PTOF
- RADAR (FREQUENCY MODULATED CONTINUOUS WAVE)
- RADAR TDR
- SUSPENDED/ SUBMERSIBLE
- TUNING FORK
- ULTRASONIC

PRESSURE/VACUUM

PRESSURE	DIFFERENTIAL PRESSURE	PRESSURE SEALS
GAUGE (PI)	GAUGE DIFFERENTIAL INDICATOR (PDI)	SEAL ANNULAR
MANOMETER	DIFFERENTIAL PRESSURE SWITCH (PDSL, PDE)	SEAL DIAPHRAGM
PRESSURE SWITCH (PSH, PE)	DIFFERENTIAL PRESSURE TRANSMITTER (PDIT, PDE)	SEAL SANITARY
PRESSURE TRANSMITTER (PIT, PE)		EXAMPLE: PRESSURE SWITCH (PSH, PE)

TEMPERATURE

- TEMPERATURE w/THERMOWELL
- TEMPERATURE GAUGE
- THERMOMETER (T)

WEIGHT

- HYDRAULIC
- STRAIN GAUGE

WEIRS

SIDE VIEW	PLAN VIEW
RECTANGULAR w/o END CONTRACTIONS	RECTANGULAR w/o END CONTRACTIONS
RECTANGULAR w/ END CONTRACTIONS	RECTANGULAR w/ END CONTRACTIONS
V-NOTCH (TRIANGULAR)	V-NOTCH (TRIANGULAR)
TRAPEZOIDAL (CIPOLLETTI)	TRAPEZOIDAL (CIPOLLETTI)

REV	DATE	BY	DESCRIPTION
			50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

DESIGNED JLH
DRAWN SGS
CHECKED DEB
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER — DANIEL ROBINSON — No. 20405 — ELECTRICAL — STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

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AQUIFER STORAGE AND RECOVERY WELLS PROJECT
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SYMBOLS AND ABBREVIATIONS 4

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JOB NO. 11843A.10
DRAWING NO. GI04
SHEET NO. XX OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1009GI004.dgn

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EQUIPMENT TAGGING SYSTEM

XX # # _ XXX X _ # # # # #

- EQUIPMENT
- PRIMARY EQUIPMENT
- REMOTE STATION DESIGNATOR
- MODIFIER
- FUNCTION
- SUB-SYSTEM
- SYSTEM
- FACILITY

KEY NOTES:

1. REFER TO GN02 FOR ADDITIONAL ISA ABBREVIATIONS.

CG	COMPRESSED NATURAL
DC	DRY CREEK WWTP
FD	FIRE DEPARTMENT
PG	PLEASANT GROVE WWTP
PD	POLICE DEPARTMENT
PR	PARKS AND RECREATION
RW	RECYCLED WATER
SO	SOLID WASTE
SW	STORM WATER
WT	BARTON RD WTP
WC	WASTEWATER COLLECTION
WD	**WATER DISTRIBUTION**

SYSTEM DESIGNATOR	SUB-SYSTEM DESIGNATOR	SCADA ALARM	DESCRIPTION
0			**COMMON SUPPORT FACILITIES**
	1	WD	ADMINISTRATION
	2	WD	SHOP FACILITIES
	3	WD	WAREHOUSE / STORAGE
	4	WD	LABORATORY
	5	WD	UTILITIES (HVAC, SANITARY SEWER, POTABLE UTILITY WATER, COMPRESSED AIR)
	6	WD	ELECTRICAL DISTRIBUTION
	7	WD	COMMUNICATIONS / OFFICE NETWORKING
	8	WD	SCADA / PLANT NETWORKING / HDR, RADIO BASE STATION, SECURITY & FIRE SYSTEMS
	9	WD	HEALTH & SAFETY (PPE, PORTABLE GAS GAS DETECTORS, FIRE SYSTEMS, SECURITY
10			**TRANSMISSION**
	11	WD	ELECTRICAL & CONTROL (PLC, PP, MCC, RADIO)
	12	WD	
	13	WD	PROCESS CHEMICAL / PHYSICAL ADJUSTMENT
	14	WD	PRODUCT CONVEYANCE
	15	WD	PROCESS BASINS / TANKS / CHANNELS
	16	WD	
	17	WD	BUILDINGS / STRUCTURES / VAULT / SUMPS
	18	WD	
	19	WD	
20			**DISTRIBUTION**
	21	WD	ELECTRICAL & CONTROL (PLC, PP, MCC, RADIO)
	22	WD	
	23	WD	PROCESS CHEMICAL / PHYSICAL ADJUSTMENT
	24	WD	PRODUCT CONVEYANCE
	25	WD	PROCESS BASINS / TANKS / CHANNELS
	26	WD	
	27	WD	BUILDINGS / STRUCTURES / VAULT / SUMPS
	28	WD	
	29	WD	
30			**WELLS**
	31	**WD**	**ELECTRICAL & CONTROL (PLC, PP, MCC, RADIO)**
	32	**WD**	
	33	**WD**	**PROCESS CHEMICAL / PHYSICAL ADJUSTMENT**
	34	**WD**	**PRODUCT CONVEYANCE**
	35	**WD**	**PROCESS BASINS / TANKS / CHANNELS**
	36	**WD**	
	37	**WD**	**BUILDINGS / STRUCTURES / VAULT / SUMPS**
	38	**WD**	**AQUIFER STORAGE SYSTEM**
	39	**WD**	
40			**STORAGE**
	41	WD	ELECTRICAL & CONTROL (PLC, PP, MCC, RADIO)
	42	WD	
	43	WD	PROCESS CHEMICAL / PHYSICAL ADJUSTMENT
	44	WD	PRODUCT CONVEYANCE
	45	WD	PROCESS BASINS / TANKS / CHANNELS
	46	WD	
	47	WD	BUILDINGS / STRUCTURES / VAULT / SUMPS
	48	WD	
	49	WD	
50			**INTERTIES**
	51	WD	ELECTRICAL & CONTROL (PLC, PP, MCC, RADIO)
	52	WD	
	53	WD	PROCESS CHEMICAL / PHYSICAL ADJUSTMENT
	54	WD	PRODUCT CONVEYANCE
	55	WD	PROCESS BASINS / TANKS / CHANNELS
	56	WD	
	57	WD	BUILDINGS / STRUCTURES / VAULT / SUMPS
	58	WD	
	59	WD	

ACRONYM ◇1	DESCRIPTION
ADFF	DIFFUSER, AERATION
AERD	AERATOR, DISC
AERS	AERATOR, SURFACE
AFHx	ACTIVE HARMONIC FILTER
AGIT	AGITATOR
AITx	ANALYZER INDICATING TRANSMITTER
ATSx	AUTOMATIC TRANSFER SWITCH (USE MTSx FOR MANUAL TRANSFER SWITCH)
BASN	BASIN: SED BASIN, AERATION BASIN, U.V. CONTACT BASIN
BATT	BATTERIES
BCHG	BATTERY CHARGER
BFPx	PRESS, BELT FILTER
BIOA	BIO-ASSAY
BOIL	BOILER
BLDG	BUILDING
BLWR	BLOWERS: CENTRIFUGAL, ROTARY LOBE
BKRx	BREAKER, ELECTRICAL
BRNR	BURNERS
BSCR	BAR SCREEN
BCKT	BUCKET (CONTROLS COMPARTMENT LOCATED IN SWGR OR
CAMx	CAMERA
CAPx	CAPACITOR, POWER FACTOR CORRECTION
CENT	CENTRIFUGE
CHAN	CHANNEL, PROCESS FLOW
CLAR	CLARIFIER: PRIMARY, SECONDARY
CLAS	CLASIFIER, GRIT
CNVR	CONVEYOR
COLL	COLLECTOR, SLUDGE
COMP	COMPRESSORS - ALL TYPES
CTFN	COOLING TOWER FAN
CTWR	COOLING TOWERS
DAMP	VENTILLATION AIR DAMPER
DISP	DISPENSER (CNG)
DITx	DENSITY INDICATING TRANMITTER
DRVc	CENTRIFUGE DRIVE
DRYR	GAS DRYER / DESICANT
EDUC	EDUCTOR (VENTURI NOZZLE)
EGEN	EMERGENCY GENERATOR
ENGN	ENGINE: DIESEL BACK-UP, INTERNAL COMBUSTION
EVAP	EVAPORATORATIVE COOLER
EXCH	EXCHANGERS, HEATED SLUDGE
FANx	FAN, COOLING OR VENTILATING
EWSS	EYEWASH – SAFETY SHOWER STATIONS
FALL	FALL RESTAINT, FALL PROTECTION
FGSD	FIXED GAS DETECTOR
FIRE	FIRE SYSTEMS
FITx	FLOW INDICATING TRANSMITTER
FLAS	FLASH PROTECTION EQUIPMENT (FACE SHIELDS, SUITS)
FSCR	FINE SCREENS
FLTR	FILTER: EFFLUENT FILTER AND MECHANICAL FILTERS
FQxx	FLOW TOTALIZER (MECHANICAL COMPOUND OR TURBO
GAGE	GAUGES: PRESSURE, TEMPERATURE, VACUUM - ALL TYPES, CALIBRATION COLUMNS
GATE	ENTRY/EXIT VEHICLE, PERSONNEL
GCND	GAS CONDITIONING EQUIPMENT
GENx	GENERATOR
GRBT	GRAVITY BELT THICKENER
GRBX	GEAR BOX: INCREASER, DECREASER - ALL TYPES
GRND	GRINDER
HEAT	HEATER: BLOCK, PIPE, STRIP
HPGN	SODIUM HYPOCHLORITE GENERATOR
HPRx	HOPPER
HSTS	HOISTS / CRANES
HVAC	HEATING, VENTILATION, AIR CONDITIONING: CLIMATE
HXGR	HEAT EXCHANGER, DEMAND HEATERS, HOT WATER TANKS
HYDc	HYDRAULIC UNIT, CENTRIFUGE
HYDu	HYDRAULIC POWER UNIT (ULTRAVIOLET)
HYDx	HYDRAULIC POWER UNIT
IJBx	INSTRUMENT JUNCTION BOX

ACRONYM ◇1	DESCRIPTION
INJR	INJECTOR - CL2 / SO2
LCPx	LOCAL CONTROL PANEL
LDBK	LOAD BANK
LITx	LEVEL INDICATING TRANSMITTER
LPxx	LIGHTING PANEL
LSPx	LOAD SHED RELAY PANEL
LUBE	LUBRICATING OIL SYSTEM
MCCx	MOTOR CONTROL CENTER
MIXR	MIXER
MODL	LAMP MODULE
MONT	MONITOR (WATER CANNON)
MODx	MOTOR OPERATED DOOR
MOGx	MOTOR OPERATED GATE VALVE
MOVx	MOTOR OPERATED VALVE (SLIDE, BALL, GLOBE…)
MSTR	MOTOR STARTER
MTRB	MICROTURBINE
MTRx	MOTOR
MTSx	MANUAL TRANSFER SWITCH
MVFD	MOTOR V.F.D.
ODOR	ODOR SCRUBBING SYSTEM
PCxx	PERSONAL COMPUTERS
PDCu	POWER DISTRIBUTION CENTER (ULTRA-VIOLET)
PEDx	METERING PEDESTAL
PITx	PRESSURE INDICATING TRANSMITTER
PMIX	POLYMER MIXING UNIT
POND	TREATMENT PLANT EMERGENCY OR PROCESS STORAGE
POVx	PNEUMATICALLY OPERATED VALVE
PPxx	POWER DISTRIBUTION PANEL, PANELBOARD
PLCx	PROGRAMMED LOGIC CONTROLLERS
PLCP	PLC PANEL
PQMx	POWER QUALITY MONITOR
PUMP	PUMPS - ALL TYPES
PWRS	POWER SUPPLY (USE UPSx FOR UNINTERUPTIBLE POWER
RADx	RADIO SYSTEMS
RADI	RADIATORS
RDTx	ROTARY DRUM THICKENER
RELx	RELAY, MULTI-FUNCTION ELECTRICAL PROTECTIVE
RESP	RESPIRATORS (FULL & HALF FACE, AIR SUPPLIED, AIR
RVSS	REDUCED VOLTAGE SOFT STARTER
SAMP	SAMPLER UNIT
SECR	SECURITY SYSTEMS
SRVR	SERVER, SCADA / CONTROL
SBFP	SLUDGE BELT FILTER PRESS
SGAT	GATE: SLIDE, SLUICE, KNIFE
SKMR	SKIMMERS: SLUDGE, SCUM
SOVx	SOLENIOD OPERATED VALVE
SPDx	SURGE PROTECTIVE DEVICE (TVSS & SPD)
STAT	STATION (PUMPING, PRESSURE REDUCING…)
STNR	STRAINERS
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TANK	TANKS, STORAGE VESSELS, PRESSURE ACCUMULATORS
TCOM	TELECOMMUNICATIONS SYSTEMS
TCPx	TEMPERATURE CONTROL PANEL
TITx	TEMPERTURE INDICATING TRANSMITTER
TOOL	TOOLS, LATHES, MILLS, SHEARS, PRESS
TRAP	TRAPS: DRIP, CONDENSATE
UPSx	POWER SUPPLY, UNINTERRUPTIBLE
UVRx	ULTRAVIOLET BANK
VALV	VALVES: BALL, GATE, GLOBE, BUTTERFLY - ALL TYPES
VFDx	DRIVE, VARIABLE FREQUENCY
VGLV	VOLTAGE GLOVES
VSCD	VISCOUS, HYDRAULIC DRIVE / TORQUE CONVERTER
WEIR	FLOW REGULATION WEIR
WASH	WASHER / COMPACTOP
WITx	WEIGHT INDICATING TRANSMITTER
WKST	WORKSTATION, SCADA / CONTROL
XFMR	TRANSFORMER

REMOTE STATION DESIGNATOR	DESCRIPTION
0	PRIMARY FACILITY
1	PRESSURE REDUCING STATION, 1589 PLEASANT GROVE BLVD
2	PRESSURE REDUCING STATION, 1303 CANEVARI DR (AKA WOODCREEK OAKS)
3	PRESSURE REDUCING STATION, BLUE OAKS BLVD
4	PRESSURE REDUCING STATION, JUNCTION BLVD (WEST #2)
5	PRESSURE REDUCING STATION, 3400 BASELINE ROAD (WEST
6	PRESSURE REDUCING STATION, 2054 PFE
7	UNUSED
08 – 19	PRESSURE REDUCING STATIONS – FUTURE
20	WELL 1 401 ATLANTIC STREET (SHORT STREET)
21	WELL 3 CHURCH STREET (DECOMMISSIONED)
22	WELL 2 PACIFIC STREET (DECOMMISSIONED)
23	WELL 4 1002 DARLING WAY (DARLING)
24	WELL 5 1746 CHELSEA WAY (OAKMONT)
25	WELL 6 1490 NORTH PARK DRIVE (DIAMOND CREEK)
26	WELL 7 WOODCREEK NORTH
27	WELL 8 2100 HAYDEN PARKWAY
28	WELL, WEST SIDE DRIVE (FUTURE)
29	WELL 12 1745 BLUE OAKS BLVD
30	WELL 13 HEWLETT PACKARD
31	WELL 14 FIDDYMENT ROAD
32	WELL, SIERRA VISTA SPECIFIC PLAN #1
33	WELL, SIERRA VISTA SPECIFIC PLAN #2
34 – 40	WELL SITES - FUTURE
41	RESERVOIR – NORTHEAST
42	RESERVOIR – BARTON ROAD
43	RESERVOIR – STONERIDGE
44	UNUSED
45	UNUSED
46-50	RESERVOIR - FUTURE
51	PUMP STATION – DUAL PURPOSE
52	PUMP STATION – HIGHLAND RESERVE, 9300 FAIRWAY DR
53	PUMP STATION – 1589 PLEASANT GROVE BYPASS PUMP STN
54	PUMP STATION – 4501 WESTPARK DRIVE RESERVOIR AND PUMPING STATION
55	PUMP STATION – 2054 PFE BYPASS PUMP STN
56 – 60	PUMP STATION - FUTURE
61	INTER-TIE - PCWA TINKER
62	INTER-TIE – PCWA CROWDER
63	INTER-TIE – PCWA STONERIDGE
64	INTER-TIE – PFE
65	INTER-TIE – BARTON ROAD (9341 BARTON ROAD)
66	INTER-TIE – BIANCHI (3551 BASELINE ROAD)
67	INTER-TIE – BLOSSOM HILL (1406 BLOSSOM HILL WAY)
68	INTER-TIE – CAVITT (8098 SIERRA COLLEGE BLVD)
69	INTER-TIE – FIVE STAR (6712 STANFORD RANCH ROAD)
70	INTER-TIE – HIGHLAND (9000 HIGHLAND PARK DR)
71	INTER-TIE – ORLANDO (1205 ORLANDO AVE)
72	INTER-TIE – PLEASANT GROVE (600 PLEASANT GROVE BLVD)
73	INTER-TIE – SIERRA COLLEGE (9200 SIERRA COLLEGE BLVD)
74	INTER-TIE – VERNON OAKS (651 VERNON OAKS DR)
75	INTER-TIE – AMERICAN VINEYARD VILLAGE
76	INTER-TIE – BUREAU OF RECLAMATION 72" RAW WATER
76-94	INTER-TIE – FUTURE
95-98	MISCELLANEOUS WD RELATED REMOTE SITES
99	316 REPEATER LOCATION

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SYMBOLS AND ABBREVIATIONS 5

VERIFY SCALES
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JOB NO. 11843A.10
DRAWING NO. GI05
SHEET NO. XX OF XX

Plot Date: 08-OCT-2021 1:39:37 PM
User: svcPW
PlotScale: 1:1
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ColorTable: gshade.ctb
Model: Layout1
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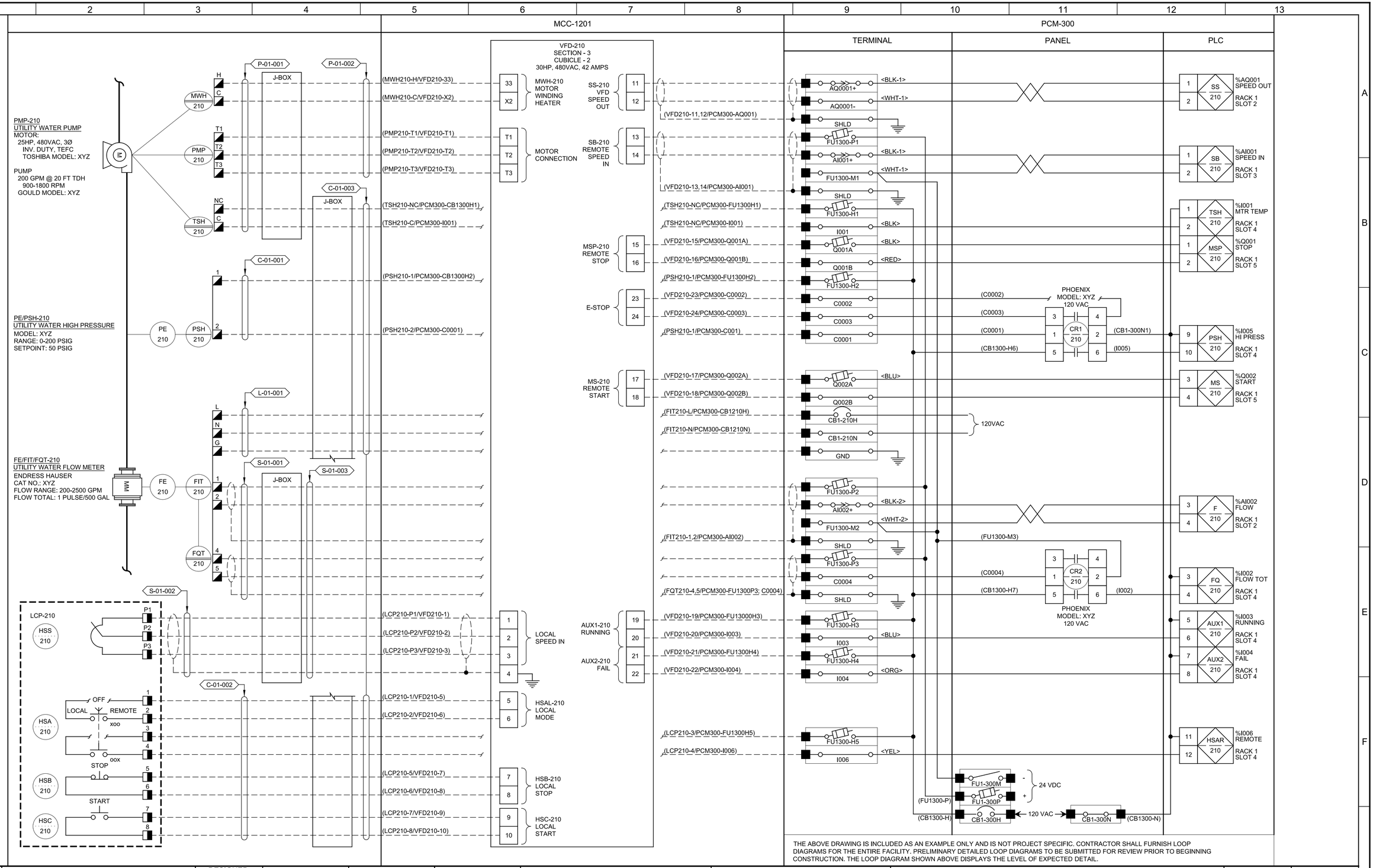
PROJECT NO. 11843A10_P2 FILE NAME: 11843A1009GI005.dgn



THE ABOVE DRAWING IS INCLUDED AS AN EXAMPLE ONLY AND IS NOT PROJECT SPECIFIC. CONTRACTOR SHALL FURNISH LOOP DIAGRAMS FOR THE ENTIRE FACILITY. PRELIMINARY DETAILED LOOP DIAGRAMS TO BE SUBMITTED FOR REVIEW PRIOR TO BEGINNING CONSTRUCTION. THE LOOP DIAGRAM SHOWN ABOVE DISPLAYS THE LEVEL OF EXPECTED DETAIL.

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AQUIFER STORAGE AND RECOVERY WELLS PROJECT

INSTRUMENTATION

WESTBROOK ASR WELL SAMPLE LOOP DRAWING

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JOB NO. 11843A.10
DRAWING NO. GI06
SHEET NO. XX OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1009GI006.dgn

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ColorTable: gshade.ctb
Model: Layout1
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ColorTable: gshade.ctb
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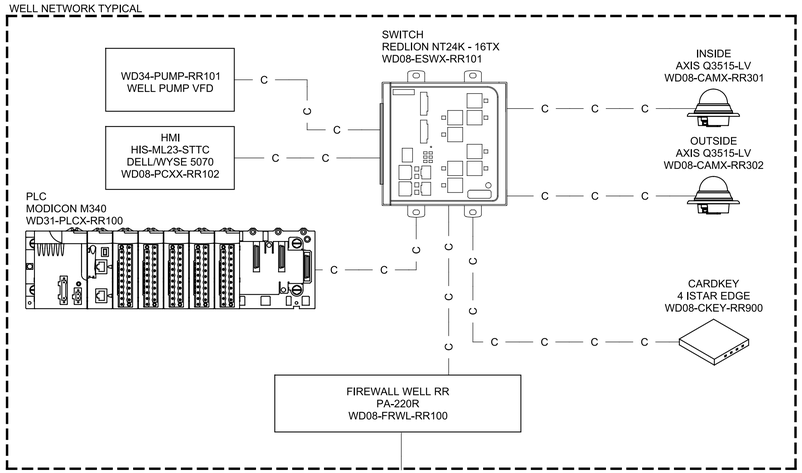

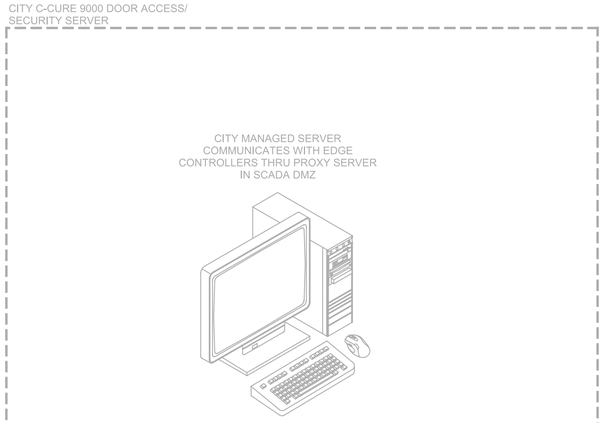

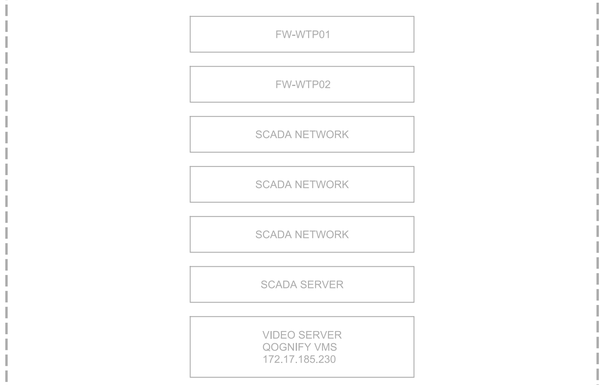

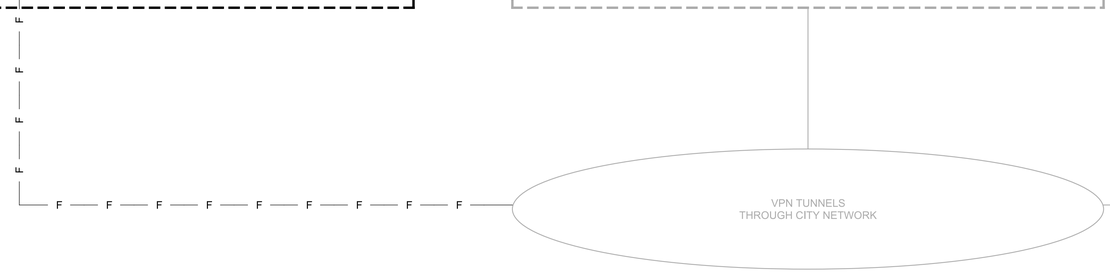

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INSTRUMENTATION
WESTBROOK ASR WELL
CONTROL BLOCK DIAGRAM

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JOB NO. 11843A.10
DRAWING NO. GI07
SHEET NO. XX OF XX

PROJECT NO. 11843A10_P2 FILE NAME: 11843A1009GI007.dgn

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WD34-HSXX 28101 — DI REMOTE — PLC-RR101
WD34-HCCX 28101 — DO RUN — PLC-RR101
WD34-SIXX 28101 — AI SPEED IN — PLC-RR101
WD34-SCXX 28101 — AO SPEED OUT — PLC-RR101
WD34-FSLX 28101 — DI SEAL ALARM — PLC-RR101
WD34-TSHX 28101 — DI TEMP — PLC-RR101
WD34-PUMP 28101 — DI RUNNING — PLC-RR101
WD34-YAFX 28101 — DI FAILED — PLC-RR101
ETHERNET
WD34-VFDX- 28101
VFD-18/B
480VAC-3P
WD31-MCCX-RR100
WD34-BKR2 28101 — SS 480VAC-3P — WD31-MCCX-RR100
WD34-BKRX 28101 — TM 120VAC-1P — PLCX-RR101
WD34-BKRX 28105 — TM 120VAC-1P — WD31-PLCX-RR101

WD34-PITX 28111 — AI — PLC-RR101 — PRESSURE — WD34-PEXX 28111
WD34-LTXX 28100 — AI — PLC-RR101 — P-SUB — WD34-LEXX 28100
WD34-PUMP 28101 — RTD
WD34-HEAT 28101 — RTD
WD34-TE1X 28101 — RTD
WD34-TE2X 28101 — RTD
WD34-TE3X 28101
WD34-FSLX 28101 — THERMAL — WD34-FEXX 28101
WD34-FITX 28105 — AI — PLC-RR101 — MAGNETIC — WD34-FE2X 28105
WD34-PITX 28102 — AI — PLC-RR101 — PRESSURE — WD34-PEXX 28102
WD34-PIXX 28111

NITROGEN
DOWNHOLE CONTROL PANEL
NITROGEN
NITROGEN
WD34-PIXX 28105
WD34-PSHH 28107 — PRESS SW — WD34-PEXX 28107
3/4" PW — MM — 3/4" PW — WELL WATER — I-002 I-001 3
12" AS/AR — PUMP COLUMN RECHARGE/TO DISTRIBUTION — 1 — I-001 I-002
DOWNHOLE FLOW CONTROL VALVE
WD34-VALV 28111
SCREEN
WET WELL RR29 PUMP
10" AS — 12" AS — ANNULAR RECHARGE — I-002 I-001 2

WD34-PIXX-2811 DOWNHOLE VALVE PRESSURE GAUGE
WD34-PEXX-2811 DOWNHOLE VALVE NITROGEN PRESSURE
WD34-LEXX-2810 WELL LEVEL
WD34-PIXX-2810 TRICKLE PRESSURE GAUGE
WD34-PUMP-2810 ASR WELL PUMP 500HP 480VAC 3PH — 1 / E-010
WD34-PEXX-2810 PRESSURE SWITCH HIGH HIGH __ PSIG OPEN
WD34-FEXX-2810 PUMP SEAL FLOW SWITCH LOW
WD34-FE2X-2810 TRICKLE FLOW __"
WD34-PEXX-2810 WELL PUMP DISCHARGE PRESS

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WESTBROOK ASR WELL WELL PUMP AND VALVES P&ID 1

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JOB NO. 11843A.10
DRAWING NO. 09I01
SHEET NO. XX OF XX

I/O

POWER SOURCE

FIELD

WD34-ZCOX 28120 DO OPEN
WD34-ZCCX 28120 DO CLOSE
WD34-HSXX 28120 DI REMOTE
WD34-ZSOX 28120 DI OPENED
WD34-MOVX 28120 DI CLOSED
PLC-RR101
WD34-BKRX 28120 TM 480VAC-3P WD31-MCCX-RR100
WD34-ZSOC 28120 LSR
WD34-HSAX 28120 OSC
WD34-HSGX 28120
WD34-MOVX 28120
WD34-DISC 28120

WD34-ZCOX 28130 DO OPEN
WD34-ZCCX 28130 DO CLOSE
WD34-HSXX 28130 DI REMOTE
WD34-ZSOX 28130 DI OPENED
WD34-MOVX 28130 DI CLOSED
PLC-RR101
WD34-BKRX 28130 TM 480VAC-3P WD31-MCCX-RR100
WD34-ZSOC 28130 LSR
WD34-HSAX 28130 OSC
WD34-HSGX 28130
WD34-MOVX 28130
WD34-DISC 28130

WD34-FITX 28104 AI PLC-RR101
WD34-BKRX 28104 TM 120VAC-1P PLC-RR101
WD34-FITX 28104 MAGNETIC
WD34-FEXX 28104

WD34-HSXX 28150 DI REMOTE
WD34-ZCOX 28150 DO OPEN PLC-RR100
WD34-ZCCX 28150 DO CLOSE
WD34-ZITX 28150 AI POSITION
PLC-RR101
WD34-BKRX 28150 TM 120VAC-1P WD31-PLCX-RR101
WD34-HSAX 28150 LSR
WD34-HSGX 28150 OSC
WD34-LCPX 28150
WD34-ZITX 28150
WD34-VALV 28150

WD34-ZCOX 28160 DO OPEN
WD34-ZCCX 28160 DO CLOSE
WD34-HSXX 28160 DI REMOTE
WD34-ZSOX 28160 DI OPENED
WD34-MOVX 28160 DI CLOSED
PLC-RR101
WD34-BKRX 28160 TM 480VAC-3P WD31-MCCX-RR100
WD34-ZSOC 28160 LSR
WD34-HSAX 28160 OSC
WD34-HSGX 28160
WD34-MOVX 28160
WD34-DISC 28160

WD34-ZCOX 28140 DO OPEN
WD34-ZCCX 28140 DO CLOSE
WD34-HSXX 28140 DI REMOTE
WD34-ZSOX 28140 DI OPENED
WD34-MOVX 28140 DI CLOSED
PLC-RR101
WD34-BKRX 28140 TM 480VAC-3P WD31-MCCX-RR100
WD34-ZSOC 28140 LSR
WD34-HSAX 28140 OSC
WD34-HSGX 28140
WD34-MOVX 28140
WD34-DISC 28140

WD34-PDITX 28151 AI PLC-RR101
WD34-PDITX 28151
PRESS DIFF
WD34-PE1X 28151

WD34-PITX 28106 AI PLC-RR101
WD34-PITX 28106
PRESSURE
WD34-PEXX 28106

HYPOCHLORITE INJECTION I-003 I-002 7
FLUORIDE INJECTION I-004 I-002 8
3/4" CLS
3/4" NAF
MM
DRAIN
SAMPLE TAP
SPARE TAP
WD34-FCVX 28150
WD34-PIXX 28150
H-STRAINER
FROM DISTRIBUTION SYSTEM
TO TREATMENT WATER DISTRIBUTION SYSTEM N-002 N-006
WELL WATER SAMPLE 5 I-002 I-005
WELL WATER 4 I-002 I-005 3/4" PW
WELL WATER 3 I-002 I-001 3/4" PW
AIR GAP 6 I-002 I-005
PUMP COLUMN RECHARGE/TO DISTRIBUTION 1 I-001 I-002
ANNULAR RECHARGE I-002 I-001 2
12" AS/AR
WD34-MOVX 28130
WD34-MOVX 28120
WD34-MOVX 28160
WD34-MOVX 28140

10" AS
12" AR
12"
12" AS
8" AF
8" AF
8" AF

WD34-MOVX-2812
WELL ANNULUS RECHARGE VALVE
1HP 480VAC 3PH

WD34-MOVX-2813
PUMP COLUMN RECHARGE VALVE
1HP 480VAC 3PH

WD34-FEXX-2810
WELL FLOW METER

WD34-VALV-2815
INJECTION FLOW CONTROL VALVE

WD34-MOVX-2816
WASTE VALVE
1HP 480VAC 3PH

WD34-PIXX-2815
RECHARGE LINE PRESSURE GAUGE

WD34-MOVX-2814
PRODUCTION VALVE
1HP 480VAC 3PH

WD34-PE1X-2815
RECHARGE LINE STRAINER DIFF PRESS

WD34-PEXX-2810
DISTRIBUTION SYSTEM PRESSURE

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WESTBROOK ASR WELL
WELL PUMP AND VALVES P&ID 2

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DRAWING NO. 09I02
SHEET NO. XX OF XX

1 2 3 4 5 6 7 8 9 10 11 12 13

A I/O
B POWER SOURCE
C FIELD
D
E
F
G

F WD33-LITX 28205 AI PLC-RR101

WD33-LITX 28204 AI PLC-RR101

WD33-HSXX 28211 DI REMOTE PLC-RR101
WD33-HCCX 28211 DO RUN PLC-RR101
WD33-SIXX 28211 AI SPEED IN PLC-RR101
WD33-SCXX 28211 AO SPEED OUT PLC-RR101
WD33-PUMP 28211 DI RUNNING PLC-RR101
WD33-YAFX 28211 DI FAILED PLC-RR101

WD33-HSXX 28221 DI REMOTE PLC-RR101
WD33-HCCX 28221 DO RUN PLC-RR101
WD33-SIXX 28221 AI SPEED IN PLC-RR101
WD33-SCXX 28221 AO SPEED OUT PLC-RR101
WD33-PUMP 28221 DI RUNNING PLC-RR101
WD33-YAFX 28221 DI FAILED PLC-RR101

WD33-FITX 28203 AI FLOW PLC-RR101

WD34-LSHX 28209 DI PLC-RR101

WW33-VFDX- 28211
VFD
120VAC-1P
WD31-LPXX-RR211

WW33-VFDX- 28221
VFD
120VAC-1P
WD31-LPXX-RR221

WD33-BKRX 28203 TM 120VAC-1P PLCX-RR101

E-STOP OO
WD33-HSUX 28211
WD33-HSEX 28211
WD33-LCPX 28211

WD33-PUMP 28211
WD33-HEAT 28211

E-STOP OO
WD33-HSUX 28221
WD33-HSEX 28221
WD33-LCPX 28221

WD33-PUMP 28221
WD33-HEAT 28221

F WD33-LITX 28205
F WD33-LEXX 28205 PRESSURE

WD33-LITX 28204
WD33-LEXX 28204 PRESSURE

2" VENT TO OUTSIDE BUILDING

WD33-PSHX 28211 PRESS SW
WD33-PIXX 28211
WD33-PEXX 28211

WD33-PSHX 28221 PRESS SW
WD33-PIXX 28221
WD33-PEXX 28221

WD33-FITX 28203 MAGNETIC
WD33-FEXX 28203

WD34-LSHX 28209
WD34-LEXX 28209

MM

HYPOCHLORITE INJECTION ON RECOVERY PIPE
3/4" CLS
7 I-003 I-002

F WD33-TANK 28205
2'D
DRAIN TO SUMP

WD33-TANK 28201
2'D
DRAIN TO SUMP

DRAIN TO SUMP

DRAIN TO SUMP

VENDOR SUPPLIED HYPOCHLORITE FEED SKID

FLUORIDE SYSTEM
9 I-004 I-003

SEWER

CONTAINMENT SUMP

WD33-TANK-2820 FUTURE HYPOCHLORITE TANK
WD33-LEXX-2820 FUTURE HYPO STORAGE TANK LEVEL
WD33-TANK-2820 HYPOCHLORITE TANK
WD33-LEXX-2820 HYPO STORAGE TANK LEVEL
WD33-PIXX-2821 HYPO FEED PUMP 1 PRESS GAUGE
WD33-PEXX-2821 HYPO FEED PUMP 1 PRESS HIGH
WD33-PUMP-2821 HYPOCHLORITE FEED PUMP 1 0.5HP 120VAC 1PH
WD33-PUMP-2822 HYPOCHLORITE FEED PUMP 2 0.5HP 120VAC 1PH
WD33-PIXX-2822 HYPO FEED PUMP 2 PRESS GAUGE
WD33-PEXX-2822 HYPO FEED PUMP 2 PRESS HIGH
WD33-FEXX-2820 HYPO DOSE FLOW
WD34-LEXX-2820 CONTAINMENT SUMP LEVEL SWITCH HIGH

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INSTRUMENTATION
WESTBROOK ASR WELL
SODIUM HYPOCHLORITE FEED SYSTEM P&ID

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DRAWING NO. 09I03
SHEET NO. XX OF XX

11843A10_P2 11843A1009I003.dwg

I/O

POWER SOURCE

FIELD

WD09-EWSS 28500 — DI — PLC-RR101

WD33-HSXX 28311 — DI REMOTE — PLC-RR101
WD33-HCCX 28311 — DO RUN — PLC-RR101
WD33-SIXX 28311 — AI SPEED IN — PLC-RR101
WD33-SCXX 28311 — AO SPEED OUT — PLC-RR101
WD33-PUMP 28311 — DI RUNNING — PLC-RR101
WD33-YAFX 28311 — DI FAILED — PLC-RR101
WD33-FITX 28311 — AI FLOW — PLC-RR101

WW33-VFDX- 28311
VFD
120VAC-1P
WD31-LPXX-RR311

WD33-BKRX 28311 — TM 120VAC-1P — PLCX-RR101

WD09-FSHX 28500
WD09-FEXX 28500

E-STOP
WD33-HSUX 28311
WD33-HSEX 28311 — OO
WD33-LCPX 28311

WD33-PUMP 28311
WD33-HEAT 28311

WD33-FITX 28311
MAGNETIC
WD33-FEXX 28311

WD33-SVXX 28311

WD33-PSHX 28311
PRESS SW
WD33-PEXX 28311
WD33-PIXX 28311

INSTANT HOT WATER HEATER

WD33-TANK 28310
WD33-TANK 28311
WD33-TANK 28311

POTABLE WATER
3/4" PW

S
WD33-FCVX 28303

WD33-TANK 28301
OVERFLOW
WD33-TANK 28302
M

SECONDARY CONTAINMENT

VENDOR SUPPLIED SODIUM FLUORIDE SYSTEM

MM

3/4" NAF
FLUORIDE INJECTION ON RECOVERY PIPE
8 — I-004 I-002

CONTAINMENT SUMP
9 — I-004 I-003

WD09-FEXX-2850
EMERGENCY EYEWASH & SHOWER

WD33-TANK-28311
WATER SOFTENER TANK 1

WD33-TANK-2830
SATURATOR TANK

WD33-PUMP-2831
FLUORIDE FEED PUMP
0.5HP 120VAC 1PH

WD33-PEXX-2831
FLUORIDE FEED PUMP PRESS HIGH

WD33-TANK-28310
SATURATION TANK

WD33-TANK-28311
WATER SOFTENER TANK 2

WD33-TANK-2830
SOLUTION TANK

WD33-PIXX-28311
FLUORIDE FEED PUMP PRESS GAUGE

WD33-FEXX-2831
FLUORIDE FLOW

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11843A10_P2 11843A1009I004.dwg

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PlotScale: 1:1
DesignScript: Carollo_Std_Pen_v0905.pen
ColorTable: gshade.ctb
Model: Layout1
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I/O

POWER SOURCE

FIELD

WD33-AITX 28305 AI FL PLC-RR101
WD33-AITX 28205 AI CL PLC-RR101
WD33-AITX 28404 AI TURB PLC-RR101
WD33-AITX 28405 AI COND PLC-RR101
WD33-SIXX 28411 AI SPEED IN PLC-RR101
WD33-SCXX 28411 AO SPEED OUT PLC-RR101
WD33-PUMP 28411 DI RUNNING PLC-RR101
WD33-YAFX 28411 DI FAILED PLC-RR101
WD33-HSXX 28411 DI REMOTE PLC-RR101
WD33-HCCX 28411 DO RUN PLC-RR101
WD33-LTXX 28401 AI PLC-RR101
WD33-LTXX 28402 AI PLC-RR101
WD33-LTXX 28403 AI PLC-RR101

WD33-BKRX 28305 TM 120VAC-1P PLCX-RR101
WD33-BKRX 28205 TM 120VAC-1P PLCX-RR101
WD33-BKRX 28404 TM 120VAC-1P PLCX-RR101
WD33-BKRX 28405 TM 120VAC-1P PLCX-RR101

WD33-VFDX- 28411
VFD
480VAC-3P
WD31-MCCX-RR400

WD33-AITX 28305 FL
WD33-AEXX 28305
WD33-AITX 28205 CL
WD33-AEXX 28205
WD33-AITX 28404 TURB
WD33-AEXX 28404
WD33-AITX 28405 COND
WD33-AEXX 28405

WD33-MWHX 28411
WD33-PUMP 28411

WD33-LTXX 28401 P-SUB
WD33-LEXX 28401
WD33-LTXX 28402 P-SUB
WD33-LEXX 28402
WD33-LTXX 28403 P-SUB
WD33-LEXX 28403

SAMPLE 5 I-002 I-005 1/2" SAM
WELL WATER 4 I-002 I-005 3/4" PW
AIR GAP 6 I-002 I-005 8" AF

HOSE BIB CHEMICAL ROOM
HOSE BIB OUTSIDE BUILDING
SEWER
BUG SCREEN
AIR GAP STRUCTURE
STORM DRAIN
MONITORING WELL 1
MONITORING WELL 2
MONITORING WELL 3

WD33-AEXX-2830 FLUORIDE ANALYZER
WD33-AEXX-2820 CHLORINE ANALYZER
WD33-AEXX-2840 WELL TURBIDITY
WD33-AEXX-2840 MONITORING WELL 1 CONDUCTIVITY ANALYZER
WD33-PUMP-2841 MONITORING WELL 1 PUMP
WD33-LEXX-2840 MONITORING WELL 1 LEVEL
WD33-LEXX-2840 MONITORING WELL 2 LEVEL
WD33-LEXX-2840 MONITORING WELL 3 LEVEL

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WATER QUALITY P&ID 1

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DRAWING NO. 09I05
SHEET NO. XX OF XX

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POWER SOURCE

FIELD

WD33-VCP 2871 MBTCP PLC-RR101

WD33-VCP 2872 MBTCP PLC-RR101

WD33-VCP 2873 MBTCP PLC-RR101

WD33-BKRX 2871 TM 120VAC-1P

WD33-BKRX 2872 TM 120VAC-1P

WD33-BKRX 2873 TM 120VAC-1P

WD33-LCPX 2871 FBV

WD33-LCPX 2872 FBV

WD33-LCPX 2873 FBV

WD34-ZCOX 28177 DO OPEN PLC-RR101

WD34-ZCCX 28177 DO CLOSE PLC-RR101

WD34-HSXX 28177 DI REMOTE PLC-RR101

WD34-ZSOX 28177 DI OPENED PLC-RR101

WD34-MOVX 28177 DI CLOSED PLC-RR101

WD33-FITX 28177 AI FLOW PLC-RR101

WD34-BKRX 28177 TM 480VAC-3P WD31-MCCX-RR100

WD33-BKRX 28177 TM 120VAC-1P PLCX-RR101

WD34-ZSOC 28177 LSR

WD34-HSAX 28177 OSC

WD34-HSGX 28177

WD34-MOVX 28177

WD34-DISC 28177

WD33-FITX 28177 MAGNETIC

WD33-FEXX 28177

VENDOR SUPPLIED FILTER

WD34-MOVX 28171B FBV

WD33-FLTR 28171

WD34-MOVX 28171C FBV

WD34-MOVX 28171A FBV

WD34-MOVX 28171D FBV

WD34-MOVX 28172B FBV

WD33-FLTR 28172

WD34-MOVX 28172C FBV

WD34-MOVX 28172A FBV

WD34-MOVX 28172D FBV

WD34-MOVX 28173B FBV

WD33-FLTR 28173

WD34-MOVX 28173C FBV

WD34-MOVX 28173A FBV

WD34-MOVX 28173D FBV

WD34-MOVX 28177

MM

AIR GAP STRUCTURE

BACKWASH TO SEWER

POTABLE WATER TO DISTRIBUTION

POTABLE WATER SAMPLE

WELL WATER 3/4" PW

WELL WATER 3/4" PW

WELL WATER N-002 N-006

WD33-FLTR-28171 MOUNTED WATER FILTER 1

WD33-FLTR-28172 MOUNTED WATER FILTER 2

WD33-FLTR-28173 MOUNTED WATER FILTER 3

WD34-MOVX-2817 FLOW CONTROL VALVE 1HP 480VAC 3PH

WD33-FEXX-2817 BACKWASH MAG FLOW

50% DESIGN SUBMITTAL NOT FOR CONSTRUCTION

REV	DATE	BY	DESCRIPTION

DESIGNED JLH
DRAWN SGS
CHECKED DEB
DATE OCTOBER 2021

REGISTERED PROFESSIONAL ENGINEER DANIEL ROBINSON No. 20405 ELECTRICAL STATE OF CALIFORNIA

carollo

CITY OF ROSEVILLE CALIFORNIA

CITY OF ROSEVILLE

AQUIFER STORAGE AND RECOVERY WELLS PROJECT

INSTRUMENTATION

WESTBROOK ASR WELL
PACKAGED/SKID MOUNTED WATER FILTERS P&ID

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 11843A.10
DRAWING NO. 09I06
SHEET NO. XX OF ~~99~~ XX

Plot Date: 12-OCT-2021 1:22:15 PM
User: svcPW
PlotScale: 1:1
DesignScript: Carollo_Std_Pen_v0905.pen
ColorTable: gshade.ctb
Model: Layout1
CYoung

11843A10_P2 11843A1009I006.dwg

CITY OF ROSEVILLE
ROSEVILLE, CALIFORNIA

AQUIFER STORAGE AND RECOVERY WELLS PROJECT
WESTBROOK AND SOLAIRE ASR WELLS

CLIENT PROJECT NO. 500157

TECHNICAL SPECIFICATIONS

50% DESIGN SUBMITTAL

VOLUME 3 OF 3

OCTOBER 2021

This document is released for the purpose of information exchange review and planning only under the authority of Christopher T. Cleveland, October 2021, California PE No. 72713. It is not to be used for bidding, permit, or construction purposes.

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pw://Carollo/Documents/Client/CA/Roseville/11843A10/Specifications/00002

CITY OF ROSEVILLE

AQUIFER STORAGE AND RECOVERY WELLS PROJECT
WESTBROOK AND SOLAIRE ASR WELLS

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SECTION 01140

SPECIAL PROJECT CONSTRAINTS

PART 1 GENERAL

1.01 SUMMARY

A. Water projects:
   1. Conduct Work such that the Owner's ability to meet its customer's demands for treated drinking water shall not be impaired or reduced in terms of the required quantity or quality of treated water. Do not impair the operational capabilities of essential elements of the treatment process or reduce treatment capacity below levels sufficient to meet demands for water throughout the contract time. The quantities of and quality of treated water required are described in this Section.
   2. Conduct commissioning activities as specified in Section 01756 - Commissioning in a manner that will not impair capabilities of essential elements of the treatment process or reduce treatment capacity below levels sufficient to meet demands for water throughout the contract time. The quantities of and quality of treated water required are described in this Section.
   3. PCIS Optimization and Fine-Tuning as specified in Section 01756 - Commissioning.
   4. The status of the treatment plant shall be defined as "operational" when the plant is capable of meeting the Owner's customer's demands for treated drinking water in terms of the required quantity or quality of treated water as defined in this Section.

1.02 LIMIT OF CONSTRUCTION ACTIVITIES ON WORK SITE

A. Traffic Control:
   1. During non-work hours, the CONTRACTOR shall keep all lanes of traffic open and clear. All trenches shall be backfilled or covered with suitable steel plates and open to traffic.
   2. No equipment, construction material or excavated material that will interfere with traffic shall be stored on streets or roadways at any time.

1.03 SEQUENCE OF WORK

A. General:
   1. The CONTRACTOR shall schedule and sequence their work to complete the Work by the specified completion date.
   2. The OWNER’s water distribution, recycled water, sewer collection and storm drain systems must remain operational at all times, with scheduled shutdowns as necessary to complete the Work and with prior approval of Owner, as described herein.
   3. Re-vegetation of graded areas shall take place as quickly as possible as weather permits.

1.04 PROJECT CONSTRAINTS

A. Maintenance of OWNER's Operations:
   1. Constraints listed herein involve limits on activities during construction. These limits relate to the critical nature of the existing water system.
   2. Continuous operation of OWNER's facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.
   3. Work Plan:
      a. The CONTRACTOR shall submit a detailed Work Plan and time schedule for all construction activities that will make it necessary to remove a tank, pipeline, electrical circuit, equipment, structure, road or other facilities from service, including the critical outages identified herein.
      b. The Work Plan shall, at a minimum, identifying:
         1) The date and time when each activity will occur.
         2) What equipment will be present including standby equipment.
         3) What assistance will be required by OWNER's operating personnel.
         4) An emergency backup plan identifying what action will be taken if Work cannot be completed within the allotted time.
         5) What individual will be in charge of the activity.
      c. Submit Work Plan 10 working days prior to the scheduled activity.
   4. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of OWNER's operations.
   5. Shutdowns:
      a. Coordinate proposed Work with OWNER and facility operations personnel before affecting unit shutdowns. The CONTRACTOR shall provide written confirmation of the shutdown date and time five (5) working days prior to the actual shutdown.
      b. Under no circumstances shall the CONTRACTOR cease Work at the end of a normal working day or at the end of a working week if such actions may inadvertently cause a cessation of any facility operating process, in which case, remain onsite until necessary repairs are complete.
   6. Do not close lines, open valves or gates, shut down equipment, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after approval of OWNER.
   7. Do not proceed with Work affecting a facility's operation without obtaining OWNER's advance approval of the need for and duration of such Work.

B. Relocation of Existing Facilities:
   1. During construction, it is expected that minor relocations of Work will be necessary.
   2. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.
   3. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
   4. Perform relocations to minimize downtime of existing facilities.
   5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by OWNER.

C. Hours of Work and Overtime:
    1. Normal working hours at the Construction Site for the project shall be 7 a.m. to 5 p.m., weekdays, no work during the weekend nor during City observed holidays.
        a. Conduct Work outside normal working hours only after obtaining prior written consent and approval from the OWNER.
            1) Contractor shall request work-hour variations in writing, a minimum of ten (10) days prior to the start of the proposed work period.
            2) Contractor shall not rely on approval of work outside of normal working hours without prior consent of the OWNER. Approval shall be at the sole discretion of the OWNER.
        b. Contractor will develop Project Schedule assuming work during normal working hours only.
    2. All overtime Work by the CONTRACTOR necessary to conform to the requirements of this Section and related Sections shall be performed by the CONTRACTOR, at no cost to the OWNER and shall be performed in accordance with the Agreement. The CONTRACTOR shall make no claims for extra compensation as a result thereof.

1.05 CONSTRUCTION SEQUENCING CONSTRAINTS

A. Shutdown activities:
    1. Scheduling:
        a. Perform between the hours of 7 a.m. and specific construction sequencing constraints other than those listed in this section or other Specification sections have been determined at the time of Final Design.

B. Construction sequencing constraints will be developed by Design-Assist Team as necessary.

1.06 PROJECT STAFFING

A. Project superintendent (Job Superintendent, serving as resident Superintendent and Contractor's authorized representative), employed by the Contractor, shall be on-site five days per week for 8 hours a day and in Dewatering of existing process and disposal of residue:
    1. When the Owner has turned the process unit over to the Contractor for modification or temporary use, the Contractor is responsible for costs and procedures required to dewater and dispose of liquid, solids, etc. in the process unit.
        a. Drainage and disposal of process unit liquids, solids, etc. into another treatment process unit on the plant site may be allowed if approved in advance by the Engineer and Owner, and is conducted in accordance with Owner's requirements.
        b. Costs for dewatering, disposal of solids and residuals, and preparation of surfaces for the Work are Contractor's responsibility.
            1) Includes tipping fees for the removal and disposal of the grit/debris.
        c. Dewatering of grit/debris to meet landfill requirements is the responsibility of the Contractor.

B. Contractor shall provide adequate time in schedules for draining and cleanup.

1.07 METHOD OF PROCEDURE (MOP)

A. Comply with MOP Instructions as specified in Attachment A - Method of Procedure (MOP).

B. Prepare MOP for the following conditions:
   1. Shutdowns, diversions, and tie-ins to the existing facility.
   2. Process start-up activities.
   3. Power interruption and tie-ins.
   4. Switch over between temporary and permanent facilities, equipment, piping, and electrical and instrumentation systems.
   5. Process constraints requiring interruption of operating processes or utilities.

C. Other Work not specifically listed may require MOPs as determined necessary by the Contractor, Owner, or Engineer. Qualified Storm Water Pollution Prevention Plan (SWPPP) Practitioner (QSP), employed by Contractor, must be on call to come to the site when a Rain Event Action Plan (REAP) needs to be prepared.

1.08 STORMWATER MANAGEMENT

A. CONTRACTOR responsible for stormwater management for the duration of the project.

B. No consideration will be given to claims of additional time and cost associated to preparing MOPs required by the Owner and Engineer to complete this work in a manner that facilitates proper operation of the facility and compliance with effluent discharge criteria.

C. Submittals:
   1. Submit Baseline Schedule, as specified in Section 01321 - Schedules and with proposed MOPs.
   2. Submit MOP Log at construction progress meetings.
   3. Submit the following for each shutdown:
      a. Attachment B - Method of Procedure (MOP) Form.
      b. Attachment C - Readiness Checklist.
      c. Attachment D - Safety Checklist.
      d. Attachment E - Method of Procedure (MOP) Log.

1.09 OPERATIONS AND MAINTENANCE ACCESS

A. Provide safe, continuous access to process control equipment for plant operations personnel.

B. Provide access on 1-hour advance notice to process control equipment for plant maintenance personnel and associated maintenance equipment.

1.10 UTILITIES

A. Provide advance notice to and utilize services of Underground Services Alert (U.S.A.) for location and marking of underground utilities operated by utility agencies other than the Owner.

B. New yard utilities were designed using existing facility drawings.
   1. Field verification of utilities locations was not performed during design.
   2. Services crossed or located nearby by new yard utilities may require relocation and possible shutdowns.
   3. Pipe alignments as indicated on the Drawings.

PART 2 PRODUCTS

2.01 PRODUCTS

A. All material that contacts potable water shall be "lead free" to the extent defined in theCalifornia Assembly Bill 1953 Chapter 853 and NSF 61 approved.

PART 3 EXECUTION

Not Used.

END OF SECTION

ATTACHMENT A - METHOD OF PROCEDURE (MOP)

"METHOD OF PROCEDURE" (MOP)
Instructions and Forms

Definition and Purpose

"Method of Procedure" (MOP) is a detailed document submitted by the Contractor to request process shutdown(s), utility tie-in(s), work in areas that may risk unanticipated outages, or flow diversions to accommodate site construction activities during a project. Such activities may include (but are not limited to) new tie-ins to utilities or structures, mechanical modifications to process piping or equipment, demolition, bulkhead installation, and cleaning processes.

The MOP provides a detailed plan to the Owner and Engineer that describes specific aspects of the work including purpose, time of execution, and anticipated impacts on treatment processes. The MOP also includes contingency measures and provisions for rapid closure in the event that shutdown or work progress difficulties are encountered. Information from relevant trades associated with the requested shutdown, diversion, or tie-in is also included.

The Owner should use the information within the MOP to define operational procedures and methods to safely and successfully assist the Contractor.

MOP Process Summary

WHO	STEP	TIMING
Contractor	1. Identify MOPs needed on MOP Log and Baseline Schedule.	No later than 7 days prior to Preconstruction Scheduling Meeting
Contractor, Owner, Engineer	2. Pre-MOP Meeting.	More than 28 days prior to work
Contractor	3. Submits MOP.	No later than 28 days prior to work
Owner	4. Reviews MOP.	
Owner	5. MOP finalized.	No later than 7 days prior to work
Contractor	6. Complete Readiness Checklist.	No later than 5 days prior to work
Contractor	7. Complete Safety Checklist.	Immediately prior to commencing work
Contractor	8. Complete Work.	
Contractor	9. Update MOP Log and Progress Schedules.	Monthly

MOP Process Detail

STEP 1. Identifies MOPs needed on MOP Log and Baseline Schedule.

Contractor submits a preliminary list of anticipated project MOPs on MOP Log. MOPs identified but not limited to those shutdowns, diversions, or tie-ins described in the Contract Documents. Incorporate MOPs as tasks in Baseline Schedule. Date scheduled MOPs to coincide with the appropriate construction activities.

STEP 2. Pre-MOP Meeting.

Contractor requests a Pre-MOP Meeting with the Owner and Engineer to discuss the nature of the shutdown, diversion, or tie-in, and to gather the information necessary to complete the MOP Form. The pre-MOP meeting may be waived by the Owner or Engineer if the work is deemed to be minor.

STEP 3. Submits MOP.

Contractor completes the MOP Form and submit 3 copies for approval to the Owner's Project Manager (OPM).

STEP 4. Reviews MOP.

OPM distributes MOP Form for review by the Owner's Construction Coordinator, O&M Representative, and Engineer's Project Representative. Review MOP Form for completeness, accuracy, compliance with both the construction schedule, constraints defined in contract documents, and to ensure that the requested work does not negatively impact plant operations or other concurrent project activities. Additional information may be requested to better understand the nature of and method for completing the Work.

STEP 5. MOP finalized.

Once the MOP is agreed to by all parties, the MOP will be finalized by signature. Copies are distributed to the Owner, Engineer, and Contractor.

STEP 6. Complete Readiness Checklist.

Contractor verifies everything is ready for the work.

STEP 7. Complete Safety Checklist.

Contractor ensures safety.

STEP 8. Complete work.

Contractor complete work.

STEP 9. Update MOP Log and Progress Schedules.

Contractor updates MOP Log weekly and distributes at the regularly scheduled construction progress meetings.

ATTACHMENT B - METHOD OF PROCEDURE (MOP) FORM

METHOD OF PROCEDURE (MOP) FORM

Owner: _____ **Date:** _____

Contractor: _____ **Carollo Project No.:** _____

Project Name: _____ **Submittal No.:** _____

Submittal Title: _____ **Spec/Dwg. Reference:** _____

MOP #	Task Title *(Provide <10 word title)*:	Submittal Date: *(No later than 28 days prior to work)*

SCHEDULE OF WORK ACTIVITY START: *(Date/Time)* END: (Date/Time)

REQUESTOR:

PRIMARY POINT OF CONTACT: PHONE/PAGER:

SECONDARY POINT OF CONTACT: PHONE/PAGER:

NOTIFY ☐ Control Room, Phone ☐ Security, Phone

BUILDING: LOCATION OF WORK FLOOR/LEVEL:

DESCRIPTION OF WORK: *(Provide sufficient details on process isolation, work sequencing, and safety (i.e., control of significant hazards unique to the work) to demonstrate an understanding of the work and how it will be completed within the constraints, and its impact on the processes and facility.)*

Task Summary: _____

Processes Affected: _____

Trades Affected: _____

WORK PLAN:

Work Sequencing: _____

Process Isolation: _____

Spill Prevention Plan: _____

Contingency Plans: _____

CRITICAL EQUIPMENT/TOOLS: *(pumps and discharge hoses with correct fittings, blind flanges and pipe plugs, no-hub fittings, properly sized electrical service components, generators, portable lighting, chlorine for potable water pipe breaks, etc.)*

☐	Acoustic Ceiling/or Walls Access	☐	Excavation Permit	☐	Lock Out/Tag Out
☐	Chemical Use Approval	☐	Fire Sprinkler Impairment	☐	Life Safety Systems
☐	Confined Space Permit	☐	Flammable Materials	☐	Roof Protocol
☐	Critical Lift Plan	☐	Flush / Discharge	☐	Work After Dark
☐	Energized Electrical Work	☐	High Pressure Test	☐	
☐	Elect. Panel Schedules	☐	Hot Work/Open Flame	☐	

EXISTING SERVICE(S) AT RISK:

☐	Breathing Air	☐	Elect Normal	☐	Process Access	☐	Telephones
☐	Chemical Distribution	☐	Fire Protection	☐	Safety Showers	☐	UPS
☐	City Water	☐	HVAC	☐	SCADA	☐	VAX/DATA
☐	Communication	☐	Inert Gas	☐	Security	☐	
☐	Domestic Drain	☐	Instrument - Air	☐	Solvent Drain	☐	
☐	Elect-Bus Duct	☐	Life Safety System	☐	Specialty Gases	☐	

☐	Elect Emergency	☐	Natural Gas	☐	Storm Drain	☐	
REVIEWER'S INSTRUCTIONS / COMMENTS:							
☐	PREJOB BRIEFING MUST BE COMPLETED PRIOR TO COMMENCING WORK:						

	Full Name (printed)	Signature	Phone	Date
Submitted By				
System Owner				
Reviewer (if needed)				
Reviewer (if needed)				
Reviewer (if needed)				
Reviewer (if needed)				

ATTACHMENT C - READINESS CHECKLIST

READINESS CHECKLIST
(5 days prior to work)

Checklist provided as a guide but is not all inclusive.

1. Confirm all parts and materials are on site: _____
2. Review work plan: _____
3. Review contingency plan: _____

ATTACHMENT D - SAFETY CHECKLIST

SAFETY CHECKLIST
(Just prior to commencing work)

Checklist provided as a guide but is not all inclusive.

1. Location awareness:
   a. Emergency exits: _____
   b. Emergency shower and eyewash: _____
   c. Telephones and phone numbers: _____
   d. Shut-off valve: _____
   e. Electrical disconnects: _____
2. Inspect work area:
   a. Take time to survey the area you are working in. Ensure that what you want to do will work. Do you have enough clearance? Is your footing secure? Do you have adequate lighting and ventilation? Are surrounding utilities out of the way for you to perform your work?
3. SDS (Safety Data Sheets):
   a. Understand the chemicals and substances in the area you are working in by reading the SDS.
4. Lockout/Tagout Procedure:
   a. Lockout/tagout energy sources before beginning work.
   b. Make sure all valves associated with the work are locked out and tagged out on each side of the penetration.
   c. Make sure the lines are depressurized.
5. Overhead work:
   a. Use appropriate personal protective equipment; i.e., safety harness, lifeline, etc.
   b. Select appropriate tie-off points; i.e., structurally adequate, not a pipe or conduit, etc.
   c. Spotter assigned and in position.
   d. Pipe rack access; i.e., check design capacity, protective decking or scaffolding in place, exposed valves or electrical switches identified and protected.
6. Safety equipment:
   a. Shepherd's hook.
   b. ARC flash protection.
   c. Fire extinguisher.
   d. Other: _____.
7. Accidents:
   a. Should accidents occur, do not shut off and do not attempt to correct the situation, unless you are absolutely positive that your action will correct the problem and not adversely affect other people or equipment.
8. Review process start-up documents:
   a. In the event the system is shutdown, the Control Center should have a working knowledge of the process start-up procedures in order to deal effectively with unforeseen events.
9. Evacuation procedures:
   a. Do not obstruct evacuation routes.
   b. Take time to survey the area for evacuation routes.

ATTACHMENT E - METHOD OF PROCEDURE (MOP) LOG

METHOD OF PROCEDURE (MOP) LOG
Sample

MOP Number	Task Title	Date Requested	Date Approved	Date Work Planned	Work Completed (yes/no)
001					
002					
003					

SECTION 01322

WEB BASED DOCUMENT CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. The project team will use and maintain a web-based database as the primary means of communication related to the Project's correspondence, submittals, requests for information (RFIs), advisory notices, and non-compliance issues. Correspondence from the Contractor shall be sent to the Construction Manager via the PROCORE System.

B. The Construction Manager and Contractor shall utilize PROCORE's system for electronic submittal of all data and documents (unless specified otherwise by the Construction Manager) throughout the duration of the Contract. PROCORE is a web-based electronic media site that is hosted by PROCORE LLC utilizing their PROCORE web solution. PROCORE will be made available to all Contractor's project personnel. The joint use of this system is to facilitate; electronic exchange of information, automation of key processes, and overall management of the Contract. PROCORE shall be the primary means of project information submission and management. When required by the Construction Manager, paper documents will also be required. In the event of discrepancy between the electronic version and paper documents, the paper documents will govern. PROCORE is a registered trademark of PROCORE LLC.

1.02 USER ACCESS LIMITATIONS

A. The Construction Manager will control the Contractor's access to PROCORE by allowing access and assigning user profiles to accepted Contractor personnel. User profiles will define levels of access into the system; determine assigned function-based authorizations (determines what can be seen) and user privileges (determines what they can do).

1.03 AUTOMATED SYSTEM NOTIFICATION AND AUDIT LOG TRACKING

A. Review comments made (or lack thereof) by the Construction Manager and Design Consultant on Contractor submitted documentation shall not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. The Construction Manager's acceptance via automated system notifications or audit logs extends only to the face value of the submitted documentation and does not constitute validation of the Contractor's submitted information.

1.04 CONTRACTOR RESPONSIBILITY

A. The Contractor shall be responsible for the validity of their information placed in PROCORE and for the abilities of their personnel. Accepted users shall be knowledgeable in the use of computers, including Internet Browsers, email

programs, CAD drawing applications, and Adobe Portable Document Format (PDF) document distribution program. Adobe PDF documents will be created through electronic conversion rather than optically scanned whenever possible. The Contractor is responsible for the training of their personnel in the use of PROCORE (outside what is provided by the Construction Manager) and the other programs indicated above as needed.

1.05 USER ACCESS ADMINISTRATION

A. Provide a list of Contractor's key PROCORE personnel for the Construction Manager's acceptance. The Construction Manager is responsible for adding and removing users from the system. The Construction Manager reserves the right to perform a security check on all potential users.

1.06 CONNECTIVITY PROBLEMS

A. PROCORE is a web-based environment and therefore subject to the inherent speed and connectivity problems of the Internet. The Contractor is responsible for its own connectivity to the Internet. PROCORE response time is dependent on the Contractor's equipment, including processor speed, Internet access speed, etc. and current traffic on the Internet. The Owner and Construction Manager will not be liable for any delays associated from the usage of PROCORE including, but not limited to: slow response time, down time periods, connectivity problems, or loss of information. The Contractor will ensure that its connectivity to the PROCORE system (whether at the home office or job site) is accomplished through some form of high-speed communications with 128 kb/s as the minimum bandwidth requirements for using the system. It is recommended a faster connection be used when uploading pictures and files into the system. Under no circumstances shall the usage of PROCORE be grounds for a time extension or cost adjustment to the Contract. If there are problems that persist with the PROCORE site for more than 24 consecutive hours that prevent the electronic submission of data by the Contractor, the Contractor may submit documents in paper form to the Construction Manager until such time that the Construction Manager notifies the Contractor that the PROCORE site is operable and available for use. Construction Manager shall likewise send documents to Contractor in paper form during such disruption of the PROCORE system.

1.07 TRAINING

A. The Construction Manager has arranged for the following training to be provided to the Contractor. The Construction Manager will provide a one-hour training class to the Contractor within ten (10) days of NTP at a time mutually agreeable to Contractor and Construction Manager. Thereafter the Construction Manager will provide up to one hour of additional training via telephone during the project per month of the project life.

PART 2 PRODUCTS

2.01 GENERAL

A. In order to process correspondence, submittals, and RFIs, the Contractor must provide and have in place for its own use the required basic components outlined below.
   1. Hardware:
      a. A computer with internet access and sufficient capabilities to perform all project duties; a scanner at least large enough to scan 11-inch by 17-inch sheets with sufficient resolution to maintain clarity and legibility of the document at its native size; and a color printer of sufficient size and capacity to accept incoming correspondence as described in this section.
   2. Software:
      a. Adobe Acrobat 9 or higher; Microsoft's Internet Explorer v7 or higher; Microsoft Office 2010 or higher, including but not limited to Microsoft Word and Microsoft Excel.
      b. PROCORE currently supports Mozilla's Firefox v3.5 and newer, Apple's Safari v4 and newer, Google Chrome, and Microsoft's Internet Explorer v7 and v8 web browsers for accessing the application. Certain functions may not be available when using any program other than the newest version of Microsoft's Internet Explorer.
   3. Facilities:
      a. The Contractor shall make its own arrangements to provide high-speed (minimum speed: download 1Mbps/upload 256Kbps) internet connection for its own use as soon as practicable.

PART 3 EXECUTION

3.01 SUMMARY

A. Items to be uploaded to PROCORE by the Construction Manager include but are not limited to: RFI responses, Submittal comments, Clarification letters, Design Clarifications, Field Orders, et al. These items will be emailed via PROCORE as attachments in PDF file format via PROCORE. These attachments may include files that need to be viewed and/or printed in color. Formal letters, stop notices, Field Orders, Progress Payment Requests, and Contract Change Orders will always include a wet- signed hard copy.

B. Items to be uploaded to PROCORE by the Constructor include but are not limited to: RFI, Submittals, Request for Clarification letters, Request for Design Clarification letters, et al. These items will be emailed via PROCORE as attachments in PDF file format via PROCORE. These attachments may include files that need to be viewed and/or printed in color. Contractor shall provide wet-signed hard copies of documents required by Contract Documents, as well as any documents requested by the Construction Manager, including but not limited to: Formal letters, Progress Payment Requests, and Contract Change Orders, et al.

3.02 PROCURE UTILIZATION

A. All project related correspondence (RFIs, submittals, etc.) originated by the Contractor or Subcontractor, Supplier, et al. shall be directed to the Construction Manager, unless otherwise indicated in the Specifications.

3.03 SUBMITTALS

A. The use of the electronic communication does not waive the requirement for the provision of hard copies of all formal correspondence and submittals. The hard copies of all documents must match the electronic copies of all correspondence and submittals.

B. Submittals shall be in accordance with Section 01300. The provisions of Section 01300 shall apply both to electronic copies and hard copies of submittals.

C. In addition to above, PROCORE shall be utilized in connection with submittal preparation and information management required by but not limited to Sections:
   1. Section 01321 - Schedules and Reports.
   2. Section 01300 - Submittals.

D. PROCORE will be utilized by all other Sections not listed above and as required by the Construction Manager.

E. If a submittal package has multiple items that are not directly related, each item shall be considered a separate submittal and shall be sent separately. For example, “Concrete Mix Design,” and “Concrete Curing Compound” shall be submitted as separate items to the Construction Manager.

3.04 TERMINATION IN USE

A. The Owner may request a termination of the use of PROCORE for the electronic submission of data, and alternatively the use of paper documents submitted in accordance with the Contract Documents by providing notification in writing with ten (10) days’ notice that it intends to discontinue use of PROCORE.

3.05 ADOBE PDF

A. All information, comments, questions, and statements shall be scanned and/or converted to the PDF file format and attached to the email via PROCORE. Items to be sent via email via PROCORE include but are not limited to large-format plan sheets (22-inch by 34-inch or larger), small-format plan sheets, pages within tabbed binders, RFIs, transmittal sheets, et al. The PDF attachments supplied to the Construction Manager shall be in a sufficient resolution to be fully legible at its native size.

B. All separate files within a given piece of correspondence shall be combined into a single PDF document (e.g., An RFI that contains a text file and two photo files shall be combined into a single PDF document prior to delivery to the Construction Manager.)

3.06 LABELING FORMAT

A. The subject line of each email via PROCORE, and the file name of any attached files, shall be in accordance with Section 01330-1.3.A.2 for submittals and as directed by Construction Manager other correspondence (RFIs, Letters, Transmittals, Proposed Change Orders, et al.).

B. Label shall include the type of correspondence (i.e., RFI, etc.), a unique number, sequentially assigned for the given piece of correspondence. The Contractor will indicate the subject at the end of the numbering scheme with a description (key words) of the item. Each piece of correspondence shall be sent in a separate email via PROCORE.

3.07 ORIGINAL DOCUMENTS

A. Where possible, the Contractor will obtain the electronic document from its original source to maintain the integrity, legibility, and searchability of the document.

3.08 ORGANIZATION

A. The information included in the attachments shall be organized in a logical and thoughtful manner. Where the information originated in a tabbed format (a binder, for example), the scanned and/or converted PDF file shall be electronically bookmarked accordingly using the “bookmark” function of Adobe Acrobat 9 Std.

3.09 PRINTING

A. Except where otherwise indicated, the Contractor will receive no hard copies of the above outlined correspondence. The Contractor will be required to print for its use, in color if necessary, any record copies, field copies, sub-Contractor copies, etc., if such copies are desired.

3.10 PROJECT FORMS

A. The Contractor may use its own correspondence forms to be attached to correspondence emails via PROCORE as long as the Contractor’s forms comply with this and all submittal sections.

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Requirements and procedures for submittals to confirm compliance with Contract Documents.

1.02 GENERAL INSTRUCTIONS

A. Contractor is responsible to determine and verify field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and check and coordinate each item with other applicable approved shop drawings and Contract Document requirements.

B. Provide submittals:
   1. That are specified or reasonably required for construction, operation, and maintenance of the Work.
   2. That demonstrate compliance with the Contract Documents.

C. Where multiple submittals are required, provide a separate submittal for each specification section.
   1. In order to expedite construction, the Contractor may make more than 1 submittal per specification section, but a single submittal may not cover more than 1 specification section:
      a. The only exception to this requirement is when 1 specification section covers the requirements for a component of equipment specified in another section.
      b. For example, circuit breakers are a component of switchgear. The switchgear submittal must also contain data for the associated circuit breakers, even though they are covered in a different specification section.

D. Prepare submittals in the English language. Do not include information in other languages.

E. Present measurements in customary American units (feet, inches, pounds, etc.).

F. Must be clear and legible, and of sufficient size for presentation of information.

G. Page size other than drawings:
   1. Minimum page size will be 8 1/2 inches by 11 inches.
   2. Maximum page size will be 11 inches by 17 inches.

H. Drawing sheet size:
   1. Maximum sheets size: 22-inch by 34-inch.
      a. Minimum plan scale: 1/8-inch equals 1 foot-0 inches.
      b. Minimum font size: 1/8 inch minimum.
   2. 11-inch by 17-inch sheet:
      a. Minimum plan scale: 1/8-inch equals 1 foot-0 inches.
      b. Minimum font size: 1/8 inch minimum.

I. If submittal is more than 80 pages, additionally provide hardcopy.

J. Show dimensions, construction details, wiring diagrams, controls, manufacturers, catalog numbers, and all other pertinent details.

K. Provide submittal information from only 1 manufacturer for a specified product. Submittals with multiple manufacturers for 1 product will be rejected without review.

1.03 SUBMITTAL ORGANIZATION

A. Organize submittals in exactly the same order as the items are referenced, listed, and/or organized in the specification section.

B. For submittals that cover multiple devices used in different areas under the same specification section, the submittal for the individual devices must list the area where the device is used.

C. Bookmarks:
   1. Bookmarks shall match the table of contents.
   2. Bookmark each section (tab) and heading.
   3. Drawings: Bookmark at a minimum, each discipline, area designation, or appropriate division.
   4. At file opening, display all levels of bookmarks as expanded.

D. Where applicable (i.e., except for drawings, figures, etc.) submittal content shall be electronically searchable utilizing the PDF file as submitted.

E. Thumbnails optimized for fast web viewing.

F. Sequentially number pages within the tabbed sections:
   1. Submittals that are not fully indexed and tabbed with sequentially numbered pages, or are otherwise unacceptable, will be returned without review.

G. Attachments:
   1. Specification section: Include with each submittal a copy of the relevant specification section.
      a. Indicate in the left margin, next to each pertinent paragraph, either compliance with a check (√) or deviation with a consecutive number (1, 2, 3).
      b. Provide a list of all numbered deviations with a clear explanation and reason for the deviation.
   2. Drawings: Include with each submittal a copy of the relevant Drawing, including relevant addendum updates.
      a. Indicate either compliance with a check (√) or deviation with a consecutive number (1, 2, 3).

b. Provide a list of all numbered deviations with a clear explanation and reason for the deviation.
c. Provide field dimensions and relationship to adjacent or critical features of the Work or materials.

H. Contractor: Prepare submittal information in sufficient detail to show compliance with specified requirements.
1. Determine and verify quantities, field dimensions, product dimensions, specified design and performance criteria, materials, catalog numbers, and similar data.
2. Coordinate submittal with other submittals and with the requirements of the Contract Documents.
3. Check, verify, and revise submittals as necessary to bring them into conformance with Contract Documents and actual field conditions.

I. Contractor: Prepare “Or Equal” submittal information.
1. Provide standard submittal requirements.
a. In addition, provide in sufficient detail to show reason for variance from specified product and impacts.
2. Provide reason the specified product is not being provided.
3. Explain the benefits to the Owner for accepting the “Or Equal”.
4. Itemized comparison of the proposed “Or Equal” with product specified including a list of significant variations:
a. Design features.
b. Design dimensions.
c. Installation requirements.
d. Operations and maintenance requirements.
e. Availability of maintenance services and sources of replacement materials.
5. Reference projects where the product has been successfully used:
a. Name and address of project.
b. Year of installation.
c. Year placed in operation.
d. Name of product installed.
e. Point of contact: Name and phone number.
6. Define impacts:
a. Impacts to other contracts.
b. Impacts to other work or products.
7. Contractor represents the following:
a. Contractor bears the burden of proof of the equivalency of the proposed “Or Equal”.
b. Proposed “Or Equal” is equal or superior to the specified product.
c. Contractor will provide the warranties or bonds that would be provided on the specified product on the proposed “Or Equal”, unless Owner requires a Special Warranty.
d. Contractor will coordinate installation of accepted “Or Equal” into the Work and will be responsible for the costs to make changes as required to the Work.
e. Contractor waives rights to claim additional costs caused by proposed “Or Equal” which may subsequently become apparent.

J. Contractor: Prepare substitution submittal information.
    1. Provide standard submittal requirements.
        a. In addition, provide in sufficient detail to show reason for variance from specified product and impacts.
    2. Provide reason the specified product is not being provided.
    3. Explain the benefits to the Owner for accepting the substitution.
    4. Itemized comparison of the proposed substitution with product specified including a list of significant variations:
        a. Design features.
        b. Design dimensions.
        c. Installation requirements.
        d. Operations and maintenance requirements.
        e. Availability of maintenance services and sources of replacement materials.
    5. Reference projects where the product has been successfully used:
        a. Name and address of project.
        b. Year of installation.
        c. Year placed in operation.
        d. Name of product installed.
        e. Point of contact: Name and phone number.
    6. Define impacts:
        a. Impacts to Contract Price.
            1) Required license fees or royalties.
            2) Do not include costs under separate contracts.
            3) Do not include Engineer’s costs for redesign or revision of Contract Documents.
        b. Impacts to Contract Time.
        c. Impacts to Contract Scope.
        d. Impacts to other contracts.
        e. Impacts to other work or products.
    7. Contractor represents the following:
        a. Contractor shall pay associated costs for Engineer to evaluate the substitution.
        b. Contractor bears the burden of proof of the equivalency of the proposed substitution.
        c. Proposed substitution does not change the design intent and will have equal performance to the specified product.
        d. Proposed substitution is equal or superior to the specified product.
        e. Contractor will provide the warranties or bonds that would be provided on the specified product on the proposed substitution, unless Owner requires a Special Warranty.
        f. Contractor will coordinate installation of accepted substitution into the Work and will be responsible for the costs to make changes as required to the Work.
        g. Contractor waives rights to claim additional costs caused by proposed substitution which may subsequently become apparent.

1.04 SUBMITTAL METHOD AND FORMAT

A. Submittal identification numbering:
   1. Number each submittal using the format defined below:

	Spec Section Number	Dash	Initial Submittal - Sequential Number	Decimal Point	Subsequent Submittal Revisions Sequential Number
Example 1 Description	*Cast-In-Place Concrete*		*8th initial submittal*		
	03300	-	0008		
Example 2 Description	*Cast-In-Place Concrete*		*8th initial submittal*		*First revision to the 8th initial submittal*
	03300	-	0008	.	1

B. Deliver submittals via email to Engineer at mducker@carollo.com, unless another mutually agreeable place is designated. If submittal is greater than 80 pages, and the Engineer requests it, the Contractor shall mail one (1) hard copy of the submittal to the Engineer at:

   Attn: Michael Ducker
   Carollo Engineers, Inc.
   2880 Gateway Oaks Dr. # 300
   Sacramento, CA 95833

C. Submittals in electronic media format:
   1. General: Provide all information in PC-compatible format using Windows® operating system as utilized by the Owner and Engineer.
   2. Text: Provide text documents and manufacturer's literature in Portable Document Format (PDF).
   3. Graphics: Provide graphic submittals (drawings, diagrams, figures, etc.) utilizing Portable Document Format (PDF).

D. Submit the hardcopy submittal in the format provided in Attachment A - Contractor Submittal Transmittal Form.

1.05 SUBMITTAL PROCEDURE

A. Engineer: Review submittal and provide response:
   1. Review description:
      a. Engineer will be entitled to rely upon the accuracy or completeness of designs, calculations, or certifications made by licensed professionals accompanying a particular submittal whether or not a stamp or seal is required by Contract Documents or Laws and Regulations.
      b. Engineer's review of submittals shall not release Contractor from Contractor's responsibility for performance of requirements of Contract Documents. Neither shall Engineer's review release Contractor from

fulfilling purpose of installation nor from Contractor's liability to replace defective work.

c. Engineer's review of shop drawings, samples, or test procedures will be only for conformance with design concepts and for compliance with information given in Contract Documents.
d. Engineer's review does not extend to:
    1) Accuracy of dimensions, quantities, or performance of equipment and systems designed by Contractor.
    2) Contractor's means, methods, techniques, sequences, or procedures except when specified, indicated on the Drawings, or required by Contract Documents.
    3) Safety precautions or programs related to safety which shall remain the sole responsibility of the Contractor.
e. Engineer can Approve or Not Approve any exception at their sole discretion.

2. Review timeframe:
    a. Except as may be provided in technical specifications, a submittal will be returned within 10 calendar days.
    b. When a submittal cannot be returned within the specified period, Engineer will, within a reasonable time after receipt of the submittal, give notice of the date by which that submittal will be returned.
    c. Engineer’s acceptance of progress schedule containing submittal review times less than those specified or agreed to in writing by Engineer will not constitute Engineer’s acceptance of review times.
    d. Critical submittals:
        1) Contractor will notify Engineer in writing that timely review of a submittal is critical to the progress of Work.
3. Schedule delays:
    a. No adjustment of Contract Times or Contract Price will be allowed due to Engineer’s review of submittals, unless all of the following criteria are met:
        1) Engineer has failed to review and return first submission within the agreed upon time frame.
        2) Contractor demonstrates that delay in progress of Work is directly attributable to Engineer’s failure to return submittal within time indicated and accepted by Engineer.
4. Review response will be returned to Contractor with one of the following dispositions:
    a. Approved:
        1) No Exceptions:
            a) There are no notations or comments on the submittal and the Contractor may release the equipment for production.
        2) Make Corrections Noted - See Comments:
            a) The Contractor may proceed with the Work, however, all notations and comments must be incorporated into the final product.
            b) Resubmittal not required.
        3) Make Corrections Noted - Confirm:
            a) The Contractor may proceed with the Work, however, all notations and comments must be incorporated into the final product.

b) Submit confirmation specifically addressing each notation or comment to the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the confirmation.

b. Not approved:
   1) Correct and resubmit:
      a) Contractor may not proceed with the Work described in the submittal.
      b) Contractor assumes responsibility for proceeding without approval.
      c) Resubmittal of complete submittal package is required within 30 calendar days of the date of the Engineer's submittal review response.
   2) Rejected - See Remarks:
      a) Contractor may not proceed with the Work described in the submittal.
      b) The submittal does not meet the intent of the Contract Documents. Resubmittal of complete submittal package is required with materials, equipment, methods, etc. that meet the requirements of the Contract Documents.

c. Receipt acknowledged - Filed for record:
   1) This is used in acknowledging receipt of informational submittals that address means and methods of construction such as schedules and work plans, conformance test reports, health and safety plans, etc.

d. Receipt acknowledged with comments - Resubmit:
   1) This is used in acknowledging receipt of informational submittals that address means and methods of construction such as schedules and work plans, conformance test reports, health and safety plans, etc. Feedback regarding missing information, conflicting information, or other information that makes it incomplete can be made with comments.

B. Contractor: Prepare resubmittal, if applicable:
   1. Clearly identify each correction or change made.
   2. Include a response in writing to each of the Engineer's comments or questions for submittal packages that are resubmitted in the order that the comments or questions were presented throughout the submittal and numbered consistent with the Engineer's numbering.
      a. Acceptable responses to Engineer's comments are listed below:
         1) "Incorporated" Engineer's comment or change is accepted and appropriate changes are made.
         2) "Response" Engineer's comment not incorporated. Explain why comment is not accepted or requested change is not made. Explain how requirement will be satisfied in lieu of comment or change requested by Engineer.
      b. Reviews and resubmittals:
         1) Contractor shall provide resubmittals which include responses to all submittal review comments separately and at a level of detail commensurate with each comment.
         2) Contractor responses shall indicate how the Contractor resolved the issue pertaining to each review comment. Responses such as "acknowledged" or "noted" are not acceptable.

3) Resubmittals which do not comply with this requirement may be rejected and returned without review.
4) Contractor shall be allowed no extensions of any kind to any part of their contract due to the rejection of non-compliant submittals.
5) Submittal review comments not addressed by the Contractor in resubmittals shall continue to apply whether restated or not in subsequent reviews until adequately addressed by the Contractor to the satisfaction of the reviewing and approving authority.

c. Any resubmittal that does not contain responses to the Engineer's previous comments shall be returned for Revision and Resubmittal. No further review by the Engineer will be performed until a response for previous comments has been received.

3. Resubmittal timeframe:
   a. Contractor shall provide resubmittal within 15 days.
   b. When a resubmittal cannot be returned within the specified period, Contractor shall notify Engineer in writing.
4. Review costs:
   a. Costs incurred by Owner as a result of additional reviews of a particular submittal after the second time it has been reviewed shall be borne by Contractor.
   b. Reimbursement to Owner will be made by deducting such costs from Contractor's subsequent progress payments.

1.06 PRODUCT DATA

A. Edit submittals so that the submittal specifically applies to only the product furnished.

B. Neatly cross out all extraneous text, options, models, etc. that do not apply to the product being furnished, so that the information remaining is only applicable to the product being furnished.

1.07 SHOP DRAWINGS

A. Contractor to field verify elevation, coordinates, and pipe material for pipe tie-in to pipeline or structure prior to the preparation of shop drawings.

B. Indicate project designated equipment tag numbers for submittal of devices, equipment, and assemblies.

1.08 SAMPLES

A. Details:
   1. Submit labeled samples.
   2. Samples will not be returned.
   3. Provide number of sample submittals as below:
      a. Total: 2 minimum.
         1) Owner: 1.
         2) Engineer: 1.
         3) Contractor: None.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

ATTACHMENT A - CONTRACTOR SUBMITTAL TRANSMITTAL FORM

CONTRACTOR SUBMITTAL TRANSMITTAL FORM

Owner:	Click here to enter text.	**Date:**	MM/DD/YYYY
Contractor:	Click here to enter text.	**Project No.:**	XXXXX.XX
Project Name:	Click here to enter text.	**Submittal Number:**	000
Submittal Title:	Click here to enter text.		
To:	Click here to enter text.		
From:	Click here to enter text.	Click here to enter text.	
	Click here to enter text.	Click here to enter text.	

Specification No. and Subject of Submittal / Equipment Supplier			
Spec ##:	Spec ##.	**Subject:**	Click here to enter text.
Authored By:	Click here to enter text.	**Date Submitted:**	XX/XX/XXXX

Submittal Certification		
Check Either (A) or (B):		
☐	(A)	We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings with no exceptions.
☐	(B)	We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings except for the deviations listed.
Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.		
General Contractor's Reviewer's Signature:		
Printed Name:		
In the event, Contractor believes the Submittal response does or will cause a change to the requirements of the Contract, Contractor shall immediately give written notice stating that Contractor considers the response to be a Change Order.		
Firm: Click here to enter text.	**Signature:**	**Date Returned:** XX/XX/XXXX

PM/CM Office Use	
Date Received GC to PM/CM:	
Date Received PM/CM to Reviewer:	
Date Received Reviewer to PM/CM:	
Date Sent PM/CM to GC:	

SECTION 01455

REGULATORY QUALITY ASSURANCE

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: This Section describes project regulatory requirements for quality assurance that includes special inspections, and structural observation.

1.02 REFERENCES

A. American Concrete Institute (ACI):
   1. 318 - Building Code Requirements for Structural Concrete.
   2. 530 – Building Code Requirements for Masonry Structures.
   3. 530.1 – Specification for Masonry Structures.

B. American Institute of Steel Construction (AISC):
   1. 360 – Specification for Structural Steel Buildings.

C. American Society of Civil Engineers (ASCE):
   1. 7 - Minimum Design Loads for Buildings and Other Structures.

D. American Welding Society (AWS):
   1. D1.3 - Structural Welding Code - Sheet Steel.
   2. D1.4 - Structural Welding Code - Reinforcing Steel.

E. ASTM International (ASTM):
   1. A706 – Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
   2. C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   3. C172 - Standard Practice for Sampling Freshly Mixed Concrete.
   4. C1611 Standard Test Method for Slump Flow of Self-Consolidating Concrete.

F. California Building Code (CBC).

G. The Masonry Society (TMS):
   1. 402 – Building Code for Masonry Structures.
   2. 602 – Specifications for Masonry Structures.

1.03 DEFINITIONS

A. Special Inspection: Inspection of the materials, installation, fabrication, erection, or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards.

B. Special Inspection, Continuous: The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.

C. Special Inspection, Periodic: The part-time, or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed and at the completion of the work.

D. Structural Observation: The visual observation of the structural system by a registered design professional for general conformance to the approved construction documents at significant construction stages and at completion of the structural system.

1.04 DESCRIPTION

A. This Section describes special inspections, and structural observation of structural assemblies and components to be performed in compliance with the building code specified in Section 01410 - Regulatory Requirements.

B. The special inspections specified in this Section are in addition to the requirements specified in Section 01450 - Quality Control, and by the individual Sections.

1.05 SUBMITTALS

A. Contractor shall submit special certifications for designated seismic systems.

B. Contractor shall schedule and coordinate the submittal of Special Inspection reports and test results prepared by others.

1.06 APPROVED FABRICATORS

A. Structural steel fabricators shall be approved as required herein. Shops shall be those listed by ICBO / ICC, AISC, COLA, or other nationally-recognized agencies. Approved fabricator certificates and shop inspection test results shall be submitted for approval as part of the shop drawing submittal process per CBC Section 1704.2.5.2.

1.07 SPECIAL INSPECTION

A. Owner will employ 1 or more special inspectors who will provide special inspections during construction.

B. Special inspector(s) shall be qualified for inspection of the particular type of materials or operations requiring special inspection.

C. Testing laboratory: Testing that is required to satisfy the requirements of special inspection will be performed by the Owner's testing laboratory as specified in Section 01450 - Quality Control.

D. Duties of Special Inspector:
   1. General: Required duties of the special inspector(s) shall be as described in Chapter 17 of the building code specified in Section 01410 - Regulatory Requirements.

2. Reporting: Special inspector(s) shall provide reports of each inspection to the Contractor. Contractor shall distribute copes of inspection reports to the Owner.
    a. Reports shall, at a minimum, include the following items:
        1) Date and time of inspection, and name(s) of individual(s) preforming the inspection.
        2) Structures and areas of the structure where work or testing was observed.
        3) Discrepancies between the requirements of the Contract Documents and the work or testing observed.
        4) Other areas of deficiency in the Work.

E. Special inspections shall not be construed as fulfilling the requirements for structural observation.

F. Owner or special inspector are responsible to select materials for special inspection.
    1. It is not acceptable for Contractor to select materials for special inspection.

1.08 STRUCTURAL OBSERVATION

A. Owner will employ 1 or more registered design professionals who will provide structural observation(s) during construction.
    1. Registered design professional shall be a civil or structural engineer currently licensed as such in the state where the project is located and regularly engaged in structural design equivalent to or similar to those indicated on the Drawings.

B. Structural observations shall not be construed as fulfilling the requirements for special inspections.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 SPECIAL INSPECTIONS

A. The Owner will provide special inspection of following types of work as described in in Section 1705 of the building code as specified in Section 01410 - Regulatory Requirements wherever such work occurs unless otherwise specified.
    1. Attachment A - Concrete Special Inspection Schedule.
    2. Attachment B - Architectural, Mechanical, and Electrical Components - Special Inspection Schedule.
    3. Attachment C1 - Masonry Special Inspection Schedule – "Level B."
    4. Attachment C2 - Masonry Special Inspection Schedule – Level "C."
    5. Attachment D - Soils Verification and Inspection Schedule.
    6. Attachment E - Structural Steel Special Inspection Schedule.

3.02 SPECIAL CERTIFICATION

A. Special inspector shall examine the designated seismic system(s) specified and determine whether the designated system components, including anchorage, are consistent with the evidence of compliance submitted for special certification.

3.03 STRUCTURAL OBSERVATION

A. The following work requires structural observation in accordance with Section 1704.5 of the building code specified in Section 01455 - Regulatory Requirements.
   1. All structures in all areas:
      a. Foundations.

B. Elevated slabs.

3.04 SCHEDULE

A. Contractor shall allow time necessary for special inspections and structural observation specified herein.

B. Sufficient notice shall be given so that the special inspections and structural observations can be performed. Contractor shall allow time for individuals performing special inspection and structural observation to travel to the site.

3.05 PROCEDURE

A. The special inspector will immediately notify the Engineer of any corrections required and follow notification with appropriate documentation.

B. Contractor shall not proceed until the work is satisfactory to the Engineer.

END OF SECTION

ATTACHMENT A - CONCRETE SPECIAL INSPECTION SCHEDULE

CONCRETE SPECIAL INSPECTION SCHEDULE
(Includes: cast-in-place, precast, prestressed, precast-prestressed, and shotcrete.)

Verification and Inspection	Reference Standard ACI 318-14 AWS D1.4-18 IBC 2018	Frequency of Inspection[1] (During Task Listed)	
		Continuous	Periodic
1. Inspect reinforcement, including prestressing tendons, and verify placement.	ACI 318: 20, 25.2, 25.3, 26.6.1-26.6.3 IBC: 1908.4		●
2. Reinforcing bar welding:			
a. Verify weldability of reinforcing bars other than ASTM A706;	AWS D1.4 ACI 318: 26.6.4		●
b. Inspect single-pass fillet welds, maximum 5/16-inch; and	AWS D1.4 ACI 318: 26.6.4		●
c. Inspect all other welds.	AWS D1.4 ACI 318: 26.6.4	●	
3. Inspect anchors cast in concrete.	ACI 318: 17.8.2		●
4. Inspect anchors post-installed in hardened concrete members.			
a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads.	ACI 318: 17.8.2.4	●	
b. Mechanical anchors and adhesive anchors not defined in 4.a.	ACI 318: 17.8.2		●
5. Verify use of required design mix.	ACI 318: 19, 26.4.3, 26.4.4 IBC: 1904.1, 1904.2, 1908.2, 1908.3		●
6. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	ASTM C172 ASTM C31 ACI 318: 26.5, 26.12 IBC: 1908.10	●	
7. Inspect concrete and shotcrete placement for proper application techniques.	ACI 318: 26.5 IBC: 1908.6, 1908.7, 1908.8	●	

Verification and Inspection	Reference Standard ACI 318-14 AWS D1.4-18 IBC 2018	Frequency of Inspection(1) (During Task Listed)	
		Continuous	Periodic
8. Verify maintenance of specified curing temperature and techniques.	ACI 318: 26.5.3-26.5.5 IBC: 1908.9		●
9. Inspect prestressed concrete for:			
a. Application of prestressing forces; and	ACI 318: 26.10	●	
b. Grouting of bonded prestressing tendons.	ACI 318: 26.10	●	
10. Inspect erection of precast concrete members.	ACI 318: 26.9		●
11. Verify in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.	ACI 318: 26.11.2		●
12. Inspect formwork for shape, location and dimensions of the concrete member being formed.	ACI 318: 26.11.1.2.(b)		●

Notes:

(1) The "●" represents a required inspection activity for the project where it occurs.

ATTACHMENT B - ARCHITECTURAL, MECHANICAL AND ELECTRICAL COMPONENTS SPECIAL INSPECTION SCHEDULE

ARCHITECTURAL, MECHANICAL AND ELECTRICAL COMPONENTS
SPECIAL INSPECTION SCHEDULE

Verification and Inspection	Reference Standard IBC 2018	Frequency of Inspection[1] (During Task Listed)	
		Continuous	Periodic
1. Architectural components:			
a. Cladding - exterior, weighing more than 5 psf: erection and fastening.	IBC: 1705.12.5		●
b. Exterior insulation and finish system (EIFS):	IBC: 1705.16		
c. Non-bearing walls – exterior: erection and fastening.	IBC: 1705.12.5		●
d. Non-bearing walls – interior, weighing more than 15 psf.	IBC: 1705.12.5		●
e. Veneer, exterior and interior, weighing more than 5 psf: erection and fastening.	IBC: 1705.12.5		●
f. Access floors: erection and anchorage.	IBC: 1705.12.5.1		●
g. Suspended ceiling system: bracing.			●
h. Storage racks – 8 feet or greater in height: anchorage.	IBC: 1705.12.7		●
i. Skylight: verification of safety compliance and labeling and installation.	IBC: 1709.6		●
2. Plumbing, mechanical, and electrical components:			
a. Anchorage of electrical equipment for emergency and standby power systems.	IBC: 1705.12.6.1		●
b. Anchorage of other electrical and mechanical equipment over 400 lb. on floors or roofs.	IBC: 1705.12.6.2		●
c. Installation and anchorage of pipelines carrying hazardous chemicals and their associated mechanical units.	IBC: 1705.12.6.3		●
d. Installation and anchorage of pipelines greater than 8 inches in diameter.			●
e. Installation and anchorage of ductwork designed to carry hazardous materials.	IBC: 1705.12.6.4		●
f. Installation and anchorage of ductwork greater than 6 sf in cross section.			●

g. Installation and anchorage of vibration isolation systems where contract documents require nominal clearance of 1/4 inch or less between the equipment support frame and its support/restraint.	IBC: 1705.12.6.5		●
h. Installation of mechanical and electrical equipment, including duct work, piping systems and their structural supports, where automatic fire sprinkler systems are installed.	IBC: 1705.12.6.6		●
3. Fire-resistance elements:			
a. Sprayed fire-resistant coatings:	IBC: 1705.14		
b. Mastic and intumescent coatings:	IBC: 1705.15		
c. Fire-resistant penetrations and joint systems:	IBC: 1705.17,		
4. Smoke control systems;	IBC: 1705.18		
Notes: (1) The "●" represents a required inspection activity for the project where it occurs.			

ATTACHMENT C1 - MASONRY SPECIAL INSPECTION SCHEDULE - "LEVEL B"

MASONRY SPECIAL INSPECTION SCHEDULE - "LEVEL B"

MINIMUM TESTS

Verification of Slump flow and Visual Stability Index (VSI) as delivered to the project site as determined by ASTM C1611 for self-consolidating grout

Verification of f'_m in accordance with Specification Section 04220 - Concrete Unit Masonry prior to construction.

MINIMUM SPECIAL INSPECTION – LEVEL B			
	Reference Standard	**Frequency of Inspection(1) (During Task Listed)**	
Verification and Inspection	**TMS 402/ACI 530-13 TMS 602/ACI 530.1-13**	**Continuous**	**Periodic**
1. Verify compliance with the approved submittals.	TMS 602/ACI 530.1: Art. 1.5		●
2. As masonry construction begins, verify that the following are in compliance:			
a. Proportions of site-prepared mortar.	TMS 602/ACI 530.1: Art. 2.1, 2.6A		●
b. Placement of masonry units and construction of mortar joints.	TMS 602/ACI 530.1: Art. 3.3B		●
c. Placement of reinforcement, connectors, and anchors.	TMS 602/ACI 530.1: Art. 3.4, 6.1, 6.2.6, 6.2.7		●
d. Reinforcing bar couplers and terminators.	ICC-ES Evaluation Report	●	
3. Prior to grouting, verify that the following are in compliance:			
a. Placement of masonry units and construction of mortar joints	TMS 602/ACI 530.1: Art.3.3B		●
b. Grout space.	TMS 602/ACI 530.1: Art. 3.2D, 3.2F		●
c. Grade, type, and size of reinforcement and anchor bolts.	TMS 602/ACI 530.1: Art. 2.4, 3.4 TMS 402/ACI 530: Sec. 6.1		●
d. Placement of reinforcement, connectors, and anchors.	TMS 602/ACI 530.1: Art. 3.2E, 3.4 TMS 402/ACI 530: Sec. 6.1		●

MINIMUM SPECIAL INSPECTION – LEVEL B			
	Reference Standard	**Frequency of Inspection(1) (During Task Listed)**	
Verification and Inspection	**TMS 402/ACI 530-13 TMS 602/ACI 530.1-13**	**Continuous**	**Periodic**
e. Proportions of site-prepared grout.	TMS 602/ACI 530.1: Art. 2.6B		●
4. Verify during construction:			
a. Size and location of structural elements:	TMS 602/ACI 530.1: Art. 3.3F		●
b. Type, size, and location of anchors, including details of anchorage of masonry to structural members, frames, or other construction.	TMS 402/ACI 530: Sec. 1.2.1(e), 6.1.4.3, 6.2.1		●
c. Welding of reinforcement.	TMS 402/ACI 530: Sec. 8.1.6.7.2, 9.3.3.4(c), 11.3.3.4(b)	●	
d. Preparation, construction, and protection of masonry during cold weather (temperature below 40 degrees Fahrenheit) or hot weather (temperature above 90 degrees Fahrenheit).	TMS 602/ACI 530.1: Art. 1.8C, 1.8D		●
5. Observe preparation of grout specimens, mortar specimens, and/or prisms.	TMS 602/ACI 530.1: Art. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, 1.4 B.4		●
Notes: (1) The " ● " represents a required inspection activity for the project where it occurs.			

ATTACHMENT C2 - MASONRY SPECIAL INSPECTION SCHEDULE - “LEVEL C”

MASONRY SPECIAL INSPECTION SCHEDULE - "LEVEL C"

MINIMUM TESTS

Verification of Slump flow and Visual Stability Index (VSI) as delivered to the project site as determined by ASTM C1611 for self-consolidating grout.

Verification of proportions of materials in premixed or pre-blended mortar and grout as delivered to the project site.

Verification of f'_m in accordance with Specification Section 04220 - Concrete Unit Masonry prior to construction.

MINIMUM SPECIAL INSPECTION – LEVEL C			
	Reference Standard TMS 402/ACI 530-13 TMS 602/ACI 530.1-13	**Frequency of Inspection(1) (During Task Listed)**	
Verification and Inspection		**Continuous**	**Periodic**
1. Verify compliance with the approved submittals.	TMS 602/ACI 530.1: Art. 1.5		●
2. As masonry construction begins, verify that the following are in compliance:			
a. Proportions of site-prepared mortar.	TMS 602/ACI 530.1: Art. 2.1, 2.6A		●
b. Placement of masonry units and construction of mortar joints.	TMS 602/ACI 530.1: Art. 3.3B		●
c. Placement of reinforcement, connectors, and anchors.	TMS 602/ACI 530.1: Art 3.4 TMS 402/ACI 530: Sec 6.1, 6.2.6, 6.2.7	●	
d. Reinforcing bar couplers and terminators.	ICC-ES Evaluation Report	●	
3. Prior to grouting, verify that the following are in compliance:			
a. Placement of masonry units and construction of mortar joints.	TMS 602/ACI 530.1: Art. 3.3B		●
b. Grout space.	TMS 602/ACI 530.1: Art. 3.2D, 3.2F	●	
c. Grade, type, and size of reinforcement and anchor bolts.	TMS 602/ACI 530.1: Art. 2.4, 3.4 TMS 402/ACI 530: Sec. 6.1		●

MINIMUM SPECIAL INSPECTION – LEVEL C			
Verification and Inspection	**Reference Standard** TMS 402/ACI 530-13 TMS 602/ACI 530.1-13	**Frequency of Inspection(1) (During Task Listed)**	
		Continuous	**Periodic**
d. Placement of reinforcement, connectors, and anchors.	TMS 602/ACI 530.1: Art. 3.2E, 3.4 TMS 402/ACI 530: Sec. 6.1, 6.2.6, 6.2.7	●	
4. Verify during construction:			
a. Size and location of structural elements:	TMS 602/ACI 530.1: Art. 3.3F		●
b. Type, size, and location of anchors, including details of anchorage of masonry to structural members, frames, or other construction.	TMS 402/ACI 530: Sec. 1.2.1(e), 6.1.4.3, 6.2.1	●	
c. Welding of reinforcement.	TMS 402/ACI 530: Sec 8.1.6.7.2, 9.3.3.4(c), 11.3.3.4(b)	●	
d. Preparation, construction, and protection of masonry during cold weather (temperature below 40 degrees Fahrenheit) or hot weather (temperature above 90 degrees Fahrenheit).	TMS 602/ACI 530.1: Art. 1.8C, 1.8D		●
5. Observe preparation of grout specimens, mortar specimens, and/or prisms.	TMS 602/ACI 530.1: Art. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, 1.4 B.4	●	
Notes: (1) The " ● " represents a required inspection activity for the project where it occurs.			

ATTACHMENT D - SOILS VERIFICATION AND INSPECTION SCHEDULE

SOILS VERIFICATION AND INSPECTION SCHEDULE

Verification and Inspection	Reference Standard IBC 2018	Frequency of Inspection[1] (During Task Listed)	
		Continuous	Periodic
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	IBC: T-1705.6		●
2. Verify excavations are extended to proper depth and have reached proper material.	IBC: T-1705.6		●
3. Perform classification and testing of fill and backfill materials.	IBC: T-1705.6		●
4. Verify use of proper materials, densities, and lift thicknesses during placement and compaction of fill and backfill.	IBC: T-1705.6	●	
5. Prior to placement of fill, observe subgrade and verify that site has been prepared properly.	IBC: T-1705.6		●

Notes:

(1) The "●" represents a required inspection activity for the project where it occurs.

ATTACHMENT E - STRUCTURAL STEEL SPECIAL INSPECTION SCHEDULE

STRUCTURAL STEEL SPECIAL INSPECTION SCHEDULE

Verification and Inspection	Referenced Standard AISC 360-10	Frequency of Inspection[1] (During Task Listed) Continuous	 Periodic
Inspection Tasks Prior to Welding	AISC 360, Table N5.4-1		
1. Welding procedure specifications (WPSs) available.		●	
2. Manufacturer certifications for welding consumables available.		●	
3. Material identification (type/grade).			●
4. Welder identification system.			●
5. Fit-up groove welds (including joint geometry): • Joint preparation. • Dimensions (alignment, root opening, root face, bevel). • Cleanliness (condition of steel surfaces). • Tacking (tack weld quality and location). • Backing type and fit (if applicable).			●
5. Configuration and finish of access holes.			●
6. Fit-up of fillet welds: • Dimensions (alignment, gaps at root). • Cleanliness (condition of steel surfaces). • Tacking (tack weld quality and location).			●
7. Check welding equipment.			●
Inspection Tasks During Welding	AISC 360, Table N5.4-2		
8. Use of qualified welders.			●
9. Control and handling of welding consumables: • Packaging. • Exposure control.			●
10. No welding over cracked tack welds.			●
11. Environmental conditions: • Wind speed within limits. • Precipitation and temperature.			●

Verification and Inspection	Referenced Standard AISC 360-10	Frequency of Inspection(1) (During Task Listed) Continuous	 Periodic
12. WPS followed: • Settings on welding equipment. • Travel speed. • Selected welding materials. • Shielding gas type/flow rate. • Preheat applied. • Interpass temperature maintained (min/max). • Proper position (F, V, H, OH).			●
13. Welding techniques: • Interpass and final cleaning. • Each pass within profile limitations. • Each pass meets quality requirements.			●
Inspection Tasks After Welding	AISC 360, Table N5.4-3		
14. Welds cleaned.			●
15. Size, length, and location of welds.		●	
16. Welds meet visual acceptance criteria: • Crack prohibition. • Weld/base-metal fusion. • Crater cross section. • Weld profiles. • Weld size. • Undercut. • Porosity.		●	
17. Arc strikes.		●	
18. k-area.		●	
19. Backing removed and weld tabs removed (if required).		●	
20. Repair activities.		●	
21. Document acceptance or rejection of welded joint or member.		●	
Notes: (1) The "●" represents a required inspection activity for the project where it occurs.			

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Furnishing, maintaining, and removing construction facilities and temporary controls, including temporary utilities, construction aids, barriers and enclosures, security, access roads, temporary controls, project sign, field offices and sheds, and removal after construction.

1.02 REFERENCE

A. Occupational Safety and Health Administration (OSHA).

1.03 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

1.04 TEMPORARY UTILITIES

A. Temporary electrical power:
   1. Arrange with local utility to provide adequate temporary electrical service.
   2. Provide and maintain adequate jobsite power distribution facilities conforming to applicable Laws and Regulations.
   3. Provide, maintain, and pay for electric power for performance of the Work.

B. Temporary electrical lighting:
   1. In work areas, provide temporary lighting sufficient to maintain lighting levels during working hours not less than lighting levels required by OSHA and state agency which administers OSHA regulations where Project is located.
   2. When available, permanent lighting facilities may be used in lieu of temporary facilities:
      a. Prior to Substantial Completion of the Work, replace bulbs, lamps, or tubes used by Contractor for lighting.

C. Temporary heating, cooling, and ventilating:
   1. Heat and ventilate work areas to protect the Work from damage by freezing, high temperatures, weather, and to provide safe environment for workers.
   2. Permanent heating system may be utilized when sufficiently completed to allow safe operation.

D. Temporary water:
   1. Pay for and construct facilities necessary to furnish potable water for human consumption and non-potable water for use during construction.
   2. Remove temporary piping and connections and restore affected portions of the facility to original condition before Substantial Completion.
   3. Pay for water used for construction prior to Substantial Completion.

E. Temporary sanitary facilities:
   1. Provide suitable and adequate sanitary facilities that are in compliance with applicable Laws and Regulations.
   2. Existing facility use is not allowed.
   3. At completion of the Work, remove sanitary facilities and leave site in neat and sanitary condition.

F. Temporary fire protection:
   1. Provide sufficient number of fire extinguishers of type and capacity required to protect the Work and ancillary facilities.

G. First aid:
   1. Post first aid facilities and information posters conforming to requirements of OSHA and other applicable Laws and Regulations in readily accessible locations.

H. Utilities in existing facilities: As specified in Section 01140 - Work Restrictions.

I. Temporary piping for interim recharge:
   1. Submit layout drawings showing proposed routing of piping, including proposed pipe support and pipe restraint locations.
   2. Submit product data for piping, fittings, appurtenances, restraints, supports, and other components of the temporary piping system.
   3. Submit information at least 28 days prior to when each temporary piping system is scheduled to be installed and allow 14 days for review and comment.

1.05 CONSTRUCTION AIDS

A. Provide railings, kick plates, enclosures, safety devices, and controls required by Laws and Regulations and as required for adequate protection of life and property.

B. Use construction hoists, elevators, scaffolds, stages, shoring, and similar temporary facilities of ample size and capacity to adequately support and move loads.

C. Design temporary supports with adequate safety factor to ensure adequate load bearing capability:
   1. When requested, submit design calculations by professional registered engineer prior to application of loads.
   2. Submitted design calculations are for information and record purposes only.

D. Accident prevention:
   1. Exercise precautions throughout construction for protection of persons and property.
   2. Observe safety provisions of applicable Laws and Regulations.
   3. Guard machinery and equipment, and eliminate other hazards.
   4. Make reports required by authorities having jurisdiction, and permit safety inspections of the Work.
   5. Before commencing construction work, take necessary action to comply with provisions for safety and accident prevention.

E. Barricades:
   1. Place barriers at ends of excavations and along excavations to warn pedestrian and vehicular traffic of excavations.
   2. Provide barriers with flashing lights after dark.
   3. Keep barriers in place until excavations are entirely backfilled and compacted.
   4. Barricade excavations to prevent persons from entering excavated areas in streets, roadways, parking lots, treatment plants, or other public or private areas.

F. Warning devices and barricades: Adequately identify and guard hazardous areas and conditions by visual warning devices and, where necessary, physical barriers:
   1. Provide devices in accordance with minimum requirements of OSHA and State agency which administers OSHA regulations where Project is located.

G. Hazards in public right-of-way:
   1. Comply with local jurisdiction standards and requirements for right-of-way barricades and other safety devices.
   2. Mark at reasonable intervals, trenches, and other continuous excavations in public right-of-way, running parallel to general flow of traffic, with traffic cones, barricades, or other suitable visual markers during daylight hours:
      a. During hours of darkness, provide markers with torches, flashers, or other adequate lights.
   3. At intersections or for pits and similar excavations, where traffic may reasonably be expected to approach head on, protect excavations by continuous barricades:
      a. During hours of darkness, provide warning lights at close intervals.

H. Hazards in protected areas: Mark or guard excavations in areas from which public is excluded, in manner appropriate for hazard.

I. Above grade protection: On multi-level structures, provide safety protection that meets requirements of OSHA and State agency which administers OSHA regulations where Project is located.

J. Protect existing structures, trees, shrubs, and other items to be preserved on Project site from injury, damage, or destruction by vehicles, equipment, worker or other agents with substantial barricades or other devices commensurate with hazards.

K. Fences:
   1. Enclose site of the Work with fence adequate to protect the Work against acts of theft, violence, and vandalism.
   2. When entire or part of site is to be permanently fenced, permanent fence may be built to serve for both permanent and temporary protection of the work site, provided that damaged or defaced fencing is replaced prior to Substantial Completion.
   3. Protect temporary and permanent openings and close openings in existing fences to prevent intrusion by unauthorized persons.
      a. Bear responsibility for protection of plant and material on site of the Work when openings in existing fences are not closed.

4. During night hours, weekends, holidays, and other times when no work is performed at site, provide temporary closures or enlist services of security guards to protect temporary openings.
5. Fence temporary openings when openings are no longer necessary.

1.06 SECURITY

A. Make adequate provision for protection of the work area against fire, theft, and vandalism, and for protection of public against exposure to injury.

1.07 ACCESS ROADS

A. General:
   1. Build and maintain access roads to and on site of the Work to provide for delivery of material and for access to existing and operating plant facilities on site.
   2. Build and maintain dust free roads which are suitable for travel at 20 miles per hour.

B. Off-site access roads:
   1. Build and maintain graded earth roads.
   2. Build roads only in public right-of-way or easements obtained by Owner.
   3. Obtain rights-of-way or easements when electing to build along other alignment.

C. On-site access roads:
   1. Maintain access roads to storage areas and other areas to which frequent access is required.
   2. Maintain similar roads to existing facilities on site of the Work to provide access for maintenance and operation.
   3. Protect buried vulnerable utilities under temporary roads with steel plates, wood planking, or bridges.
   4. Maintain on-site access roads free of mud.
   5. Provide controls to prevent vehicles leaving the site from tracking mud off the site onto the public right-of-way.

1.08 TEMPORARY CONTROLS

A. Dust control:
   1. Prevent dust nuisance caused by operations, unpaved roads, excavation, backfilling, demolition, or other activities.
   2. Control dust by sprinkling with water, use of dust palliatives, modification of operations, or other means acceptable to agencies having jurisdiction.

B. Noise control:
   1. Comply with noise and work hours regulations by local jurisdiction.
   2. In or near inhabited areas, particularly residential, perform operations in manner to minimize noise.
   3. In residential areas, take special measures to suppress noise during night hours.

C. Mud control:
   1. Prevent mud nuisance caused by construction operations, unpaved roads, excavation, backfilling, demolition, or other activities.

1.09 PROJECT SIGN

A. Provide and maintain Project identification sign at each well site consisting of painted 8-foot wide by 4-foot high exterior grade plywood and minimum 10-foot long, 4 by 4 lumber posts, set in ground at least 3 feet, with exhibit lettering by professional sign painter using no more than 5 sign colors:
   1. List at least the title of the Project, and names of the Owner, Engineer, Construction Manager, and Contractor.
   2. Identify Contractor's, Engineer's, and Construction Manager's names in upper right-hand corner underneath the bid number.

B. On third and fourth lines of printing, paint appropriate dollar amounts.

C. Erect Project identification sign where directed by Engineer within 14 days after the issuance of the Notice to Proceed.

D. Replace or repair the project sign if it is damaged or covered with graffiti within 2 working days of observation or notification of damage or graffiti.

1.10 CONTRACTOR FIELD OFFICES AND SHEDS

A. Maintain on Project Site weather tight space in which to keep copies of Contract Documents, progress schedule, shop drawings, and other relevant documents.

B. Provide field office with adequate space to examine documents, and provide lighting and telephone service in that space.

1.11 REMOVAL

A. Remove temporary facilities and controls before inspection for Substantial Completion or when directed.

B. Clean and repair damage caused by installation or use of temporary facilities.

C. Remove underground installations to minimum depth of 24 inches and grade to match surrounding conditions.

D. Restore existing facilities used during construction to specified or original condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01612

SEISMIC DESIGN CRITERIA

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Seismic design criteria for the following:
   1. Anchorage of mechanical and electrical equipment.
   2. Seismic design and design of anchorage for small tanks fabricated off site and shipped to the Project site.
   3. Other structures or items as specified or indicated on the Drawings.

1.02 REFERENCES

A. American Society of Civil Engineers (ASCE):
   1. 7-16 - Minimum Design Loads for Buildings and Other Structures.

1.03 SUBMITTALS

A. Shop drawings and calculations: Complete shop drawings and seismic calculations for anchorage to structures.

B. Calculations shall be signed and sealed by a civil or structural engineer licensed in the state where the Project is located.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Design in accordance with the requirements of the building code as specified in Section 01410 - Regulatory Requirements.

B. Risk Category:

Table 1: Risk Category	
Structure/Area	Risk Category
All	IV

C. Design spectral acceleration at short period, S_{DS}: 0.445.

D. Design of non-structural components and their connections to structures:
   1. Component amplification factor, a_p: In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.
   2. Component response modification factor, R_p: In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.
   3. Component importance factor, I_p: 1.5.

E. Seismic Design Category (SDC):
   1. Seismic Design Category (SDC) for certification of mechanical and electrical equipment as required by ASCE 7:
      a. Water Treatment Facility. All areas: Seismic Design Category D.

F. Design requirements: Anchorage of equipment to structures.
   1. Do not use friction to resist sliding due to seismic forces. Do not design or provide connections that use friction to resist seismic loads. Resist seismic forces through direct tension and/or direct bearing in shear on anchors and fasteners.
   2. Do not use more than 60 percent of the weight of the mechanical and electrical equipment for designing anchors for resisting overturning due to seismic forces.
   3. Do not use more than 60 percent of the weight of the tank for resisting overturning due to seismic forces.
   4. Anchoring and fastening to concrete and masonry:
      a. Anchors provided under the following Specifications shall hold a current Evaluation Service report allowing use in Seismic Design Categories indicated for this Work.
         1) Post-installed mechanical anchors specified in Section 05190 - Mechanical Anchoring and Fastening to Concrete and Masonry.
         2) Post-installed adhesive bonded anchors specified in Section 03055 - Adhesive-Bonded Reinforcing Bars and All Thread Rods in Concrete.
         3) Post-installed adhesive bonded anchors specified in Section 04055 – Adhesive Bonding Reinforcing Bars and All Thread Rods in Masonry.
   5. Anchor bolt holes in equipment support frames:
      a. Do not exceed bolt diameter by more than 25 percent, up to a maximum diameter equal to that of the bolt plus 1/4 inch.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01614

WIND DESIGN CRITERIA

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Wind design criteria.

1.02 SYSTEM DESCRIPTION

A. Design requirements:
   1. Building code criteria: Design for wind in accordance with building code as specified in Section 01410 - Regulatory Requirements:
      a. Risk category: IV.
      b. Wind speed, V_{ult}: 104 miles per hour.
      c. Exposure category: C.
      d. Topographic factor, K_{zt}: 1.0.
   2. Resist wind forces through direct bearing on anchors and fasteners. Do not design or provide connections that use friction to resist wind loads.
   3. Anchoring and fastening to concrete and masonry:
      a. Provide anchors specified in Section 03055 - Adhesive-Bonded Reinforcing Bars and All-Thread Rods and 05190 - Mechanical Anchoring and Fastening to Concrete and Masonry.

1.03 SUBMITTALS

A. Shop drawings and calculations: Complete shop drawings and wind design calculations.

B. Calculations shall be signed and stamped by a civil or structural engineer licensed in the state where the Project is located.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 02820

FENCES AND GATES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Fence, framework, fabric, and accessories.
   2. Excavation for post bases and concrete foundation for posts.
   3. Manual gates and related hardware.

1.02 REFERENCES

A. ASTM International (ASTM):
   1. A121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
   2. A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   3. A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   4. A385 - Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).
   5. A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
   6. A702 - Standard Specification for Steel Fence Posts and Assemblies, Hot-Wrought.
   7. F626 - Standard Specification for Fence Fittings.
   8. F668 - Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric.
   9. F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework.
   10. F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.
   11. F2200 - Standard Specification for Automated Vehicular Gate Construction.

B. State of California Department of Transportation (Caltrans).

C. Underwriters Laboratories, Inc. (UL):
   1. 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.03 SUBMITTALS

A. Product data: Submit data completely describing products.

B. Shop drawings:
   1. Submit drawings showing connection details indicating methods and means of mounting, attaching, and installing fence, operators and locks to gates, including wiring diagrams.

C. Samples:
   1. Provide 2 privacy slats and 2 pickets.

D. Quality control submittals:
   1. Certificates of compliance: Provide certification that materials conform to referenced specifications.
   2. Qualifications: Provide installer's references and list of local references.
   3. Manufacturer's instructions: Provide for gate operator equipment.

E. Contract closeout submittals:
   1. Operation and maintenance manuals: Provide for electrical and mechanical equipment.

1.04 QUALITY ASSURANCE

A. Pre-installation conference: Participate in conference, if required.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Storage and handling: Unload, store, and protect materials such that they are not damaged.

1.06 PROJECT CONDITIONS

A. Field measurements:
   1. Verify actual field distances so that post spacing or CMU column and post spacing can be made uniform.
   2. Verify and coordinate gate opening and column distances for driveway.

1.07 SEQUENCING AND SCHEDULING

A. Fences and gates: May be constructed at any time after earthwork, pipe work, and structures to which fence is related has been completed, but prior to erosion control application.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Chain link fence and gates: One of the following or equal:
   1. Allied Tube and Conduit.
   2. Master-Halco.

B. Commercial double drive black iron gate: The following or equal:
   1. Frontier Fence Co.

2.02 DESIGN AND PERFORMANCE CRITERIA

A. Design requirements:
   1. Fences and gates shall be designed and constructed to withstand wind loads per the requirements of Section 01614 - Wind Design Criteria.

B. Performance requirements:
   1. Gate operator controls:
      a. In addition to standard controls furnished with gate operators, make provisions for and provide terminal connection points for controls indicated on the Drawings and clearly indicated such connection points on operator control terminal board.
      b. Operational sequence: Provide sequence as specified in Section 17100 - Control Strategies and 17101 - Specific Control Strategies.

2.03 MATERIALS

A. Chain link fence:
   1. Fabric:
      a. Height:
         1) Plant fence: As indicated on the Drawings.
      b. Mesh for privacy slats: 3-1/2 inches by 5 inches.
      c. Size wire: 9 gauge:
         1) Coating: Zinc coating, ASTM A392, Class 1.
         2) Tensile strength: 80,000 pounds per square inch minimum.
   2. Framework: In accordance with ASTM F1043 Group 1A or 1C. Pipe shall be straight and conform to the following weights:

Pipe Size Outside Diameter (Inches)	Group IA Weight (Lbs/ft)	Group IC Weight (Lbs/ft)
1-5/8	2.27	1.84
1-7/8	2.72	2.28
2-3/8	3.65	3.12
2-7/8	5.79	4.64
3-1/2	7.58	5.71
4	9.11	6.56
6-5/8	18.97	-
8-5/8	24.70	-

      a. Top rail:
         1) Size: 2-3/8 inches outside diameter.
         2) Tension wire: 7-gauge galvanized coil spring wire.
      b. Bottom rail:
         1) Size: 1-5/8 inches outside diameter.
         2) Tension wire: 7-gauge galvanized coil spring wire.
      c. Line posts:
         1) Size: Minimum 3-1/2-inches outside diameter.
      d. Terminal, corner, and pull posts:
         1) Size: 6-5/8-inches outside diameter.
      e. Coatings:
         1) Group IA: External coatings in accordance with ASTM F1043 Type A; internal coatings in accordance with ASTM F1043 Type A.
         2) Group IC: External coatings in accordance with ASTM F1043 Type B; internal coatings in accordance with ASTM F1043 Type D.

3. Accessories:
    a. Fence fittings: In accordance with ASTM F626:
        1) Post top fittings:
            a) Provide post caps that fit snugly over posts to exclude moisture. Provide dome style caps for terminal posts and loop style caps for line posts.
            b) Extension arms, 45-degree angle type, capable of receiving 3 strands of barbed wire.
        2) Rail and brace ends: Provide pressed steel or malleable castings that are cup shaped to receive rail and brace ends.
    b. Fabric accessories:
        1) Wire clips: Minimum 6 gauge hot-dip galvanized.
        2) Tension bars: 1/4 inch by 3/4 inch, galvanized.
        3) Steel bands: 11 gauge, 1 inch wide, hot-dip galvanized.
        4) Bolts and nuts: 3/8-inch diameter.
        5) Hog rings: 11 gauge.
    c. Privacy slats:
        1) Vinyl strips, sized to fit fabric weave, green color.

B. Barbed wire fence:
    1. Fence:
        a. Total number strands: 3.
        b. Barbed wire strands:
            1) Not less than 12-1/2 gauge galvanized wires with 14 gauge, 4 point galvanized barbs (at not more than 5 inches on center spacing).
            2) Wires per strand: 2.
        c. Coatings:
            1) Galvanize: In accordance with ASTM A121, Class 2.
        d. Stays: Minimum 9-1/2 gauge galvanized twisted wire.

C. Chain link and barbed wire gates:
    1. Gate posts and concrete foundations for gate posts: Except where differently indicated on the Drawings, determine gate posts and concrete foundations for gate posts in accordance with following schedule:

Gate Leaf Widths (Feet)	Gate Posts	Foundations	
	Post O.D. ASTM F1043 Group IA or IC (Inches)	Diameter (Inches)	Depth (Feet)
18 and under	6-5/8 (Group IA)	18	4
Over 18 to 25	8-5/8 (Group IA)	18	4.5

    2. Chain link gates:
        a. Frames and center supports: 2-3/8-inch outside diameter galvanized steel pipe that in accordance with ASTM F1043 Group IA or IC.
        b. Gate accessories:
            1) Post top fittings:
                a) Provide post caps that fit snugly over posts to exclude moisture.

b) Provide dome style caps for terminal posts and loop style caps for line posts.
c) Post top fittings: Extension arms, 45-degree angle type, capable of receiving three strands of barbed wire.

2) Corner fittings: Heavy pressed steel or malleable castings.
3) Gate tensioning:
a) Cross tensioning rods: 3/8 inch, galvanized.
b) Turnbuckles: Heavy duty.
4) Tension rods for 4-foot gates: 3/8 inch, easily adjustable, galvanized.
5) Gate frame corner fittings: Fitting designed for purpose, Manufacturer's standard.
6) Horizontal gate stiffeners: 1-5/8-inch outside diameter galvanized steel pipe that in accordance with ASTM F1043 Group IA or IC.
7) Gate hardware:
a) Catch and locking attachment: Combination steel or malleable iron catch and locking attachment of acceptable design.
b) Stops:
(1) Type 1: Capable of holding gates open.
(2) Type 2: Center rest with catch.
c) Color: Match color of fabric.

2.04 SPECIAL GATES AND ACCESSORIES

A. Ornamental iron roller gates:
1. Material: Black iron, galvanized.
2. Pickets:
a. 3/4 inch by 3/4 inch tubing.
b. Clear space between tubing for gate and section(s) of fence covered when the gate is in the open position shall be no greater than 2-1/4 inches in accordance with UL 325 and ASTM F2200.
3. Rail frames: 1-1/2 inch by 1-1/2 inches tubing.

B. Commercial double drive black iron gate:
1. Material: Black Regal iron.
2. Panel: 68-inch by 102-inch and 2-inch square frame.
3. Pickets:
a. 3/4 inch by 3/4 inch tubing.
b. Clear space between tubing for gate and section(s) of fence covered when the gate is in the open position shall be no greater than 2-1/4 inches in accordance with UL 325 and ASTM F2200.
4. Gate top and bottom rails: 2-inch by 2-inch square steel tubing factory powder coated black.
5. Balusters: 3/4-inch by 3/4-inch square steel tubing factory powder coated black, 4 inches on center.
6. Posts: 4-inch by 4-inch black iron posts with cap.
7. Attachment: Posts anchored to 2-foot by 2-foot concrete masonry unit columns.
8. Hinges: 6-inch square ball bearing hinges.
9. Latch: Clamp on double drive latch assembly.

C. Tracking channel: Provide each channel with stop permanently attached at rear of channel:
   1. Roller guide: Steel guide capable of being cast into concrete.
   2. Posts for gate and track support: 3 inches by 3 inches tubing.
   3. Roller wheels: Minimum 3-inch diameter.

D. Coatings:
   1. Galvanized repair paint: 2 component, moisture-cured, zinc-rich urethane primer, minimum solids by volume of 83 percent plus or minus 2 percent.
      a. Manufacturers: One of the following or equal:
         1) Tnemec, 90-97.
         2) Devoe: Catha-Coat 313.

2.05 MANUFACTURED UNITS

A. Special gates:
   1. Roller gates:
      a. Consist of 2 movable sections, each operated independently of each other.
      b. Provide each section with front roller wheels and 2 sets of rear rollers on channel tracks.
      c. Fence sections.
      d. Shop welded by arc-gas shield method.
      e. Provide welds that are smooth and clean. No weld residue will be allowed.
   2. Swing gates:
      a. Corners of gate frames:
         1) Fasten together and reinforce with fitting designed for purpose or by welding.
         2) Grind weld smooth.
      b. Gate stiffeners: Provided as follows:
         1) On gates 12 feet and wider: Vertically on gates at 6 feet on center.
         2) On gates over 7 feet in height: Horizontally.
      c. Gates with fabric 7 feet or more in height:
         1) Install vertical stiffeners at maximum of 8-foot centers.
         2) Install adjustable tension rod on gates over 4 feet in width.
         3) Chain link fence fabric: Attach to gate frame by use of tension bars and tie wires as specified for fence construction, and suitable tension connectors spaced at approximately 16-inch intervals.
      d. Gate tensioning: Provide gates with cross tensioning rods and turnbuckles rigidly attached to gate frame.
      e. Gate hardware: Provide each pair gates with following:
         1) Catch and locking attachment.
         2) 2 Type 1 stops and 1 Type 2 stop as indicated on the Drawings.
   3. Swing gates:
      a. Hinges: Provide swing gates with minimum 2 hinges designed as to securely clamp to gatepost and permit gate to be swung open 180 degrees.

b. Controls:
1) Provide control for pair of motor operators for each gate by either of 2 manually operated switches located where indicated on the Drawings:
a) Also provide controls for pair of motor operators for each gate controlled by either of 2 key-operated switch stations located at each gate.
b) Provide gooseneck stands for mounting of switch stations.
c) Gate keying: Key gates alike.

4. Rolling gates:
a. Provide controls for each gate motor operator such that operator can be controlled by either of 2 manually operated switches located where indicated on the Drawings:
1) Also provide control for motor operator such that gate can be controlled by either of 2 key-operated switch stations.
2) Provide gooseneck-mounting stands for switch station and key such stations alike.
b. Provide 1 key-operated switch station located inside gate.

B. Outside gate operator stands for plant entry gates.

2.06 EQUIPMENT

A. Roller gates:
1. Gate operator equipment:
a. Manufacturers: One of the following or equal:
1) HySecurity, SlideDriver 40.
2) Richards-Wilcox, Number 1295.
3) Stanley Vemco, ASJH-1.
b. Switch:
1) Provide 2 key-operated switch station.
2) Located as indicated on the Drawings.
c. Provide gooseneck-mounting stands for switch station and key such stations alike.
d. Provide each sliding type electric operator unit built into compact enclosure mounted on heavy steel base.
1) Provide weatherproof and pad lockable enclosure.
e. Electric operator unit:
1) In accordance with UL 325.
2) Provide unit consisting of right angle gear head instantly reversing motor and magnetic brake, safety disc clutch, chain driven geared type automatic limit switch, magnetic reversing starter with overload protection, open and close adjustable limit switches, and emergency release for operation during power failure.
3) Provide unit that is prewired and ready to be connected to power and control sources.
4) Provide operators capable of operating on nominal 480-volt, 3 phase, 60 hertz power supply.
5) Size motor to be capable of moving the weight of the gate.
f. Gear head motor:
1) Provide motor that is built as 1 unit with 1 stage of reduction.

2) Provide reduction stage consisting of carefully machine cut carburized worm and SAE 65 bronze worm gear.
3) Bearings: Provide anti-friction bearings complying with following:
   a) On motor shaft: Highest quality ball bearings.
   b) On slow speed shafts: Tapered roller bearings.
4) Gears and bearings: Operate in bath of oil:
   a) Prevent leakage of oil by providing double type oil seals around motor shaft and countershaft.
   b) Provide magnetic drum type brake with its easily adjustable feature built onto jackshaft for positive gate control.

g. Automatic limit switch:
1) Provide automatic limit switch designed to stop gates in fully open or closed positions that is precision built gear type driven by chain drive from jackshaft of operator.
2) Provide limit switch chain drive so located that any safety friction disc clutch slippage or manual operation of gate shall not cause mistiming of operator mechanism.

h. Operation:
1) Move gate by use of highest quality roller chain and heavy brackets attached to gates.
2) Provide simple releasing feature that is designed to operate in case of power failure.
3) Provide chain that is driven from dependable safety friction disc clutch on gear head motor's countershaft.
4) Provide safety clutch designed to protect personnel and equipment in case gate comes to contact with obstruction.
5) Operating speed:
   a) Provide operators having operating speed of not less than 60 feet per minute nor more than 90 feet per minute.
6) In addition to standard controls furnished with gate operators, make provisions for and provide terminal connection points for controls indicated on the Drawings and clearly indicated such connection points on operator control terminal board.
7) Operational sequence: Provide sequence as specified in Section 17100 - Control Strategies and 17101 - Specific Control Strategies.

B. Swing gates:
1. Hang gates by at least 2 hinges.
   a. Manufacturers: One of the following or equal:
      1) Richards-Wilcox, Number 1295.
      2) Stanley Vemco, ASJH-1.

C. Post mounted gate locks: Provide locks that:
1. Are electrically operated, post mounted type, and capable of positively locking gates to latch post.
2. Include manual key lock for disconnect in event of power failure.
3. Are designed to operate on 120 volts alternating current and that are suitable for outdoor use.
4. Manufacturers: The following or equal:
   a. Stanley Vemco, Number 420-141 for slide gate.

D. Remotely operated gates: Provide each gate or leaf operator having following features:
   1. Totally enclosed high starting torque motor separate from reduction system for ease of maintenance.
   2. Starters:
      a. Size and type: Provide size "O" contactor type, magnetic, reversing with electrical and mechanical interlocks.
      b. Wiring: Provide completely prewired to terminal block ready for field installation.
      c. Motor overload protection: Provided in starter.
      d. Control circuit: 120 volt, 1 phase, 60 hertz.
   3. Gear reducers:
      a. Gear reducers: Heavy-duty worm gear type running in oil.
      b. Additional gears, sprockets, pulleys, and chain: Heavy-duty.
      c. Bearings: Permanently lubricated type.
   4. Safety: Provide safety friction adjustable clutch capable of slipping if gate meets obstruction.
   5. Limit switches: Accurate and easily adjustable capable of controlling travel in full open and closed positions.
   6. Travel:
      a. Provide maximum travel by heavy crank arm with modified harmonic action.
      b. Provide gate travel that starts with smooth acceleration, keeps gradual speed, and then decelerate slowly into stop position.
   7. Housing: Provide housing that completely protects operating mechanism against weather conditions.
   8. Motors: Provide motor on each operator that is minimum 1/2 horsepower, 460 volt, 3 phase, 60 hertz, and high starting torque type.
   9. Manufacturers: One of the following or equal:
      a. Vemco Products, Inc., Model HSG-2 Vemco Industrial Gate Operators.
      b. Electric Power Door, Electric Power Door Gate Operators.

E. Electrically operated locks:
   1. Provide locks that are capable of being electrically operated from same locations from which gates are remotely controlled.
   2. Provide each lock having manual means of operating lock locally by use of key without use of electrical power.
   3. Provide locks for entrance gates that are keyed alike.
   4. Manufacturers: The following or equal:
      a. **[ ]**.
      b. **[ ]**.

F. Outside gate operator stands for plant entry gates:
   1. Provide stands containing phone handset connected to in-plant communication system.

2.07 FABRICATION

A. Shop finishing:
   1. Galvanizing: For items not fabricated of galvanized materials hot-dip galvanize products after fabrication in accordance with following as applicable:
      a. ASTM A123.

b. ASTM A153.
c. ASTM A385.
2. Mark galvanized products with name of galvanize, applicable ASTM designation, and weight of zinc coating.
3. Galvanize fabricated items complete, or in largest practicable sections.
4. Provide galvanizing at rate of 2.0 ounces per square foot, minimum.
5. Hardware:
a. Padlocks: Cadmium plated.
b. Chain: Galvanized.

B. Finish schedule:
1. Ferrous metal:
a. Typical: Clean, then hot-dip galvanize in accordance with galvanizing standards.

C. Field finish touch-up painting:
1. Galvanized repair paint: Apply paint having minimum dry film thickness of 2.0 to 3.5 mils.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of conditions: Verify field conditions prior to construction.

3.02 PREPARATION

A. Surface preparation:
1. Before locating fence posts grade ground to permit grade of fence to remain constant over any local elevations or depressions in ground line.

3.03 INSTALLATION

A. Chain link fences and gates:
1. General:
a. Install chain link fence and gates as indicated on the Drawings and specified in this Section.
b. Provide fence systems that are plumb, taut, true to line and grade, and complete in details.
c. Install fencing to generally follow finish grade of ground and provide pull posts at points where required to conform to change in grade.
d. Install fencing such that space between bottom of fence and finish ground line does not exceed 3 inches.
2. Concrete foundation for fence posts:
a. Set fence posts in concrete foundations, that extend at least 3 feet into ground, and space posts not over 10 feet apart.
b. Provide concrete foundations having minimum of 10 inches in diameter for line posts and 12 inches in diameter for corners and gates.
c. Provide foundations that extend minimum of 1 inch above finish grade and have tops that are shaped to slope to drain away from posts.
d. Trowel finish tops of footings, and slope or dome to direct water away from posts.

e. Set keepers, stops, sleeves, tracks, eye bolts, and other accessories into concrete as required.
f. Wheel rolling area for sliding gates shall be steel-trowel smooth finish concrete.

3. Post bracing:
   a. End corner, pull, and gate posts: Brace with same material as top rail and trussed to line posts with 3/8-inch rods and tighteners.
   b. Bracing end, corner, slope, and gate posts:
      1) Brace to midpoint of nearest line post or posts with horizontal braces used as compression members.
      2) Then from such line posts truss from brace back to bottom of end, corner, slope, or gate post with 3/8-inch steel truss rods with turnbuckles or other suitable tightening devices used as tension members.
4. Top rail:
   a. Unless otherwise specified or indicated on the Drawings, install fencing with top rail and bottom tension wire.
5. Fabric:
   a. Place fabric on outward facing side of the posts and install so that top edge projects over top rail of fence.
   b. Stretch fabric taut and securely fasten to posts, top rail, and bottom tension wire.
   c. Install tension wire parallel to line of fabric.
   d. Fabric: Connect fabric to:
      1) Line posts with wire clips minimum every 14 inches.
      2) Terminal, corner, and gate posts with tension bars tied to posts minimum 14 inches on center and with steel bands and bolts and nuts.
      3) Tension wires with hog rings minimum 24 inches on center.
6. Post top fittings: Provide post tops with extension arms.
7. Swing gates:
   a. Provide chain link fencing with swing gates, unless otherwise indicated on the Drawings or specified in this Section.
   b. Provide swing chain link gates where indicated on the Drawings.

B. Barbed wire fence and gates:
1. Typical barbed wire fencing:
   a. Construct 5-strand barbed wire fence with gates where indicated on the Drawings:
      1) Posts:
         a) Corner and gate posts and their braces: Set in concrete.
         b) Line posts: Firmly drive into ground with flat faces away from the property.
         c) Corner posts: Install at changes in direction over 5 degrees.
         d) Pull posts: Provide at not more than 500 feet on centers.
2. Barbed wire fencing Type 2:
   a. Except as otherwise specified or indicated on the Drawings, install barbed wire fence in accordance with requirements as specified in Caltrans State Specifications, Section 80-3.02 and as indicated in Caltrans, Standard Plan A 78-B.1.

C. Fabric wire gates:
   1. Install gateposts and gates as indicated on the Drawings. Deliver padlocks and keys to the Owner.

D. Rolling gates:
   1. Provide gates that are motor operated where indicated on the Drawings.
      a. Motor operator controls:
         1) Install manually operated switches where indicated on the Drawings.
         2) Install switch station stands where indicated on the Drawings.

3.04 FIELD QUALITY CONTROL

A. Manufacturer's field service:
   1. Manufacturer shall check and test powered gates and accessories before acceptance.
   2. Test gate operator through 10 full cycles and adjust operation without binding, scraping, or uneven motion.

3.05 TEST LIMIT SWITCHES FOR PROPER “AT REST” GATE POSITION. ADJUSTING

A. Adjust gate travel, stops, and operator position to meet field conditions.

3.06 CLEANING

A. Clean up surplus dirt, concrete, and other waste material and dress grade up upon completion of the work.

3.07 PROTECTION

A. Protect installed fences and gates against damage and, if damaged, repair prior to final acceptance.

END OF SECTION

SECTION 03200

CONCRETE REINFORCING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Reinforcing bars.
   2. Thread bars.
   3. Bar supports.
   4. Tie wires.

1.02 REFERENCES

A. American Concrete Institute (ACI):
   1. 318 - Building Code Requirements for Structural Concrete and Commentary.
   2. SP-66 - ACI Detailing Manual.

B. American Iron and Steel Institute (AISI).

C. American Welding Society (AWS):
   1. D1.4 - Structural Welding Code - Reinforcing Steel.

D. ASTM International (ASTM):
   1. A615 - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.

E. Concrete Reinforcing Steel Institute (CRSI):
   1. Manual of Standard Practice.

1.03 DEFINITIONS

A. Architectural concrete: Concrete surfaces that will be exposed to view in the finished work.
   1. Additionally, for purposes of this Section,includes:
      a. Concrete surfaces that are designated to receive paints or coatings.
      b. Exposed concrete in open basins, channels, and similar liquid containing structures:Surfaces shall be considered exposed to view if located above a line 2 feet below the normal operating water surface elevation in that structure.

B. Bars: Reinforcement or reinforcing bars as specified in this Section.

C. Evaluation Report: Report prepared by ICC-ES , or by other testing agency acceptable to the Engineer and to the Building Official, that documents testing and review of a product to confirm that it complies with the requirements of designated ICC-ES Acceptance Criteria, and its acceptance for use under the Building Code specified in Section 01410 - Regulatory Requirements.

D. Give away bars: Reinforcing bars that are not required by the Contract Documents, but are installed by the Contractor to provide support for the required reinforcing bars.

E. Wire supports: Metal reinforcing supports constructed of steel wire as specified. Includes individual high chairs, continuous high chairs, bolsters and other similar configurations and shapes.

1.04 SUBMITTALS

A. General:
   1. Submit in accordance with Section 01330 - Submittal Procedures.
   2. Changes to reinforcement in Contract Documents:
      a. Indicate in a separate letter submitted with shop drawings any changes to reinforcement indicated on the Drawings or specified.
      b. Such changes will not be acceptable unless Engineer has accepted them in writing.

B. Product data:
   1. Bar supports:
      a. Wire bar supports:
         1) Schedule of support materials to be provided and locations of use.
      b. Precast concrete bar supports ("dobies"):
         1) Manufacturer's data indicating compression strength of concrete and confirming dimensions and thickness(es).height(s) to be provided for each location where used.

C. Shop drawings:
   1. Reinforcement shop drawings:
      a. Submit drawings showing bending and placement of reinforcement required by the Contract Documents.
      b. Clearly indicate structures or portions of structures covered by each submittal.
         1) Submit reinforcement shop drawings for each structure as a complete package. Submittals addressing only a portion of a structure will be rejected and returned without review, unless such presentation is accepted by Engineer in advance.
      c. Shop drawings shall conform to the recommendations of the CRSI Manual of Standard Practice and ACI SP-66.
      d. Use the same bar identification marks on bending detail drawings, placement drawings, and shipping tags.
      e. Submittals consisting solely of reinforcing bar schedules, without accompanying placement drawings, will not be accepted unless accepted under prior written agreement with Engineer.
   2. Reinforcement placement drawings:
      a. Clearly show placement of each bar listed in the bill of materials, including additional reinforcement at corners and openings, and other reinforcement required by details in the Contract Documents.
      b. Clearly identify locations of reinforcement with coatings (e.g., galvanized or epoxy) and with yield strength other than ASTM A615, Grade 60.

c. Show anchor bolt locations based on anchor bolt templates for approved equipment.
d. Show splice locations.

3. Reinforcement fabrication drawings:
   a. If bend types or nomenclature differs from that recommended in the CRSI Manual of Standard Practice, provide details showing bend types and dimensional designations.
      Clearly identify reinforcement with coatings and with yield strength other than ASTM A615, Grade 60.

D. Samples (when requested by Engineer):
1. Bar supports/wire reinforcement supports: Samples of each type of chair and bolster proposed for use. Submit with letter stating where each type will be used.
2. Precast concrete bar supports: Samples of each type of precast support proposed for use. Submit with letter stating where each will be used.

E. Test reports:
1. Certified copy of mill test for each steel used. Show physical properties and chemical analysis.
   a. Mill test reports may be submitted as record documents at the time the reinforcement from that heat of steel is shipped to the site.
   b. In such cases, submit certificates under the shop drawing submittal number with the letter "R" (for record date) appended to the end (e.g., of the reinforcement was submitted as 03200-002-1, deliver the associated mill certificate as submittal 03200-002-1R).

F. Special procedures:
1. Welding procedures conforming to AWS D1.4 for reinforcement to be field welded.
   a. Procedures qualification record.

G. Qualifications statements:
1. Welder qualifications.

H. Closeout documents:
1. Field quality control and inspection reports.
2. Field quality assurance special inspection and testing reports.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Packing and shipping:
1. Deliver bars bundled and tagged with identifying tags.

B. Acceptance at site:
1. Reinforcing bars: Deliver reinforcing bars lacking grade identification marks with letter containing manufacturer's guarantee of grade.

1.06 SEQUENCING AND SCHEDULING

A. Bar supports:
1. Do not place concrete until samples and product data for bar supports have been accepted by Engineer.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. The drawings contain notes describing the size and spacing of reinforcement and its placement, details of reinforcement at wall corners and intersections, and details of extra reinforcement around openings in concrete, and other related information.

2.02 MATERIALS

A. Reinforcing bars:
   1. Provide reinforcement of the grades and quality specified, fabricated from new stock, free from excessive rust or scale, and free from unintended bends or other defects affecting its usefulness.
   2. Reinforcing bars:
      a. ASTM A615 Grade 60 deformed bars, including the following requirements.
         1) Actual yield strength based on mil tests of reinforcement provided shall not exceed the minimum yield strength specified in this Section by more than 18,000 pounds per square inch.
         2) Ratio of actual ultimate tensile strength to actual tensile yield strength shall not be less than 1.25.
   3. Reinforcing bars designated or required to be welded:
      a. Low-alloy, ASTM A706 Grade 60, deformed bars.

B. Bar supports:
   1. Wire supports:
      a. All stainless steel bar supports:
         1) Conforming to CRSI Manual of Standard Practice recommendations for types and details, but custom fabricated entirely from stainless steel wire conforming to ASTM A493, AISI Type 316.
      b. Stainless steel protected bar supports:
         1) Conforming to CRSI Manual of Standard Practice Class 2, Type B, and consisting of bright basic wire support fabricated from cold-drawn carbon steel wire with stainless steel ends attached at the bottom of each leg.
         2) Stainless steel wire ends shall conform to ASTM A493, AISI Type 316 and shall extend at least 3/4 inch inward from the formed surface of the concrete.
      c. Bright basic wire bar supports.
         1) Conforming to CRSI Manual if Standard Practice, Class 3.
   2. Plastic supports:
      a. Manufacturers: The following or equal:
         1) Aztec Concrete Accessories.
   3. Deformed steel reinforcing bar supports:
      a. Fabricated of materials and to CRSI details recommended for typical reinforcement embedded in concrete and bent to dimensions required to provide specified clearances and concrete cover.
   4. Precast concrete bar supports ("dobies"):
      a. Pre-manufactured, precast concrete blocks with cast-in annealed steel wires, 16-gauge or heavier.

b. Compression strength of concrete: Equal to or exceeding the compression strength of the surrounding concrete.
c. Block dimensions:
1) Height to provide specified concrete cover.
2) Footprint not less than 3 inches by 3 inches, and adequate to support the weight of the reinforcement and maintain specified concrete cover without settling into the underlying surface.

5. Stainless steel wire supports on stainless steel plates:
a. Type 304 stainless steel wire bar support chairs or bolsters supported on Type 304 stainless steel plates resting on the ground surface.
1) Weld plates to at least 2 legs of wire support chairs.

C. Tie wires:
1. General use: Black annealed steel wire, 16-gauge or heavier.

D. Welded wire fabric reinforcement:
1. Material:
a. Carbon steel conforming to ASTM A1064.
2. Provide welded wire reinforcement in flat sheet form. Rolled wire fabric is not permitted.
3. Fabric may be used in place of reinforcing bars if accepted by Engineer:
a. Provide welded wire fabric having cross-sectional area per linear foot not less than the cross-sectional area per linear foot of reinforcing bars indicated on the Drawings.

2.03 FABRICATION

A. Shop fabrication and assembly:
1. Cut and bend bars in accordance with provisions of ACI 318 and the CRSI Manual of Standard Practice.
2. Bend bars cold. Use bending collars to develop the recommended bend radius.
3. Provide bars free from defects and kinks and from bends not indicated on the Drawings.
4. Circumferential and radiused reinforcement: Roll to the radius required for its location in the structure before installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of conditions:
1. Reinforcing bars and welded wire reinforcement:
a. Verify that reinforcement is new stock, free from rust scale, loose mill scale, excessive rust, dirt, oil, and other coatings that will adversely affect bonding capacity when placed in the Work.

3.02 PREPARATION

A. Surface preparation:
   1. Reinforcing bars - uncoated:
      a. Clean reinforcement of concrete, dirt, oil and other coatings that will adversely affect bond before embedding bars in subsequent concrete placements.
      b. Thin coating of red rust resulting from short exposure will not be considered objectionable. Thoroughly clean bars having rust scale, loose mill scale, or thick rust coat.
      c. Partially embedded reinforcement: Remove concrete or other deleterious coatings from dowels and other projecting bars by wire brushing or sandblasting before bars are embedded in subsequent concrete placements.

3.03 INSTALLATION

A. Reinforcing bars: General:
   1. Field-cutting of reinforcing bars is not permitted.
   2. Field-bending of reinforcing bars, including straightening and rebending, is not permitted.

B. Placing reinforcing bars:
   1. Accurately place bars to meet position and cover requirements indicated on the Drawings and specified. Secure bars in position.
   2. Tolerances for placement and minimum concrete cover: As listed in Table 1.

Table 1 - Reinforcement Placing Tolerances

Member	Tolerance on Reinforcement Location (1)	Tolerance on Minimum Concrete Cover (1,2)
Slabs, beams, walls and columns except as noted below:		
10 inches thick and less	± 3/8 inch	- 3/8 inch
More than 10 inches thick	± 1/2 inch	- 1/2 inch
Formed soffits:	As noted above	- 1/4 inch
Longitudinal location of bends and ends of reinforcement:		
Conditions not listed below:	± 2 inches	- 1/2 inch
At discontinuous ends of brackets and corbels	± 1/2 inch	- 1/4 inch
At discontinuous ends of other members:	± 1 inch	- 1/2 inch

Notes:
(1) ± indicates "plus or minus;" - indicates "minus;" + indicates "plus."
(2) Tolerance on cover is limited as noted, but decrease in cover shall not exceed one third of the minimum cover indicated on the Drawings.

3. Spacing between bars:
    a. Minimum clear spacing between bars in a layer:
        1) As indicated on the Drawings, but not less than the larger of 1.5 times the bar diameter or 1-1/2 inches.
    b. Minimum clear spacing between bars in 2 or more parallel layers:
        1) Place bars in upper layers directly above bars in lower layers.
        2) Minimum spacing between layers: As indicated on the Drawings, but not less than the larger of 1.5 times the bar diameter or 1-1/2 inches.
    c. Limits on minimum clear spacing between bars also applies to the clear spacing between a lap splice and the adjacent bars and/or lap splices.
4. Lap splices for bars:
    a. Lap splice locations and lap splice lengths: as indicated on the Drawings. Where lap lengths are not indicated, provide in accordance with ACI 318.
    b. Unless otherwise specifically indicated on the Drawings (and noted as "non-contact lap splice"), install bars at lap splices in contact with each other and fasten together with tie wire.
    c. Where bars are to be lap spliced at concrete joints, ensure that bars project from the first concrete placement a length equal to or greater than minimum lap splice length indicated on the Drawings.
    d. Stagger lap splices where indicated on the Drawings.
    e. Where lap splice lengths are not indicated on the Drawings, provide lap splice lengths in accordance with ACI 318.

C. Reinforcing supports:
1. Provide supports of sufficient numbers, sizes, and locations to maintain concrete cover, to prevent sagging and shifting, and to support loads during construction without displacement and without gouging or indentation into forming surfaces.
    a. Quantities and locations of supports shall not be less than those indicated in ACI SP-66 and the CRSI Manual of Standard Practice.
2. Do not use brick, concrete masonry units, concrete spalls, rocks, wood, or similar materials for supporting reinforcement.
3. Do not use "give away bars" that have less cover than that required by the Contract Documents. Do not adjust the location of reinforcement required by the Contract Documents to provide cover for give away bars.
4. Provide bar supports of height required to maintain the clear concrete cover indicated on the Drawings.
5. Provide bar supports at formed vertical faces to maintain the clear concrete cover indicated on the Drawings.
6. Schedule of reinforcement support materials: Provide bar supports as indicated in Table 2.

Table 2 - Reinforcement Support Materials

Case	Location	Material
a.	Concrete placed over earth and concrete seal slabs ("mud mats"):	Precast concrete bar supports. Stainless steel wire supports on stainless steel plates.
b.	Concrete placed against forms and exposed to water or wastewater process liquids (whether or not such concrete received additional linings or coatings):	All stainless steel bar supports.

Table 2 - Reinforcement Support Materials		
Case	**Location**	**Material**
c.	Concrete placed against forms and exposed to earth, weather, frequent washdown, or groundwater in the finished work	All stainless steel bar supports. Stainless steel protected bar supports.
d.	Concrete placed against forms and exposed to interior equipment/piping areas in the finished work	All stainless steel bar supports. Stainless steel protected bars supports.
e.	Between mats of reinforcement, and fully embedded within a concrete member	Bright basic wire bars supports, or deformed steel reinforcing bars.

D. Tying of reinforcing:
   1. Fasten reinforcement securely in place with wire ties.
   2. Tie reinforcement at spacings sufficient to prevent shifting.
      a. Provide at least 3 ties in each bar length. (Does not apply to dowel lap splices or to bars shorter than 4 feet, unless necessary for rigidity).
   3. Tie slab bars at every intersection around perimeter of slab.
   4. Tie wall bars and slab bar intersections other than around perimeter at not less than every fourth intersection, but at not more than the spacing indicated in Table 3:

Table 3 - Maximum Spacing of Tie Wires for Reinforcement		
Bar Size	**Slab Bar Spacing (inches)**	**Wall Bar Spacing (inches)**
Bars Number 5 and Smaller	60	48
Bars Number 6 through Number 9	96	60
Bars Number 10 and Number 11	120	96

   5. After tying:
      a. Bend ends of wires inward towards the center of the concrete section. Minimum concrete cover for tie wires shall be the same as cover requirements for reinforcement.
      b. Remove tie wire clippings from inside forms before placing concrete.

3.04 FIELD QUALITY CONTROL

A. Provide quality control for the Work of this Section as specified in Section 01450 - Quality Control.

B. Field inspections and testing:
   1. Submit records of inspections and testing to Engineer in electronic format within 24 hours after completion.

3.05 FIELD QUALITY ASSURANCE

A. Provide quality assurance as specified in Section 01450 - Quality Control.

B. Special inspections and tests:
   1. Provide as specified in Section 01455 - Regulatory Quality Assurance.
   2. Frequency of inspections:
      a. Unless otherwise indicated on the Drawings or in this Section, provide periodic special inspection as required by the Building Code specified in Section 01410 - Regulatory Requirements.
   3. Preparation:
      a. Review Drawings and Specification for the Work to be observed.
      b. Review approved submittal sand shop drawings.
   4. Inspections: Special inspection shall include, but is not limited to, the following items.
      a. Reinforcement: General:
         1) Type (material) and location of reinforcement supports.
         2) Bar material/steel grade and bar size.
         3) Location, placement, and spacing of bars.
         4) Clear concrete cover over reinforcement.
         5) Lap splice: Location and lap length. Bars within tolerances for contact (unless non-contact splice is indicated on the Drawings.)
         6) Bar hooks and development lengths embedded within concrete sections as indicated on the Drawings.
         7) Reinforcement tired in position and tie wire legs turned inward toward the center of the concrete section.
      b. Reinforcement: Welding:
         1) Inspector qualification and inspections shall be in accordance with the requirements of AWS D1.4.
         2) Provide periodic inspection for:
            a) Weldability of reinforcement other than ASTM A706.
            b) Single pass fillet welds with thickness less than or equal to 5/16 inch.
         3) Provide continuous inspection for:
            a) Other welds.
            b) Welds at mechanical reinforcing bar couplers and end anchors.
         4) In addition to visual inspection, Owner may inspect reinforcing bar welds by other methods, including radiographic inspection.
   5. Records of inspections:
      a. Provide a written record of each inspection using forms acceptable to the Engineer and to the Building Official.
      b. Submit electronic copies of inspection reports to Engineer within 24 hours after completion of inspections.

3.06 NON-CONFORMING WORK

A. Before placing concrete, adjust or remove and re-install reinforcement to conform to the requirements of the Contract Documents.

END OF SECTION

SECTION 03300

CAST-IN-PLACE-CONCRETE

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PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Cast-in-place concrete:

B. The requirements of this Section will require advance planning for preparation and testing of trial batches. Review the mix design and testing requirements carefully, and schedule preparations and testing with sufficient time to complete tests, to obtain Engineer's review of mixes and testing results, and to complete revisions and re-testing if required.

1.02 REFERENCES

A. American Concrete Institute (ACI):
1. 212.3R - Report on Chemical Admixtures for Concrete.
2. 302.1R - Guide to Concrete Floor and Slab Construction.
3. 305R - Guide to Hot Weather Concreting.
4. 306R - Guide to Cold Weather Concreting.
5. 318 - Building Code Requirements for Structural Concrete and Commentary.
6. 350 - Code Requirements for Environmental Engineering Concrete Structures and Commentary.
7. Manual of Concrete Practice.

B. ASTM International (ASTM):
1. C29 - Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate.
2. C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
3. C33 - Standard Specification for Concrete Aggregates.
4. C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
5. C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.
6. C42 - Standard Test Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
7. C88 - Standard Test Method of Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
8. C94 - Standard Specification for Ready-Mixed Concrete.
9. C114 - Standard Test Methods for Chemical Analysis of Hydraulic Cement.
10. C117 - Standard Test Method for Materials Finer that 75-m (No. 200) Sieve in Mineral Aggregates by Washing.
11. C123 - Standard Test Method for Lightweight Particles in Aggregate.
12. C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
13. C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
14. C138 - Standard Test Method for Den.sity (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
15. C142 - Standard Test Method for Clay Lumps and Friable Particles in Aggregate.
16. C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete.

17. C150 - Standard Specification for Portland Cement.
18. C156 - Standard Test Method for Water Loss from a Mortar Specimen Through Liquid Membrane-Forming Curing Compounds for Concrete.
19. C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
20. C171 - Standard Specifications for Sheet Materials for Curing Concrete.
21. C172 - Standard Practice for Sampling Freshly Mixed Concrete.
22. C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
23. C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
24. C293 - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam With Center-Point Loading).
25. C295 - Standard Guide to Petrographic Examination of Aggregates for Concrete.
26. C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
27. C311 - Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete.
28. C494 - Standard Specification for Chemical Admixtures for Concrete.
29. **[C595 - Standard Specification for Blended Hydraulic Cements.]**
30. C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
31. C702 - Standard Practice for Reducing Samples of Aggregate to Testing Size.
32. C856 - Standard Practice for Petrographic Examination of Hardened Concrete.
33. C989 - Standard Specification for Slag Cement for Use in Concrete and Mortars.
34. C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
35. C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
36. C1218 - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
37. C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
38. C1260 - Standard Test Method of Potential Alkali Reactivity of Aggregates (Mortar Bar Method).
39. C1293 - Standard Test Method for Determination of Length Change of Concrete due to Alkali-Silica Reaction.
40. C1567 - Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method).
41. C1602 - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
42. C1778 - Standard Guide for Reducing the Risk of Deleterious Alkali-Aggregate Reaction in Concrete.
43. D29 - Standard Practice for Determining Volatile and Nonvolatile Content of Cellulosics, Emulsions, Resin Solutions, Shellac, and Varnishes.
44. D75 - Standard Practice for Sampling Aggregates.
45. D2103 - Standard Specification for Polyethylene Film and Sheeting.
46. D3665 - Standard Practice for Random Sampling of Construction Materials.
47. D4791 - Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

C. National Ready-Mixed Concrete Association (NRMCA).

D. NSF International (NSF):
   1. 61 - Drinking Water System Components - Health Effects.

1.03 DEFINITIONS

A. Alkali: The sum of sodium oxide and potassium oxide calculated as sodium oxide.

B. Alkali load: Amount of alkalies contributed by the portland cement in a concrete mixture, expressed in pounds per cubic yard (lb/yd^3) and calculated by multiplying the portland cement content of the concrete in lb/yd^3 by the alkali content of the portland cement, or the portland cement portion of a blended cement, divided by 100.

C. Architectural concrete: Concrete surfaces that will be exposed to view in the finished work.
   1. For purposes of this Section, includes only those surfaces that receive paint or coatings.
   2. Exposed concrete surfaces in open basins, channels, and similar liquid containing structures: Surfaces will be considered exposed to view if located above the water line as defined in Section 03366 - Tool Concrete Finishing.
   3. Exterior concrete surfaces with portions above and below grade: Surface will be considered exposed to view of located above the grade line as defined in Section 03366 - Tool Concrete Finishing.

D. Average daily temperature: Calculated by summing hourly measurements of air temperature in the shade at the face of the concrete and dividing that sum by 24. In calculating the sum of the temperatures recorded, any measurement less than 50 degrees Fahrenheit shall be recorded as 0 degrees Fahrenheit and included in the sum.

E. Cementitious materials: Portland cement and supplementary cementitious materials.

F. Class of concrete: Refers to a mix with characteristics, proportions, and constituents (including a specific combination of admixtures) as specified in this Section.
   1. Any change in the source or characteristics of constituent materials, in the proportions of materials, or in the admixtures included in a mix shall be considered as creating a new and separate class of concrete.
   2. Any mix to be placed by pumping shall be considered as creating a new and separate class of concrete.

G. Cold weather: Includes one or more of the following conditions:
   1. Current air temperature is 45 degrees Fahrenheit and falling.
   2. Air temperature during the first 24 hours after placement is expected to fall into the range of 45 degrees Fahrenheit to 40 degrees Fahrenheit.
   3. A period when, for more than 3 consecutive days, the following conditions exist:
      a. The average daily air temperature drops below 40 degrees Fahrenheit.
      b. The air temperature is not greater than 50 degrees Fahrenheit for more than one-half of any consecutive 24-hour period.

H. Cold weather concreting: Operations for placing, finishing, curing, and protecting concrete during cold weather.

I. Green concrete: Concrete that has not yet achieved 100 percent of the minimum specified compressive strength, f'c, for that mix.

J. Hairline crack: Crack with a crack width of less than 4 thousandths of an inch (0.004 inches).

K. Hot weather: Any combination of ambient temperature, concrete temperature, relative humidity, wind speed, and solar radiation intensity that creates conditions that will evaporate water from a free concrete surface at a rate equal to or greater than 0.2 pounds per square foot per hour as determined by the Menzel Formula and nomograph published in ACI 305R and in this Section, Attachment A - Menzel Formula and Nomograph.

L. Hot weather concreting: Operations for placing, finishing, curing, and protecting concrete during hot weather.

M. Mass concrete: Concrete with a thickness of more than 36 inches.

N. Paste content: The total concrete volume minus the volume of aggregate, expressed as a percentage of total volume. Paste volume includes volume of cementitious materials, water, air, admixtures materials, and any fibers.

O. Supplemental cementitious material: inorganic material such as fly ash, natural pozzolans, silica fume, or slag cement that reacts pozzolanically or hydraulically.

1.04 DELEGATED DESIGN

A. Provide Delegated Design for the following Work, based on the requirements of this Section.
   1. Concrete mix designs.

1.05 SUBMITTALS

A. General:
   1. Data for concrete mixes and mix constituents supplied to the Work shall be coordinated through a single supplier.
   2. A maximum of 2 mix designs will be reviewed by the Engineer for each class of concrete required.
      a. Review of additional mix designs shall be at the expense of the Contractor.

B. Product data:
   1. Submit data completely describing products and demonstrating compliance with the requirements of this Section.
   2. Data for all products in the mix for each class of concrete shall be submitted concurrently with that mix design.
   3. Where products conforming to NSF-61 are required, submit evidence of testing and listing under NSF-61 for use in direct contact with potable water. Testing and listing shall be by a nationally recognized agency acceptable to the Engineer.

4. Admixtures:
    a. For each admixture included in concrete mixes, submit manufacturer's product data demonstrating compliance with standards specified.
    b. If air entraining admixture requires test method other than ASTM C173 to accurately determine air content, make special note of requirements in submittal.
5. Curing compound: Submit complete data on proposed compound.

C. Design data:
1. Concrete mix designs:
    a. Submit full details, including mix design calculations and plots, for concrete mixes proposed for use for each class of concrete.
    b. Include mix design calculations of proportions by both weight and volume.
    c. Determine and include the alkali load of the proposed mix.
    d. Include information on correction of batching for varying moisture contents of fine aggregate.
    e. Submit source quality test records with mix design submittal.
    f. Provide calculations demonstrating that the mixes proposed provide the required average compression strength of concrete (f'cr) based on source quality test records.
    g. For each Class A mix design submitted, plot the mix design Attachment B - Coarseness Factor Chart and submit.
    h. For each Class A mix design submitted, plot the combined aggregate gradation on the chart Attachment C - Combined Aggregate Gradation Chart and submit.

D. Concrete mixes - Trial batches:
1. Drying shrinkage test results.
    a. Submit results of testing.
2. Compression strength test results.
    a. Submit results of testing. Provide data for each cylinder tested.
    b. Submit data indicating trial batch mix designator, slump, and specimen number for each test cylinder.
        1) Using indelible marker, clearly label each cylinder with concrete class, trail batch number, and specimen number.
3. If there is any change in suppliers or in quality of concrete mix constituents, submit new test data.

E. Test reports:
1. Dated not more than 24 months prior to the date of submittal.
2. Aggregate:
    a. Submit certified copies of commercial laboratory tests proposed for use in concrete.
    b. Sieve analyses:
        1) During construction, submit sieve analyses of coarse, fine, and combined aggregates used any time there is a change in supplier, or a significant change in the character and/or grading of materials, and when requested by the Engineer.
    c. Aggregates - coarse:
        1) Physical properties:
            a) Sieve analysis.

b) Percentage of particles having flat and/or elongated characteristics.
c) Abrasion loss.
d) Soundness.

2) Deleterious substances:
a) Clay lumps and friable particles content.
b) Materials finer than 200 sieve (percentage).
c) Shale and chert content.
d) Coal and lignite content.

3) Alkali reactivity.

4) Deleterious substances:
a) Clay lumps and friable particles content.
b) Chert and shale content.
c) Coal and lignite content.
d) Materials finer than No. 200 sieve.

5) Alkali reactivity.

d. Aggregates - Fine:
1) Physical properties:
a) Sieve analysis and fineness modulus.
b) Soundness.

2) Deleterious substances:
a) Clay lumps and friable particles (percentage).
b) Materials finer than No. 200 sieve (percentage).
c) Coal and lignite (percentage).
d) Shale and chert.
e) Organic impurities ("Color" as determined by ASTM C40).

3) Alkali reactivity.

e. Aggregates - Combined:
1) Test combined gradation for the following sieve sizes: 1.5 inches, 1 inch, 3/4 inch, 1/2 inch, 3/8 inch, Number 4, Number 8, Number 16, Number 30, Number 100, Number 200.
2) Bulk density in accordance with ASTM C29.
3) Void content in accordance with ASTM C29.
4) Submit at:
a) Initial mixture design submittal.
b) Intervals of not more than 4 weeks.
c) Any time there is a change in character or grading of constituent materials.
d) When requested by the Engineer.

3. Cement:
a. Mill tests, including alkali content measured as equivalent alkalis, for each shipment of cement included in the Work.
1) During construction, submit mill certificates for cement being used at intervals of not more than 90 days, any time there is a change in supplier or a significant change in the character of the materials, and when requested by the Engineer.

4. Supplemental cementitious material:
a. Fly ash: Identify source and provide testing results to demonstrate compliance with requirements of ASTM C618 and this Section.
1) Include supplier's report certifying the total alkali content of the material, expressed as equivalent percentage of sodium oxide (Na_2Oe).

b. Slag cement: Identify source and provide testing results to demonstrate compliance with requirements of ASTM C989 and this Section.
c. Silica fume: Identify source and provide testing results to demonstrate compliance with requirements of ASTM C1240 and this Section.

F. Certificates:
1. Current NRMCA certification for all plants and trucks that will be used to supply concrete.

G. Source quality control submittals:
1. Truck batch tickets for each load of concrete delivered to the site, whether accepted or rejected.
2. Concrete supplier's quality control plan. Include the following elements, at a minimum:
a. Names and qualifications of key quality control personnel:
1) Quality control manager.
2) Testing and inspection personnel.
b. Names and qualifications of testing laboratories:
1) Each laboratory shall hold current accreditation from the AASHTO Accreditation Program, or other accreditation program acceptable to the Engineer, for each test performed.
c. Example forms for: inspection reports, certificates of compliance, and test results.
d. Quality control procedures: Method and frequency of performing each procedure, including inspections and materials testing. At a minimum, the plan shall include:
1) Daily testing of aggregate gradation.
2) Monthly testing of cement quality.
3) Monthly testing of fly ash quality.
e. Procedures to control quality characteristics, including standard procedures to address properties outside the specified operating limits, and example reports to document non-conformances and corrective actions taken. Include procedure for notifying Contractor and Engineer of non-conformances.
f. Procedures for verifying that:
1) Materials are properly stored during concrete batching operations.
2) Batch plants have the ability to maintain concrete consistency during periods of extreme heat and of low temperatures.
3) Admixtures are dispensed in the correct dosages within the accuracy requirements specified.
4) Delivery trucks have a valid NRMCA certification card.
g. Procedures for verifying that weighmaster certificate for each load of concrete shows:
1) Cement and supplementary materials are from sources designated in the approved submittals.
2) Concrete as-batched complies with the constituent weights designated in the approved submittals.
3) Corrections for aggregate moisture are being correctly applied.
4) Any mix water withheld from the batch.
h. Procedures for visually inspecting concrete during discharge.

H. Field quality control submittals:
   1. Contractor's notifications of readiness for concrete placement.
   2. Contractor's reports of field quality control testing.
      a. Include with each report the concrete batch ticket number and identification numbers for associated cylinders used for compressive strength testing.
      b. Testing results for slump, temperature, unit weight, and air entrainment.
      c. Testing results for compressive strength at 7 and 28 days, and for any compressive strength tests after 28 days.
      d. Note on batch ticket the amount of water that was withheld and the maximum amount that can be added on site as "Max add water." Record on the batch ticket the volume of water actually added at site.
      e. Note on the batch ticket the concrete mix classification as defined in Table 3 of this Section.

I. Special procedure submittals:
   1. Sequence of concrete placing:
      a. Submit proposed sequence of placing concrete showing proposed beginning and ending of individual placements. Submittal shall include plans sections and details to address all pours.
   2. Cold weather concreting plan.
   3. Hot weather concreting plan.
   4. Repair of defective concrete: Submit mix design for repair materials to be used.

1.06 QUALITY ASSURANCE

A. Pre-installation meetings:
   1. Schedule and conduct pre-installation meeting at least 10 days prior to batching and placing of concrete.
      a. Provide additional meetings if necessary, to discuss specific concrete submittals, mixes, or placing and curing conditions.
      b. Notify Engineer of location and time of each conference.
   2. Required attendees:
      a. Contractor including Contractor's superintendent and key personnel.
      b. Concrete supplier.
      c. Technical representative(s) of supplier(s) of concrete admixtures.
      d. Subcontractor(s) providing pumping, placing, finishing, and curing.
      e. Subcontractor(s) providing embedded items (structural embedded plates, electrical conduit).
      f. Sampling and testing personnel.
      g. Engineer.
      h. On-site inspectors representing Engineer.
      i. Other persons deemed by the Engineer and the Contractor to be critical to the quality and efficiency of the Work.
   3. Agenda:
      a. Review of requirements of Drawings and Specifications.
      b. Project and product safety requirements.
      c. Discussion of points of interface and coordination between various trades or products to be used in the Work.
      d. Contractor's schedule for cast-in-place concrete work.
      e. Mix designs, mix tests, and submittals.

f. Admixture types, dosing, performance, requirements for monitoring, and limits on dosing or re-dosing at the site.
g. Placement and consolidation methods, techniques, and equipment and the effects of those methods on form pressures.
h. Slump and limits on placing time or conditions to maintain placeability.
    1) Field adjustment of slump and air content.
i. Procedures for finishing, curing, and retention of moisture during these operations.
j. Procedures and protection for hot and cold weather conditions.
k. Requirements and coordination for inspections.
    1) Responsibility for test specimen curing and storage.
    2) Distribution of test reports.
l. Other Specification requirements requiring coordination between parties to the work.

4. Prepare and submit minutes of the pre-installation meeting as specified in Section 01312 - Project Meetings.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Packing and shipping:
1. Deliver, store, and handle concrete materials in manner that prevents damage and inclusion of foreign substances.
2. Deliver and store packaged materials in original containers until ready for use.
3. Deliver aggregate to mixing site and handle in such manner that variations in moisture content will not interfere with steady production of concrete of specified degree of uniformity and slump.

B. Acceptance at site:
1. Reject material containers or materials showing evidence of water or other damage.
2. Concrete mixes: Do not accept or incorporate into the Work concrete mixes that do not comply with the specified requirements for water content, slump, temperature, and air content.

1.08 PROJECT CONDITIONS

A. Cold weather concreting: During periods of cold weather as defined in this Section, implement cold weather concreting procedures in this Section.

B. Hot weather concreting: During periods of hot weather as defined in this Section, implement hot weather concreting procedures in this Section.

1.09 SEQUENCING AND SCHEDULING

A. Schedule placing of concrete in a manner that completes all placing operations from one construction, contraction, or expansion joint to another construction, contraction, or expansion joint.

B. Joints at each end of the placement shall be as indicated on the Drawings, or as identified and accepted in advance by the Engineer.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. It is the intent of this Section to secure, for every part of the Work, concrete with a homogeneous mixture, that, when hardened, will have required strength, watertightness, and durability.

B. It is the intent of this Section to procure a workable, low-shrinkage concrete mix that maximizes aggregate content and minimizes paste content.

C. Performance requirements:
   1. General:
      a. Except as otherwise specified, provide concrete composed of portland cement, supplemental cementitious materials, aggregate, admixtures and water, proportioned and mixed to produce a plastic, workable mixture in accordance with requirements of this Section, and suitable to specific conditions of placement.
      b. Proportion aggregates to produce an gradation of aggregate that combines fine and coarse aggregate in well-graded proportions that maximizes the aggregate content and minimizes the paste content of the mix. The gradation should maximize long-term durability and strength of the concrete mixture.
      c. Durability requirements will be deemed to be satisfied when:
         1) The mixture is proportioned with a well-graded combined aggregate.
         2) The specified water-cement ratio is satisfied.
         3) The concrete contains the specified range of air content.
         4) The maximum specified paste content is satisfied.
      d. Proportion materials in a manner that will secure the lowest cement content, water-cementious materials ratio, and paste volume that is consistent with good workability, that provides a plastic and cohesive mixture, and that provides a slump that is within the specified range.
      e. Construction and expansion joints have been positioned in structures as indicated on the Drawings, and curing methods have been specified, for purpose of to reduce the number and size of cracks, resulting from normal expansion and contraction expected from the concrete mixes specified.
      f. Remove and replace, or repair as specified in Part III, non-conforming work and surfaces with cracks, voids and honeycombs, or surface wetness.
   2. Workmanship and methods: Provide concrete work, including detailing of reinforcing, conforming with best standard practices and as set forth in ACI 318, ACI 350, and the ACI Manual of Concrete Practice.

2.02 MATERIALS - GENERAL

A. Water and ice:
   1. Water for concrete mixes, for washing aggregate, and for curing concrete: Clean and free from oil and deleterious amounts of alkali, acid, organic matter, or other substances.
   2. Do not exceed the optional chemical limits in accordance with ASTM C1602.
   3. Do not use water recycled from previously returned fresh concrete.

2.03 MATERIALS - CONCRETE MIX CONSTITUENTS

A. If the project includes concrete that will be in contact with potable water then concrete mix constituents shall meet NSF-61 certification unless otherwise approved by the Engineer.

B. Water and ice:
   1. As specified in the preceding paragraphs.

C. Cementitious materials:
   1. Portland cement:
      a. In accordance with ASTM C150.
         1) Type II.
      b. Single source: To provide uniformity of appearance, for each structure use only one source, type, and brand of portland cement for walls and slabs that will be exposed in the finished work.
         1) Confirm adequate supply of cement over duration of project before making trial batches or beginning concrete placements.
      c. Cement for finishing: Provide cement from same source and of same type as concrete to be finished or repaired.
      d. In accordance with NSF 61.

D. Supplementary cementitious materials:
   1. Fly ash:
      a. Class C or Class F fly ash in accordance with the requirements of ASTM C618, except as modified in this Section.
         1) Class C, may be used in concrete made with Type II portland cement.
         2) Class F required if used in concrete mixes containing aggregates classified as potentially reactive based on ASTM C1293 or ASTM C1260.
            a) CaO content: Less than 18 percent.
      b. Loss on ignition: Not exceeding 3 percent.
      c. In accordance with NSF 61.
      d. Replace portland cement at ratio of 1.0 pound fly ash for each pound of cement, up to minimum and maximum replacement as specified in "Requirements for Mix Proportioning."
   2. Slag cement:
      a. Grade 80, 100, or 120 in accordance with ASTM C989, except as modified below:
         1) Fineness: Amount retained on a No. 325 sieve: 20 percent maximum.
         2) Total alkalies Na2O + 0.658 K2O:
            a) Minimum: 0.60 percent.
            b) Maximum: 0.90 percent.
      b. In accordance with NSF 61.
   3. Silica fume:
      a. Provide silica fume in accordance with ASTM C1240, except as modified below:
         1) Moisture content: 3 percent maximum.
         2) Loss on ignition: 6 percent maximum.

3) Reactivity with cement alkalies: 80 percent minimum.
4) Sulfate resistance: maximum 0.10 percent expansion at 6 months.

b. In accordance with NSF 61.

E. Admixtures:
1. General:
a. Do not include admixtures, other than those specified, unless written acceptance has been obtained from the Engineer during submittal of mix designs.
b. Admixtures shall be compatible with concrete constituents and with other admixtures.
1) All admixtures in a given mix shall be products of the same manufacturer to ensure compatibility.
2) Admixture manufacturers: One of the following, or equal.
a) Master Builders Solutions.
b) Euclid Chemical.
c) GCP Applied Technologies (formerly W.R. Grace).
d) Sika Corp.
c. Admixtures shall be tested and listed under NSF-61 for use in direct contact with potable water.
d. Do not use admixtures containing chlorides, calculated as chloride ion, in excess of 0.5 percent by weight of cement.
e. Use in accordance with manufacturer's recommendations. Add each admixture to concrete mix separately.
f. Admixtures used shall be the same products used in concrete trial batches, or the same products used in concrete represented by submitted field test records.
2. Air entraining admixture (AEA):
a. In accordance with ASTM C260, and dosed to provide entrained air percentages specified in this Section.
b. Provides entrained air as bubbles, evenly dispersed at the time of placement and during curing.
3. Water reducing admixture(WRA):
a. May be used at the Contractor's option.
b. Conforming to ASTM C494, Type A (water-reducing).
1) ASTM C494, Type D (water-reducing and retarding) may be used during periods of hot weather with prior acceptance by the Engineer.
c. Not containing air-entraining agents.
d. Liquid form before adding to the concrete mix.
4. High range water reducing admixtures ("super-plasticizers") (HRWR):
a. Not permitted without acceptance by Engineer.
5. Shrinkage reducing admixture (SRA):
a. May be used at Contractor's option.
1) Provide shrinkage reducing admixture in sufficient dosage so as to produce shrinkage within the limits specified.
b. Not containing expansive agents.
c. In accordance with ASTM C494, Type S (specific performance).
d. One of the following, or equal:
1) Master Builders Solutions: SRA Series.

2) Euclid Chemical: Eucon SRA Series.
3) GCP Applied Technologies: Eclipse Series.

6. Set-controlling admixtures:
   a. Shall not be used without prior acceptance from Engineer.

F. Coloring admixtures:
   1. Conduit encasement coloring agent:
      a. Red color concrete used for encasement of electrical ducts, conduits, and similar type items.
      b. Manufacturers: One of the following or equal:
         1) Davis Co., #100 Utility Red.
         2) I. Reiss Co., Inc., equivalent product.
         3) Euclid Chemical Co., Increte Division, “Colorcrete Brick Red.”
      c. Conduit encasement concrete: Mix into each cubic yard of concrete 10 pounds of coloring agent.

G. Aggregate:
   1. General:
      a. Provide concrete aggregates that are sound, graded as specified, and free of deleterious material in excess of allowable amounts specified.
      b. Provide aggregates to produce in place concrete with unit weight as follows:
         1) Normal weight concrete: Not less than 140 pounds per cubic foot.
      c. Do not use aggregate made from recycled materials such as crushed and screened hydraulic-cement concrete, brick, and other construction materials.
      d. Do not use aggregate recycled from fresh concrete returned to the batching facility.
      e. In accordance with NSF 61.
   2. Alkali-silica reactivity:
      a. Provide aggregate classified as aggregate-reactivity class of R0 in accordance with ASTM C1778 with expansion not greater than 0.10 percent at 14 days when tested in accordance with ASTM C1260, and not greater than 0.04 percent at one year when tested in accordance with ASTM C1293.
   3. Fine aggregate:
      a. Material graded such that 95 to 100 percent of material passes the No. 4 (4.75 mm) sieve, when sampled in accordance with ASTM D75 and D3665, and tested in accordance with ASTM C136.
      b. Provide fine aggregate consisting of clean, natural sand, or sand prepared from crushed stone or crushed gravel.
      c. In accordance with ASTM C33 requirements for grading, deleterious substances, soundness, and alkali reactivity, except as modified in the following paragraphs.
         1) Grading: For sieve sizes listed in ASTM C33 for fine aggregate, not more than 45 percent passing any sieve and retained on the next consecutive sieve.
         2) Deleterious substances: not in excess of the percentages by weight specified in Table 1 of this Section.

Table 1: Fine Aggregate, Limits on Deleterious Substances		
Item	**Test Method**	**Percent (maximum)**
Materials finer than No. 200 sieve(2)	ASTM C117	3.00(2)
Clay lumps and friable particles	ASTM C142	1.00
Lightweight particles (SG < 2.40)	ASTM C123	1.00
• Chert or shale(1)	ASTM C295	1.00(1)
Coal and lignite	ASTM C123	0.50

Notes:

(1) ASTM C123 tests for particles in the sample having a specific gravity less than 2.40. ASTM C295 is used to identify which of those lightweight particles are chert, shale, or coal and lignite. If testing under ASTM C123 indicates a combined percentage of lightweight particles (sum of shale, chert, coal and lignite) not greater than 1.00, testing under ASTM C295 will not be required.

(2) For manufactured sand, if material finer than the No. 200 sieve consists of crusher dust and the aggregate is essentially free of clay or shale, maximum percentage may be increased to 5.0 percent.

3) Organic impurities: Free of injurious amounts of organic matter and producing a supernatant liquid with color not darker than “standard color” when tested in accordance with ASTM C40.
4) Soundness: In accordance with requirements of ASTM C33 when tested in accordance with ASTM C88 using sodium sulfite solution.

4. Coarse aggregate:
   a. Materials graded such that not more than 10 percent of material passes the 3/8-inch sieve, when sampled in accordance with ASTM D75 and D3665, and tested in accordance with ASTM C136.
   b. Consisting of gravel, crushed gravel, crushed stone, or a combination of these materials having clean, hard, durable particles free from calcareous coatings, organic matter, or other deleterious substances.
   c. Conforming to the requirements of ASTM C33, Class 4S for physical properties, deleterious substances, and alkali reactivity, except as modified in the following paragraphs.
      1) Grading:
         a) Size number as specified in ASTM C33, and as indicated in Table 3 of this Section, except as otherwise specified or accepted by the Engineer.
         b) Weights of flat or elongated particles (particles having a length greater than 3 times average width or thickness) not exceeding 15 percent when tested in accordance with ASTM D4791.
      2) Deleterious substances: Not in excess of the percentages by weight specified in Table 2 of this Section and having total of all deleterious substances exceeding 2 percent.

Table 2: Coarse Aggregate, Limits on Impurities		
Item	**Test Method**	**Percent (maximum)**
Clay lumps and friable particles	ASTM C142	0.50
Lightweight particles (SG < 2.40)	ASTM C123	1.25
• Chert or shale(1)	ASTM C295	1.00(1)
Materials finer than No. 200 sieve	ASTM C117	0.50(2)
Coal and lignite	ASTM C123	0.25

Notes:

(1) ASTM C123 tests for particles in the sample having a specific gravity less than 2.40. ASTM C295 is used to identify which of those lightweight particles are chert, shale, or coal and lignite. If testing under ASTM C123 indicates a combined percentage (sum of shale, chert, coal and lignite) not greater than 1.25, testing under ASTM C295 will not be required.

(2) When material finer than No. 200 sieve consists of crusher dust, maximum percentage may be increased to 1.00 percent. When mix design complies with provisions of ASTM C33, Table 4, footnote C, the maximum percentage may be increased in accordance with the equation in footnote C, up to a maximum of 1.5 percent.

3) Abrasion loss: Loss not greater than 45 percent after 500 revolutions when tested in accordance with ASTM C131.
4) Soundness: Loss not greater than 10 percent when tested in accordance with ASTM C88 using sodium sulfate solution.

2.04 MATERIALS FOR PLACING, CURING AND FINISHING

A. General:
   1. Materials shall be compatible with concrete and with other materials.
   2. Materials for placing, curing and finishing concrete that will be in contact with potable water:
      a. Non-toxic and shall not impart taste or odor to the water.
      b. Listed under NSF-61 for use in contact with potable water.

B. Cement grout:
   1. Use: For spreading over surface of construction and cold joints in concrete before placing additional concrete above those joints.
   2. As specified in Section 03600 - Grouting.

C. Concrete sealer:
   1. As specified in Section 03366 - Tooled Concrete Finishing.
   2. Not for use in water-containment structures.

D. Evaporation retardant:
   1. Tested and listed under NSF-61 for use direct contact with potable water.
   2. Use: For mitigating surface moisture evaporation from freshly placed concrete during rapid drying conditions. Placed after screeding.
   3. Waterborne, monomolecular, spray-applied compound, with fugitive dye to indicate coverage.
   4. Manufacturers: One of the following or equal:
      a. Master Builders Solutions, MasterKure ER 50.
      b. Euclid Chemical Co., Eucobar.

E. Nonslip abrasive:
   1. Aluminum oxide abrasive size 8/16, having structure of hard aggregate that is, homogenous, nonglazing, rustproof, and unaffected by freezing, moisture, or cleaning compounds.
   2. Manufacturers: One of the following or equal:
      a. Exolon Co.
      b. Abrasive Materials, Inc.
      c. “Non-Slip Aggregate”, Euclid Chemical Co.

F. Plastic membrane for curing:
   1. Polyethylene film: In accordance with ASTM C171.
   2. Properties:
      a. Color: White.
      b. Thickness: Nominal thickness of polyethylene film shall not be less than 0.0040 inches when measured in accordance with ASTM D2103. Thickness of polyethylene film at any point shall not be less than 0.0030 inches.
      c. Loss of moisture: Not exceed 0.055 grams per square centimeter of surface when tested in accordance with ASTM C156.

G. Sprayed membrane curing compound:
   1. Tested and listed under NSF-61 for use direct contact with potable water.
   2. Combination curing and sealing products ("cure and seal") will not be permitted.
   3. Properties:
      a. Clear type with fugitive dye conforming with ASTM C309, Type 1D and containing no wax, paraffin, or oils.
      b. For concrete placed or cured during hot weather, curing compound shall be as specified, except that:
         1) It shall include a white, reflective fugitive dye.
         2) Moisture loss during a 72-hour period shall not exceed 9 pounds per cubic yard when tested in accordance with ASTM C156.

H. Surface-applied sealing system:
   1. Tested and listed under NSF-61 for use direct contact with potable water.
   2. Manufacturers: One of the following or equal:
      a. Euclid Chemical Co., Vandex Super.
      b. Kryton International, Inc., Krystol T1.
      c. Xypex Chemical Corp., Xypex Concentrate.
   3. Where surface-applied sealing system is placed over concrete containing permeability reducing admixture for concrete exposed to hydrostatic conditions (PRAH), provide products of same manufacturer providing the admixture.

2.05 EQUIPMENT

A. General:
   1. Provide adequate equipment and facilities for accurate measurement and control of materials and for readily changing proportions of material into mixers.

B. Batching equipment, or batch plant.
   1. Capable of controlling delivery of all material to mixer within 1 percent by weight of individual material.

C. Mixing equipment:
   1. Mixers may be of stationary plant, paver, or truck mixer type, as appropriate to the Work.
   2. Capable of combining aggregates, water, and cementitious materials, and admixtures within specified time into a thoroughly mixed and uniform mass, and of discharging the mixture without segregation.
      a. Maintain concrete mixing equipment in good working order, and operate at loads, speeds, and timing recommended by manufacturer or as specified.
      b. Proportion cementitious materials and aggregate by weight.
   3. If bulk cementitious materials are used, weigh them on separate visible scale which will accurately register scale load at any stage of weighing operation from zero to full capacity.
   4. Prevent cementitious materials from coming into contact with aggregate or with water until materials are in mixer ready for complete mixing with all mixing water.
   5. Procedure of mixing cementitious materials with sand or with sand and coarse aggregate for delivery to project site, for final mixing and addition of mixing water will not be permitted.
   6. Retempering of concrete will not be permitted.
   7. Discharge entire batch before recharging.
   8. Volume of mixed material per batch: Not exceed manufacturer's rated capacity of mixer.
   9. Equip each mixer with device for accurately measuring and indicating quantity of water entering concrete, and operating mechanism such that leakage will not occur when valves are closed.
   10. Equip each mixer with device for automatically measuring, indicating, and controlling time required for mixing:
      a. Interlock device to prevent discharge of concrete from mixer before expiration of mixing period.
   11. Transit-mixed concrete:
      a. Mix and deliver in accordance with ASTM C94.
      b. Total elapsed time between addition of water at batch plant and discharging completed mix:
         1) Not to exceed 90 minutes.
      c. Elapsed time at project site shall not exceed 30 minutes.
      d. Under conditions contributing to quick setting, total elapsed time permitted may be reduced by the Engineer.
      e. Equip each truck mixer with device interlocked to prevent discharge of concrete from drum before required number of turns and furnish device that is capable of counting number of revolutions of drum.
   12. Continuously revolve drum after it is once started until it has completely discharged its batch:
      a. Do not add water until drum has started revolving.
      b. Right is reserved to increase required minimum number of revolutions or to decrease designated maximum number of revolutions allowed, if necessary, to obtain satisfactory mixing. The Contractor will not be entitled to additional compensation because of such increase or decrease.

D. Other types of mixers: For other types of mixers, mixing shall be as follows:
   1. Mix concrete until there is uniform distribution of materials, and discharge mixer completely before recharging.
   2. Neither speed nor volume loading of mixer shall exceed manufacturer's recommendations.
   3. Continue mixing for minimum of 1-1/2 minutes after all materials are in drum, and for batches larger than 1 cubic yard increase minimum mixing time 15 seconds for each additional cubic yard or fraction thereof.

2.06 CONCRETE MIXES

A. General:
   1. Develop and provide mix design for each Concrete Class listed in Table 3 of this Section.
   2. Select and proportion mixes and document properties using one of the two methods that follow. Procedures and requirements for use of each alternative are specified in subsequent paragraphs of this Section.
      a. Field experience method.
      b. Trial batch method.
   3. Organize and submit mix designs with data on all constituent materials and products for that mix, for Engineer's review.
   4. Do not place concrete until the mix design for that Concrete Class has been accepted by Engineer.
   5. After acceptance, do not modify accepted mixes or provide new mixes without Engineer's prior review and acceptance of the proposed alternative.
      a. Exception: At all times, adjust batching of water to compensate for free moisture content of the fine aggregate used.
      b. For any change to approved mixes, Engineer may require new trial batching and testing program as specified in this Section before acceptance and use.
      c. For any change to approved mixes, make modifications within limits set forth in this Section.
      d. If there is change in source or quality of any constituent of the concrete class or mix, the revised mix will be considered a new class of concrete and shall require full re-submittal of all data describing mix constituents, design, and testing.
   6. Material sampling, mix designs, trial batch preparation and testing, modifications to mix designs, and any re-testing required to satisfy the requirements of this Section or to obtain satisfactory performance shall be at Contractor's expense and shall not be considered cause for delay.

B. Measurements of materials:
   1. Measure materials by weighing, except as otherwise specified or where other methods are specifically authorized in writing by the Engineer.
   2. Furnish apparatus for weighing aggregates and cementitious materials that is suitably designed and constructed for this purpose.
   3. Accuracy of weighing devices: Furnish devices that have capability of providing successive quantities of individual material that can be measured to within 1 percent of desired amount of that material.
   4. Measuring or weighing devices: Subject to review by the Engineer. Shall bear valid seal of the Sealer of Weights and Measures having jurisdiction.

5. Weighing cementitious materials:
    a. Weigh cementitious materials separately.
    b. Cement in unbroken standard packages (sacks): Need not be weighed.
    c. Weigh bulk cementitious materials and fractional packages.
6. Measure mixing water by volume or by weight.

C. Requirements for mix proportioning:
1. Develop and provide mixes that:
    a. Can be readily worked into corners and angles of forms and around reinforcement, without excessive vibration, and without permitting materials to segregate or free water to collect on surface.
    b. Prevent unnecessary or haphazard changes in the consistency of the concrete supplied.
2. Constituent materials:
    a. Provide concrete mixes composed of portland cement, blended aggregates, admixtures and water.
        1) Admixtures required for each concrete class are indicated in Table 3 of this Section. Admixtures not specifically required by that table for a specific Concrete Class are optional and may be included at the discretion of the Contractor based on Contractor's planned means and methods of construction.
    b. In no case shall returned fresh concrete or its constituents be incorporated into concrete batched for the Work.
3. Minimum specified compressive strength:
    a. Minimum specified compressive strength is designated at 28 days, unless otherwise indicated in Table 3 of this Section.
    b. For locations where the placed concrete is adequately protected and is not subjected to loads for an extended period during construction, the Contractor may request that the period for achieving the minimum specified compressive strength be extended to 56 days. If accepted by the Engineer, provide mixes that achieve at least 75 percent of their minimum specified compressive strength after 28 days.
4. Proportions and consistency:
    a. Ratio of water to cementitious materials, and cementitious materials content:
        1) Conform to maximum and minimum cementitous material content requirements specified in Table 3 of this Section.
        2) Cementitious materials content: Consisting of portland cement as indicated in Table 3 of this Section, plus supplemental cementitious materials if aggregate testing indicates potentially reactive aggregates:
            a) Fly ash content:
                (1) Minimum: 15 percent of the total weight of cementitious materials.
                (2) Maximum: 25 percent of the total weight of cementitious materials.
            b) Slag cement content:
                (1) Minimum: 20 percent of the total weight of cementitious materials.
                (2) Maximum: 30 of the total weight of cementitious materials.

c) Silica fume content:
(1) Minimum: 4 percent of the total weight of cementitious materials.
(2) Minimum: 10 of the total weight of cementitious materials.

b. Aggregate size and content:
1) Blend aggregates to produce an optimized gradation that combines well-graded coarse, intermediate, and fine aggregates in proportions that maximize the aggregate content of the mix, and that minimize the cement paste content of the mix.
a) Percentage of individual fractions of the combined aggregate gradation retained on individual sieve sizes: Within the range shown in Attachment C - Combined Aggregate Gradation Chart ("Tarantula Curve").
b) Sum of the percentages of individual fractions retained on the No. 8, No. 16, and No. 30 sieves: Greater than 20 percent.
c) Sum of the percentages of individual fractions retained on the No. 30, No. 50, No. 100, and No. 200 sieves: Within the range of 25 percent to 40 percent.

c. Determine bulk density and void content of the combined gradation of aggregates in accordance with ASTM C29. Results for combined aggregates shall not be the summation of results of testing of the individual gradations.
1) Sample the combined aggregate from a flowing aggregate stream or conveyor in accordance with ASTM D75. Take care to ensure that the sample is representative of the proportions of the combined aggregate of the proposed mix.
2) Reduce sample of combined aggregate to test sample size in accordance with ASTM C702, Method A - mechanical splitter or Method B - quartering.
3) Perform bulk density test of combined aggregate in accordance with ASTM C29, Procedure A - rodding.
4) Determine void content of the combined aggregate in accordance with ASTM C29, Procedure A - rodding. Specific gravity of the combined aggregate shall be determined in accordance with ASTM C136.

d. Paste content: Limited to the following:
1) Class A mixes without air entrainment: Maximum 28 percent measured by volume.
2) Class A mixes with air entrainment: Maximum 28 percent measured by volume plus the target air content.
3) Paste content shall be limited to 175 percent of the void content of the combined aggregate gradation determined by ASTM C29.

e. Total water content:
1) Not exceeding the water to cementitious material ratio specified in Table 3 of this Section.

f. Coarseness/workability (Shilstone Method):
1) Proportion mixes to fall into the "Optimal" zone (Zone II) when plotted on the Coarseness Factor Chart ("Coarseness Factor" versus "Workability Factor") included as Attachment B - Coarseness Factor Chart to this Section. Provide plot for each Class A mix to be used in the Work.

2) Coarseness factor (CF) for each mix shall be calculated as the percent of the combined aggregate gradation retained on the 3/8 inch sieve, divided by the percent of the combined aggregate gradation retained on the Number 8 sieve, multiplied by 100: or:

$$CF = \frac{(\%\ \text{retained on 3/8" sieve})}{(\%\ \text{retained on No. 8 sieve})} \times 100$$

3) Workability factor (WF) for each mix shall be the percent of the combined aggregate gradation retained on the Number 8 sieve, adjusted for cement content in the mix.
   a) Determine volume of total cementitious material in the mix.
   b) For each 94 pounds of portland cement content above 564 pounds per cubic yard, increase workability factor by 2.5 units.
   c) For each 94 pounds of portland cement below 564 pounds per cubic yard, decrease workability factor by 2.5 units.
   d) Proportion adjustment factor by linear interpolation for each fraction of 94 pounds above or below the 564 pound basis.
   e) Example:
      650 pounds per cubic yard = 564 pounds + 86 pounds.
      Adjustment = (86 lb / 94 lb) x 2.5 = + 2.28.

D. Concrete Classes for use in the Work:
   1. Provide concrete classes listed in Table 3 of this Section.
   2. Provide normal weight concrete, having minimum weight of 140 pounds per cubic foot, unless otherwise noted.
   3. Pumped concrete:
      a. Provide pumped concrete that complies with all requirements of this Section.
      b. Mixes placed by pumping shall be considered a sub-class of each concrete class listed in Table 3 of this Section. Prepare and submit a separate mix design for each mix to be placed by pumping.
   4. Class PM concrete: In addition to the requirements of Table 3 of this Section, conform to the following:
      a. Minimum 28 day flexural strength: 650 psi when tested in accordance with ASTM C293.
      b. Cementitious materials content: 75 percent portland cement plus 25 percent Class F fly ash (by weight).
      c. Aggregate:
         1) Minimum 55 percent coarse aggregate conforming to ASTM C33 size number 357 or size number 467.
         2) Substitute ASTM C33 size number 57 or size number 67 if mechanical paving equipment is not used.

Table 3: Concrete Classes

Concrete Class[1]	Minimum Specified Compressive Strength at 28 days, f'c [2] (pounds per square inch)	Ratio of water to cementitious materials[3] (minimum - maximum).	Cementitious Materials Content (pounds per cubic yard of concrete by weight)[4]	Cement Type	Maximum Chloride Content (percent by weight of cement)	Maximum Size of Coarse Aggregate (ASTM C33)	Air Entrainment (percent), (n/a : not applicable)	Admixtures required[4,5,6]	Slump Range (inches)
A	4,000	0.40 to 0.42	535 to 575	II	0.30	#57	6±1.5	AEA WRA	2 to 4
A-NA	4,000	0.40 to 0.45	535 to 575	II	0.30	#57	n/a	WRA	2 to 4
C	2,500	0.62 max.	min. 423	II	No limit	#57	6±1.5	AEA WRA	3 to 6
CE	3,000	0.62 max.	min 423	II	No limit	#8	5±1.5	AEA WRA	3 to 6
PM	5,000	0.40	535 to 575	II	0.15	#57	5+1.5	AEA WRA	3 to 6

Notes:

(1) Sub classes within major concrete classes are designated as follows:
NA: Without air entrainment.

(2) At locations where concrete will not be subjected to load from other elements of the structure or from Contractor's placing and/or backfilling operations, maximum time period for achievement of specified compressive strength may be extended to 56 days when accepted by the Engineer.

(3) W/C Ratio = Ratio of water to cementitious materials (portland cement plus supplemental cementitious material) by weight. Include weight of admixtures in the water content of the mix when the quantity of the admixtures exceeds 10 ounces per 100 pounds of cement.

(4) Cementitious material includes portland cement plus supplemental cementitious materials. If trial batch testing demonstrates that the required strength cannot be met at 28 or 56 days with the specified combined aggregate gradation and the paste content limits, cementitious material content may be increased with Engineer's approval if a shrinkage-reducing admixture (SRA) is included in the mix design.

(5)Admixtures are designated as follows:
AEA: Air entraining admixture
HRWR: High-range water-reducing admixture SRA: Shrinkage-reducing admixture.
SFR: Synthetic fiber reinforcement.
WRA: Water-reducing admixture
PRAH: Permeability-reducing admixture for concrete exposed to hydrostatic conditions.

E. Install Concrete Classes in accordance with the following requirements unless otherwise indicated on the Drawings.
   1. Class A concrete: Structural concrete.
      a. Use Class A concrete at all locations unless other Classes are specified or indicated on the Drawings.
   2. Class A-NA concrete: Structural concrete without air entrainment.
      a. Class A-NA concrete may be used in lieu of Class A at indoor slabs (not subject to freezing and thawing) where inclusion of an air-entraining admixture makes it difficult to achieve the specified concrete finish.
   3. Class C concrete: Miscellaneous concrete fill and encasement.
      a. Class C concrete may be used for fill for unauthorized excavation, for thrust blocks and ground anchors for piping, for bedding of pipe, and where indicated on the Drawings.
   4. Class CE concrete: Use Class CE for electrical conduit encasements.
   5. Class PM concrete: Use for concrete pavement, cart paths, curbs, gutters, and sidewalks.

F. Concrete mix design documented by field experience:
   1. Mix design:
      a. Prepare preliminary mix design for each Concrete Class. Submit mix design with product and testing data for materials to be used in the mix for Engineer's review.
   2. Historical records for similar mix.
      a. Determinations of similarity of materials and proportions between historical and proposed mixes shall be by the Engineer, and that shall be final.
      b. Historical record - Materials:
         1) Submit with each mix design the following data for a previously-supplied concrete mix similar to that proposed for this Work.
         2) Records demonstrating that the previously supplied mix included similar materials and proportions as those of the proposed mix.
            a) Documentation that the same concrete supplier will provide both mixes.
            b) Documentation that the materials used was from the same suppliers and had essentially the same properties, demonstrated by test data, as those proposed.
            c) Documentation that proportions of materials in the record mix are essentially the same as those proposed and that the specified compressive strength of the record mix is within 1,000 pounds per square inch of that required by this Section.
            d) Concrete supplier's statement describing any changes made to production of the record mix during the time period reported.
            e) Concrete supplier's statement that preparation and quality control procedures for the record mix were essentially the same as those to be employed for this Work.
      c. Historical record - Testing:
         1) Submit with each record mix, corresponding test data for slump, compressive strength (with relationships for rate of strength gain between testing ages), and drying shrinkage.

2) Only records satisfying the following requirements will be accepted.
a) All tests were conducted within a period of 1-year preceding the date of the submittal.
b) All tests were conducted over a period including not less than 45 days.
c) The record of compressive strength testing includes at least 30 tests for slump and 28-day compressive strength.
d) The record of compressive strength tests is consecutive. In other words, it includes all tests conducted on the subject mix within the 1-year time period described above (not just selected tests during that period).
e) Submit concrete supplier's sworn statement confirming that all tests for the record mix have been reported.
f) Tests for drying shrinkage are described in subsequent paragraphs of this Section for "concrete mix design documented by trial batch preparation and testing."
g) Provide supplementary testing if requested by Engineer.

d. For mixes determined to be similar and to have an acceptable test history, acceptance criteria shall be as follows.
e. Acceptance criteria:
1) Slump: All tests within limits specified for record mix.
2) Compressive strength: Average compression strength for tests, as determined by ACI 318 and ACI 350 not less than minimum required average strength.
3) Drying shrinkage: Within limits stated in subsequent paragraphs of this Section for "concrete mix design documented by trial batch preparation and testing."

G. Concrete mix design documented by trial batch preparation and testing:
1. Mix design and trial batches:
a. Prepare preliminary mix design for each Concrete Class. Submit mix design with product and testing data for each combination of materials and proportions to be used for Engineer's review.
1) Determine water content of the mix based on curves showing the relation between water-cementitious materials ratio and the 7 and 28 day compressive strength of the concrete.
2) Determine each curve using 4 or more points, each representing the average compressive strength value of at least 3 specimens tested at each age.
b. After materials and proposed mix designs have been accepted by Engineer, have trial batches for each concrete mix design prepared by Contractor's testing laboratory.
1) Prepare trial batches using the cementitious materials, aggregates, and admixtures proposed to be used for the Work.
2) Provide batches of sufficient quantity to determine slump, workability, consistency, and finishing characteristics, and to provide sufficient specimens for testing.
c. For each trial batch, make and test specimens to determine and report slump, compressive strength (with relationships for rate of strength gain between testing ages), and drying shrinkage.
1) If trial batches do not produce concrete conforming to the specified requirements for slump, strength, workability, consistency, drying

shrinkage, restrained shrinkage, and finishing, change mix proportions and, if necessary, sources of materials.

2) Make additional trial batches and perform additional tests until a batch that conforms to requirements of this Section is produced.

2. Testing - Slump:
   a. Determine slump in accordance with ASTM C143.
   b. Acceptance criterion: Slump within range specified.
3. Testing - Compressive strength:
   a. Prepare 4 inch diameter by 8 inch long cylinders in accordance with ASTM C31 for tests specified in this Section.
   b. Determine average compressive strength:
      1) Test at least 12 cylinders from each trial batch for compressive strength in accordance with ASTM C39.
      2) Test 4 cylinders at 7 days, another 4 at 28 days, and another 4 at 56 days.
      3) Calculate average compression strength for 7 day tests, for 28 day tests, and for 56 day tests.
      4) Calculate ratios for:
         a) Average 7 day strength to average 28 day strength.
         b) Average 28 day strength to average 56 day strength.
   c. Determine the required average compressive strength for each mix, f'cr, as described in the following paragraphs:
      1) Calculate required average compressive strength (f'cr) based on the minimum specified 28-day compressive strength, f'c, plus a standard deviation determined from the test history available for that mix.
      2) Determine f'cr as specified in ACI 318 and ACI 350, except as modified in the following paragraphs.
         a) Where 15 or more 28-day compressive strength tests are available, calculate standard deviation as described in the preceding paragraphs for "concrete mix design documented by field experience." Add this standard deviation to the specified minimum compressive strength to determine the required average compressive strength (f'cr) for the mix.
         b) Where fewer than 15 compressive strength tests at 28-days are available, determine minimum required compressive strength, (f'cr) from Table 4 of this Section.

Table 4: Required Average Compressive Strength, Fewer than 15 Tests Available

Minimum Specified Compressive Strength, f'c (pounds per square inch)	Required Average Compressive Strength, f'cr (pounds per square inch)
Less than 3,000	f'c + 1,000
3,000 to 5,000	f'c + 1,200
Over 5,000	f'c + 1,400

   d. Acceptance criterion: Average compressive strength of the 4 cylinders tested at 28 days, or of the 4 cylinders tested at 56 days when permitted by the Engineer, shall equal or exceed the required average compression strength, f'cr for that concrete mix design.

4. Testing – Chloride content:
    a. Submit test results showing that the concrete mix contains water-soluble chloride ion content contributed from the constituents including water, aggregates, cementitious materials, and admixtures is less than the limit specified in Table 3 of this Section. Test shall be performed in accordance with ASTM C1218 at age between 28 and 42 days.
5. Testing - Drying shrinkage - Prism specimens:
    a. Class A (including A, A-NA, A-SP, and A-NA-SP) and Class PM: From trial batch for each mix, prepare 10 drying shrinkage specimens in accordance with ASTM C157 Divide specimens into 2 groups of 5 specimens each: One group including shrinkage-reducing admixture, and one group without shrinkage-reducing admixture.
    b. Prepare, cure, and test both groups in accordance with ASTM C157, except as modified in the following paragraphs.
        1) Remove drying shrinkage specimens from molds at age of 23 hours plus or minus 1 hour after trial batching.
            a) Immediately place them in lime-saturated water maintained at 73 degrees Fahrenheit plus or minus 3 degrees for at least 30 minutes.
            b) Remove specimens from the water, and wipe with a damp cloth.
            c) Measure to nearest 0.0001 inch to determine original length.
            d) Record measurements and re-submerge specimens in lime-saturated water at 73 degrees Fahrenheit plus or minus 3 degrees for moist curing.
        2) Maintain submerged curing conditions at 73 degrees Fahrenheit plus or minus 3 degrees for 7 days. 7 days after batching, remove specimens from water and repeat measuring procedures.
        3) Immediately store specimens in a humidity controlled room maintained at 73 degrees Fahrenheit plus or minus 3 degrees, and at 50 percent relative humidity plus or minus 4 percent for remainder of the test.
        4) At periods of 14, 21, 28 and 56 days after batching, remove specimens from curing room and repeat measurements.
    c. Drying shrinkage test report:
        1) Report measurements of all specimens at 1, 7, 14, 21, 28, and 56 days after batching.
        2) Using measured length at 7 days as base length for drying shrinkage, calculate the following for each measuring period:
            a) Drying shrinkage of each specimen. Determine as difference between the 7-day base length and measured length for each period.
            b) Average of these differences. If drying shrinkage of any specimen departs from the average of the measurements for each period by more than 0.0004 inch, disregard results obtained from that specimen.
            c) Percentage of drying shrinkage from batching to date of measurement.
    d. Drying shrinkage acceptance criteria:
        1) Average shrinkage of trial batch concrete specimen group at 28 days after batching, when measured and cured as indicated, shall not exceed 0.035 percent.

e. Mixes accepted by Engineer:
    1) Retain drying shrinkage test specimens. Bag in re-sealable plastic bags and submit to Engineer.
    2) Indicate trial batch identifier, specimen number, and date of final measurements on each specimen bag.

2.07 SOURCE QUALITY CONTROL

A. Sample and test materials in accordance with the following requirements:
    1. Sampling, testing, and reporting frequency:
        a. In preparation for mix design submittals and trial batch tests.
        b. Whenever there is a change in source of the material, or a significant change in the characteristics or quality of materials from the same source.
        c. For each 10,000 cubic yards of concrete mix produced.
        d. At intervals not exceeding 90 calendar days, unless otherwise specified in the following paragraphs.
    2. Supplemental cementitious materials.
        a. Sample and test fly ash in accordance with ASTM C311.
        b. Sample and test slag cement in accordance with ASTM C989.
        c. Sample and test silica fume in accordance with ASTM C1240.
    3. Aggregate:
        a. Sample combined aggregate in accordance with ASTM D75 and D3665, and test for gradation in accordance with ASTM C136.
        b. At least once every 30 days, and when requested by the Engineer.
        c. Submit test results.
    4. Portland cement:
        a. Sample and test portland cement and provide mill certificates demonstrating compliance with ASTM C150, and additional requirements of this Section.
            1) Determine alkali content by method set forth in ASTM C114.
        b. At least once every 90 days, and when requested by the Engineer.
        c. Submit test results.

B. Batch materials in accordance with the following requirements:
    1. Concrete batch weights: Control and adjust so as to secure maximum yield, and at all times maintain proportions of concrete mix within specified limits.
    2. Aggregates:
        a. Obtain aggregate from a source capable of providing uniform quality, moisture content, and grading during any single day's operation.
        b. Furnish satisfactory means at batching plant for checking moisture content of fine aggregate for each batch.
    3. Admixtures:
        a. Batch solutions using mechanical batcher capable of accurate measurement.
        b. Air entraining admixture: Add to batch in portion of the mixing water, unless otherwise recommended by the admixture manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

A. Prepare and submit mix designs for each Concrete Class indicated in Table 3 of this Section.

B. Submit proposed sequence of concrete placements. After acceptance, adhere to proposed sequence of placing concrete, except when specific changes are requested by the Contractor and accepted by the Engineer.
   1. Use construction methods and sequence work to allow concrete placement to reach adequate strength and to be constructed with required support to prevent overstress of the concrete structure during construction.

C. Make provisions for monitoring weather conditions:
   1. Install an outdoor weather station capable of measuring and recording ambient temperature, wind speed, and humidity. Furnish instruments accurate to within 2 degrees Fahrenheit, 5 percent relative humidity, and 1 mile per hour wind speed.
   2. Monitor the weather forecast beginning at least 48 hours prior to any concrete placement and make provisions for cold weather concreting or hot weather concreting if those conditions exist or are forecast to exist during the period of placement, finishing, and curing.
      a. Record temperature, relative humidity, and wind speeds for each placement beginning at least 24 hours before scheduled delivery of concrete.

D. Place no concrete without Engineer’s prior acceptance of conditions.

E. Notify the Engineer in writing that all preparations are complete and ready for placement of concrete. Such notification shall indicate readiness - not just intention - to place concrete for the designated portion of the Work.
   1. Submit notification to Engineer on forms provided by or acceptable to the Engineer and bearing the signature of Contractor’s superintendent.
      a. Sample form is included at the end of this Section, see Attachment B - Coarseness Factor Chart.
   2. Submittal of notification will be Contractor’s certification that preparations are complete and in accordance with the Contract Drawings and Specifications.
   3. Provide notification for Engineer to make final observations at the locations of concrete placements not less than 24 hours before commencing placement of concrete.

3.02 CONCRETE JOINTS

A. Locations of joints are indicated on the Drawings.
   1. In order to preserve strength and watertightness of structures, make no other joints, except as authorized by the Engineer.
   2. Construct joints where indicated, and as indicated on the Drawings.
   3. Where joint locations are not indicated on the Drawings, submit Contractor's proposed locations for Engineer's review and acceptance. Provide construction joints in slabs and walls at intervals not greater than 35 feet.

B. Time between placements of adjacent concrete separated by joints.
   1. Provide not less than 3 days (72 hours) between placement of adjacent sections for the following:
      a. Slabs.
      b. Walls.
   2. Provide not less than 7 days (168 hours) between placement of the lower and upper pours for the following:
      a. Walls over slabs.
      b. Slabs over walls.
      c. Slabs keyed into the sides of walls.

C. Edges of joints:
   1. Provide joints have edges detailed as indicated on the Drawings.
   2. Protect wall and slab surfaces at edges from concrete splatter. Thoroughly clean adjacent surfaces after completion of each placement.

D. Joint construction:
   1. Preparation of forms:
      a. Provide cleanout holes at base of each wall and column for inspection and cleaning.
      b. Wash forms and adjacent joint surfaces of sawdust, chips, and other debris after forms are built, and immediately before concrete or grout placement.
      c. Should formwork confine sawdust, chips, or other loose matter in such manner that it is impossible to remove them by flushing with water, use a vacuum cleaner for their removal, and then flush cleaned surfaces with water.
   2. Before placing concrete against previously placed concrete, thoroughly clean the prior placement of laitance, grease, oil, mud, dirt, curing compounds, mortar droppings, or other objectionable matter by means of pressure washing.
   3. Provide and install waterstops, expansion joint material, and other similar materials as indicated on the Drawings and as specified.
      a. Take special care to ensure that waterstops are secured in proper position.
      b. Take special care to ensure that concrete is well consolidated around and against waterstops during placement.
   4. Horizontal joints:
      a. As initial placement over cold joints, thoroughly spread bed of cement grout as specified in Section 03600 - Grouting.
         1) Thickness: not less than 1/2 inch nor more than 1 inch.
      b. For wall placements above planned cold joints, placement of cement grout will not be required for locations where the wall mix includes high-range water-reducing admixture (“superplasticizers”), and the Contractor can demonstrate dense concrete joints without voids or honeycomb after the forms are removed.

3.03 MEASURING AND BATCHING MATERIALS

A. Measurements of materials:
   1. Proportion and measure cementitious materials and aggregates by weight.
      a. Weigh cementitious materials separately.

b. If bulk cementitious materials are used, weigh them on separate visible scale that will accurately register scale load at any stage of weighing operation from zero to full capacity.
c. Cement in unbroken standard packages (sacks) need not be weighed.

2. Mixing water: Measure by volume or by weight.
3. Other mix constituents: Measure by weight, except as otherwise specified or accepted by the Engineer.
4. Weighing and measuring devices:
   a. Use equipment designed and constructed specifically for that purpose.
   b. Furnish devices capable of weighing successive quantities of individual material measured to within 1 percent of desired weight of that material.
   c. Bearing valid seal of the department of weights and measures for the authority having jurisdiction over the Work.
5. Measurements and measuring devices:
   a. Subject to review by the Engineer.

B. Batching:
1. Admixtures shall be added at the concrete batch plant.
2. Addition of admixtures in the field is permitted only with prior acceptance by the Engineer, and only when the following conditions are satisfied:
   a. The dosage and mixing is personally overseen by concrete supplier's trained technologist.
   b. Adequate mixing is provided after addition.
   c. The maximum time to placement of concrete remains 90 minutes after water added to mix - not 90 minutes after any field additions/adjustments.
   d. Slump at discharge after additions/modifications conforms to the requirements of Table 3 of this Section.

3.04 MIXING AND TRANSPORTING

A. Machine mixing:
1. Prevent cementitious materials from coming into contact with aggregate or with water until materials are in mixer and ready for complete mixing with all mixing water.
2. Procedure of mixing cementitious materials with sand, or with sand and coarse aggregate, for delivery to project site for final mixing and addition of mixing water is not permitted.
3. Remixing of concrete that has started to take its initial set (“retempering”)is not permitted.
4. Discharge entire batch before recharging.
5. Volume of mixed material per batch: Not exceeding manufacturer's rated capacity of mixer.

B. Transit-mixed concrete:
1. Mix and deliver in accordance with ASTM C94, except as modified in this Section.
2. Total elapsed time between addition of water at batch plant and discharging completed mix:
   a. Not to exceed 90 minutes nor 300 revolutions of the mixing drum.
   b. Under conditions contributing to rapid setting, total elapsed time permitted may be reduced by the Engineer.

3. Temperature - minimum and maximum allowable during mixing and transporting:
    a. Minimum: 50 degrees Fahrenheit.
    b. Maximum: 90 degrees Fahrenheit.
4. Continuously revolve drum after it is started until it has completely discharged its batch.
    a. Do not add water until drum has started revolving.
    b. Engineer reserves the right to increase required minimum number of revolutions or to decrease designated maximum number of revolutions allowed, if necessary, to obtain satisfactory mixing. Contractor will not be entitled to additional compensation because of such increase or decrease.

C. Concrete delivery:
1. Furnish to the Engineer a delivery ticket for each batch of ready mixed concrete within 24 hours after delivery. Include the following information on each ticket:
    a. Time of day concrete was batched, and time of day that discharge from the truck is complete.
    b. Printed record of the individual weight of each of the following constituents in the batch: fine aggregate, coarse aggregate, cement, pozzolan, and water.
    c. Concrete Class as defined in Table 3 of this Section.
    d. Type, brand, and quantity of each admixture in the batch.
    e. Total volume of water allowed in the mix, volume of mixing water added at the batch plant, volume of mixing water withheld from the mix during batching, and total volume of any water added to the mix after leaving the batch plant.
        1) In no case shall volume of mixing water withheld result in a water/cementitious materials ratio less than the minimum values specified in Table 3 of this Section.
    f. Number of revolutions of transit truck at arrival on site, and total number of revolutions when discharge is complete.
    g. Volume of concrete delivered in the batch.
    h. Numerical sequence of the batch delivered for that placement.
2. Additional water may only be added to the mix when the following conditions are fully satisfied:
    a. Batch ticket showing total volume of water already added and maximum volume of water that may be added is available for Engineer’s observation before any additional water is added.
    b. Total volume of water in the mix after the addition will be less than the maximum allowable volume of water indicated on the ticket.
    c. The full concrete load is still within the truck's mixing drum, and truck has not begun to discharge the load. Under no conditions shall water be added in the field to a partial truckload of concrete.
    d. Volume of water added, and time of addition are clearly marked for record on the batch ticket delivered to the Engineer.
3. Addition of admixtures in the field is permitted only with prior approval by the Engineer, and when the following conditions are satisfied:
    a. Dosage and mixing are personally overseen by concrete supplier's trained technologist and admixtures supplier's representative.
    b. Adequate mixing time is provided after addition of admixtures.

c. The maximum time to placement of concrete remains 90 minutes after water is added to the mix – not 90 minutes after any field additions/adjustments.
d. Slump at discharge after additions/modifications conforms to the requirements of Table 3 of this Section.

D. Conveying concrete:
1. Convey concrete from mixer to location of final deposit by methods that prevent separation or loss of materials.
2. Use equipment for chutes, pumps, and conveying of concrete of such size and design as to ensure practically continuous flow of concrete, from delivery to the point of placement, without separation of materials.
3. Design and use chutes and devices for conveying and depositing concrete that direct concrete vertically downward when discharged from chute or conveying device.
4. Keep equipment for conveying concrete thoroughly clean by washing and scraping upon completion of any day's placement.

3.05 PLACING AND CONSOLIDATING

A. Preparation:
1. Obtain Engineer’s acceptance of completed preparations before placing concrete.
a. Notify Engineer in writing that all preparations are complete and ready for placement of concrete. Such indication shall indicate readiness, not just intention, to place concrete for the designated portion of the work.
b. Submit completed Attachment D - Contractor’s Concrete Placement Checklist Form.
2. Confirm completeness of the following before notification of readiness is given to Engineer:
a. Place forms, reinforcement, screeds, anchors, ties, and inserts in final position.
b. Reinforcement is secure and properly fastened in its correct position.
c. Loose form ties at construction joints have been retightened.
d. Dowels, bucks, sleeves, hangers, pipes, conduits, anchor bolts, and any other fixtures required to be embedded in concrete have been placed and adequately anchored.
e. Forms have been cleaned of debris and form release agents are applied as specified.
3. Preparation for placement of footings and slabs on grade:
a. Do not place concrete on ground or compacted fill until subgrade is in moist condition acceptable to the Engineer.
b. If necessary, sprinkle subgrade with water not less than 6 or more than 20 hours in advance of placing concrete.
c. If subgrade surface becomes dry prior to actual placing of concrete, sprinkle again, without forming pools of water.
d. Do not place concrete if subgrade is muddy or soft.

4. Keep sufficient protective coverings on hand at all times for protection of concrete during and after placement.
    a. Protect concrete placed before rain to prevent water from coming in contact with such concrete
    b. Protect concrete placed before winds to prevent excessive drying or embedment of debris in the finished surfaces.

B. Concrete placement:
1. Do not place concrete:
    a. With slump outside the limits specified in Table 3 of this Section.
    b. In which initial set has occurred, or that has been retempered.
    c. During rainstorms or high velocity winds.
2. Deposit concrete at or near its final position to avoid segregation caused by rehandling or flowing.
    a. Do not deposit concrete in large quantities in one place, and then work material along forms with vibrator or by other methods.
3. Do not drop concrete freely into place from height greater than 5 feet. Use tremies for placing concrete where drop is over 5 feet.
4. Place concrete on slopes starting from bottom of slope and working upward.
5. Place concrete in horizontal lifts not exceeding 24 inches in depth and bring up evenly in all parts of forms.
6. After concrete placement begins, continue in a continuous operation without significant interruption until the end of the placement. Plan and implement precautions to prevent any delay, between layers or adjacent volumes, from exceeding 20 minutes.
7. If concrete is to be placed over previously placed concrete and more than 20 minutes has elapsed, spread layer of cement grout over surface before placing additional concrete. Provide grout layer thickness of not less than 1/2 inch, nor more than 1 inch.
8. Placement of concrete for slabs, beams, or walkways:
    a. If cast monolithically over walls or columns, do not commence until concrete in walls or columns has been allowed to set and shrink.
    b. Allow set time of not less than 1 hour for shrinkage.
        1) During waiting time, keep top surface of concrete moist, but not wet.
        2) Do not permit water to pond or stand on the surface.
        3) Do not coat surface with evaporation retarders or curing agents.
    c. Start placement above wall or column with layer of cement grout as described in the preceding paragraph.

C. Consolidating concrete:
1. Consolidate concrete with aid of acceptable mechanical vibrators.
2. Thoroughly consolidate concrete around reinforcement, pipes, or other shapes built into the work.
3. Provide sufficiently intense vibration to cause concrete to flow and settle readily into place and to visibly affect concrete over radius of at least 18 inches.
4. Vibrators:
    a. Keep sufficient vibrators on hand at all times to vibrate concrete as placed.

b. In addition to vibrators in actual use while concrete is being placed, have on hand a minimum of 1 spare vibrator in operable condition.
c. Do not place concrete until it has been confirmed that all vibrating equipment, including spares, are in operable condition.

5. Place concrete solidly against forms and concrete surfaces, leaving no voids or honeycomb.
6. Make concrete solid, compact, and smooth. If for any reason surfaces or interiors have voids or are in any way defective, repair such concrete in manner acceptable to the Engineer.
7. Do not over-vibrate so as to produce segregation.

3.06 FINISHING CONCRETE

A. Provide concrete finishes in accordance with Section 03366 - Tooled Concrete Finishing unless otherwise indicated on the Drawings.

B. Liquid evaporation retardant:
1. Under conditions that result in rapid evaporation of moisture from the surface of the concrete, coat the surface of the concrete with a liquid evaporation retardant immediately after screeding.
2. Conditions that result in rapid evaporation of moisture are defined as any combination of ambient temperature, concrete temperature, relative humidity, wind speed, and solar radiation intensity that creates conditions that will evaporate water from a free concrete surface at a rate equal to or greater than 0.1 pounds per square foot per hour as determined by the Menzel Formula and nomograph published in ACI 305R, and included as Attachment A - Menzel Formula and Nomograph to this Section.
3. Apply evaporation retardant again after each finishing operation as necessary to prevent drying shrinkage cracks.
4. Do not work evaporation retardant into the surface of the concrete.
5. Do no use evaporation retardant as finishing aid (to rehydrate surface a creamy state for finishing).

C. Concrete sealer:
1. Floors and slabs to receive concrete sealer: See Room Finish Schedule on the Drawings, and Section 03366 - Tooled Concrete Finishing.

3.07 CURING

A. Cure concrete by methods specified in this Section.

B. Keep concrete continuously moist and at an average daily temperature of at least 50 degrees Fahrenheit for a minimum of 7 days after placement.
1. Provide at least 350 degree days of curing (350 degrees times 7 days of 24 hours each).
2. If hourly temperatures at any surface of a concrete placement drop below 50 degrees Fahrenheit during the curing period, count the period below 50 degrees Fahrenheit as zero degrees, and extend the curing time to compensate.

C. Schedule of curing methods:
    1. Cure the following concrete surfaces using water curing, or plastic membrane curing.
        a. Floor surfaces of water containment structures.
        b. Surfaces where additional concrete will be placed over or against the surface, including concrete joints.
        c. Surfaces where grout or other toppings will be placed over the surface.
        d. Slabs scheduled to receive concrete sealer, or other bonded or adhered architectural finishes.
        e. Formed surfaces scheduled to receive coatings, paint, adhered masonry, cementitious materials, or other similar finishes, and where formwork is removed within 7 days after concrete placement.
        f. Horizontal concrete surfaces at tops of walls.
    2. Cure the following concrete surfaces by water curing, plastic membrane curing, or sprayed curing membrane. Selection of methods shall be at the Contractor's option.
        a. Surfaces not listed in the preceding paragraph.

D. Water curing:
    1. Keep surfaces of concrete constantly and visibly wet, day and night, for period of not less than 7 days.
        a. Each day forms remain in place will be counted as 1 day of water curing.
        b. Do not loosen form ties during period when concrete is cured by leaving forms in place. No further curing credit will be allowed for forms remaining in place after contact has been broken between concrete surface and forms.
    2. Begin water curing as soon as concrete attains initial set.
    3. Maintain a wet surface by ponding, continuous sprinkling, covering with saturated burlap, or otherwise saturating the surface by means acceptable to Engineer.
        a. Flood top of walls with water at least 3 times per day and keep surfaces moist at all times during 7 day curing period.
        b. Provide plastic sheet material over surfaces if required to maintain a wet surface during arid or windy conditions. See plastic membrane curing requirements for additional details.
    4. Use water having a temperature within 20 degrees Fahrenheit of the temperature of concrete, and not lower than the minimum temperature allowed for the concrete surface during curing.

E. Plastic membrane curing:
    1. Install plastic membrane as soon as concrete is finished and can support limited pedestrian traffic without damage.
    2. Cover entire surface of finished concrete with membrane.
    3. Anchor membrane to prevent uplift from wind or air trapped below the sheet.
    4. Fully seal joints and edges to provide full seal around perimeter.
    5. Keep concrete under plastic membrane moist, regularly monitoring surfaces and adding supplemental moisture if necessary. Add water as specified for water curing.

F. Sprayed membrane curing compound:
   1. Apply curing compound to concrete surface after repairing and patching, and within 1 hour after forms are removed.
      a. If more than 1 hour elapses after removal of forms, do not use membrane curing compound. Instead, provide water curing for not less than 7 days.
      b. Do not remove sprayed membrane curing compound from concrete in less than 7 days after initial application.
      c. When application of curing compound at concrete joints is accepted by Engineer, take care to apply curing compound to all surfaces along full profile of joints.
   2. Apply curing compound by mechanical, power operated sprayer with mechanical agitator that will uniformly mix all pigment and compound.
      a. Apply curing compound in at least 2 coats.
      b. Apply each coat in direction turned 90 degrees from application direction of the preceding coat.
      c. Apply curing compound in sufficient quantity so that concrete has uniform appearance and its natural color is effectively and completely concealed immediately after spraying.
      d. Continue to coat and recoat surfaces until specified coverage is achieved and until coating film remains on concrete surfaces.
   3. Thickness and coverage of curing compound:
      a. Provide curing compound having film thickness that can be scraped from surfaces at any and all points after drying for at least 24 hours.
      b. Contractor is cautioned that method of applying curing compound specified in this Section may require more curing compound than normally suggested by manufacturer of curing compound and is more than is customary in the trade. Apply amounts specified in this Section, regardless of manufacturer's recommendations or customary practice.
   4. If Contractor desires to use a curing compound other than specified product, coat sample areas of concrete wall with proposed curing compound, and also coat similar adjacent area with the specified compound in the manner specified, for comparison:
      a. If proposed sample is not equal or better, in opinion of the Engineer, the proposed substitution will not be allowed.
   5. Removal of curing compound.
      a. After curing period is complete, remove curing compound placed on surfaces that will receive additional concrete, including all concrete joint surfaces, by heavy sandblasting or by other means acceptable to Engineer. Complete removal and cleanup prior to placing any new concrete against the surface.
      b. Where additional finishes will be applied over concrete surfaces, unless otherwise recommended by the manufacturer of the finish to be applied, remove curing compound by sandblasting. Provide blasting as necessary to fully remove curing compound.
   6. Prior to final acceptance of the work, remove, by sandblasting or by other method acceptable to the Engineer, any curing compound on surfaces exposed to process water or exposed to view, so that only natural color of finished concrete is visible and uniform over the entire surface.

3.08 PROTECTION

A. General:
   1. Keep forms in place, as specified in the following paragraphs, to provide curing and to protect concrete surfaces and edges from damage.
   2. Immediately after forms are removed, carefully examine concrete surfaces, and repair any irregularities in surfaces and finishes as specified.

B. Form removal:
   1. Do not remove forms from concrete which has been placed when outside ambient air temperature is below 50 degrees Fahrenheit until the following conditions are satisfied:
      a. Concrete has sufficient strength to allow form removal without damage to surfaces.
      b. At least 48 hours have elapsed since the end of concrete placement.
      c. Provisions are in place to maintain moisture for curing concrete, and temperature at or above the required minimum curing temperature specified.
   2. Vertical forms:
      a. Retain in place for a minimum of 24 hours after concrete is placed.
      b. If concrete has sufficient strength and hardness to resist surface or other damage after 24 hours, forms may be removed.
   3. Other forms supporting concrete, and shoring: Retain in place as follows:
      a. Formed sides of footings: 24 hours minimum.
      b. Formed vertical sides of beams, girders, and similar members: 48 hours minimum.
      c. Forms below slabs, beams, and girders: Until concrete strength reaches specified strength f'c or until shoring is installed.
         1) Shoring for slabs, beams, and girders: Shore until concrete strength reaches minimum specified 28-day compressive strength.
   4. Wall bracing: Brace walls until strength of concrete beams and slabs laterally supporting wall reaches minimum specified 28-day compressive strength.

C. Loading of concrete members:
   1. Placement of loads on or against green concrete is not permitted.
   2. Do not place soil against walls, or fill over the top of concrete until conditions designated in the following paragraphs are satisfied:
      a. Walls have been cast to their full height in the structure and have achieved their minimum specified 28-day compressive strength.
      b. Connecting slabs and beams that brace the walls are in place, are complete, and (in the case of concrete) have achieved their minimum specified 28-day compressive strength.

3.09 HOT WEATHER CONCRETING

A. Implement hot weather concrete procedures during periods of hot weather as defined in this Section.
   1. Comply with the recommendations of ACI 305R and this Section.

B. If placements during hot weather are expected, and when requested by the Engineer, prepare a hot weather concreting plan. Maintain at least 1 copy on site. Provide plan for review if requested by the Engineer.
   1. Include procedures for batching, delivery, placement, curing, protection, and monitoring and recording the temperature of the concrete and the surrounding environment.
   2. Describe procedures to be implemented in the event of abrupt changes in weather conditions, or in the event of equipment failure.
   3. Review hot weather concreting plan during pre-construction meeting. Make provisions to address any concerns expressed by Engineer before beginning concrete placements.

C. Preparation:
   1. Do not place concrete against forms, reinforcement, or embedments with a surface temperature greater than 120 degrees Fahrenheit.
      a. If necessary, to maintain maximum concrete temperature during placing, cool forms and reinforcement to temperature below 90 degrees Fahrenheit using water or shades.
      b. Do not allow water to puddle in forms or placement areas.
   2. Moisten forms or subgrade to maintain a saturated surface without standing water or soft spots.
   3. Provide windbreaks, shades, fog spray, sprinkling, wet cover, or other means required to protect concrete from premature loss of moisture and rapid temperature gain.

D. Batching and delivery:
   1. Retarding admixtures will not be permitted.
   2. Temperature of concrete delivered for placement shall not exceed 90 degrees Fahrenheit.
      a. Maintain uniform temperature in the mix below this level during batching, delivery, placing, and consolidation.
      b. Temperature of mix, even if below the maximum allowable temperature specified, shall be maintained at a level to avoid loss of slump, flash setting, or cold joints in placements.
   3. If necessary:
      a. Mix water may be chilled or replaced with ice to maintain mix temperature. Where mix water is replaced with ice, provide replacement at a 1 to 1 ratio by weight.
      b. Shade transit mixed concrete trucks, or cool mixing outside of container with water to control temperature of concrete.

E. Placing and finishing:
   1. Place and finish concrete promptly. Place so that vertical lift lines will not be visible in exposed concrete surfaces.
   2. Provide plastic sheeting, fog nozzles, shades or other means to reduce concrete temperature and protect from moisture loss.

F. Protection and curing:
   1. Furnish and locate maximum/minimum temperature recording thermometers in sufficient numbers to confirm concrete temperatures over full area and edges of concrete.

2. Flatwork: Protect and cure using water curing methods as specified in this Section.
    a. Water curing:
        1) Keep concrete continuously wet and make provisions for runoff.
        2) For sprinkling or soaker hoses, maintain temperature of water as close as possible to the temperature of the concrete to minimize effects of thermal shock.
3. Formed surfaces: Protect and cure using forms left in place or membrane curing methods as specified in this Section.
    a. Cover forms and keep continuously moist for at least 24 hours after placement.
    b. Loosen forms as soon as this can be accomplished without damaging the concrete.
    c. Maintain continuously moist surfaces by fogging or spraying with water, or by application of curing compound as specified.

3.10 FIELD QUALITY CONTROL BY CONTRACTOR

A. Provide quality control over the Work of this Section as required by Section 01450 - Quality Control.

B. Field tests:
1. During progress of construction, provide testing to determine whether the concrete, as being produced, complies with requirements specified.
2. Sampling and testing shall be performed by Contractor's testing laboratory. See Section 01455 - Regulatory Quality Assurance - Special Tests and Inspections for requirements.
    a. Cooperate in testing by allowing free access to the Work for testing laboratory to sample and test materials.
    b. Provide full access for Engineer to observe concrete sampling and testing at any time.
    c. Contractor is responsible for providing care of and curing conditions for test specimens in accordance with ASTM C31 until specimens are collected by testing laboratory.
    d. Provide 4 firmly braced, insulated, heated, closed wooden curing boxes, each sized to hold 10 specimens. Include cold weather temperature and hot weather temperature control thermostat for initial curing and storage from time of fabrication through shipment to Owner's testing laboratory.
3. Testing shall include:
    a. Sampling of concrete in accordance with ASTM C172.
    b. Temperature of concrete at delivery in accordance with the requirements of ASTM C1064 and as specified in this Section.
    c. Slump of concrete using slump cone in accordance with requirements of ASTM C143. Test slump at the following intervals:
        1) At the beginning of each placement.
        2) As often as necessary to keep slump within the specified range, but not less than every 6th truck.
        3) When requested to do so by the Engineer.
        4) Observe concrete during slump test for signs of segregation.
            a) Observe concrete to see if mortar or moisture flows from slumped concrete.
            b) Reject concrete if mortar or moisture flows out of mix.

d. Unit weight of concrete in accordance with ASTM C138.
e. Air entrainment in accordance with ASTM C173. Test air content at the following intervals:
    1) At beginning of each placement.
    2) As often as necessary to keep entrained air within specified range, but not less than every 6th truck.
    3) When requested to do so by the Engineer.
    4) Test air entrainment in concrete in accordance with ASTM C173. If air entraining admixtures used for the Work require alternate testing procedures, advise the independent testing laboratory well in advance of the dates of testing, and confirm that appropriate equipment and personnel are provided for the test.
    5) Make air test at point of delivery (discharge from mixer). For pumped concrete, make air tests at point of delivery and at point where expelled after pumping for placement.
f. Compressive strength in accordance with ASTM C39. Required number of cylinders is as follows:
    1) Not less than 6 cylinder specimens, 4 inches in diameter by 8 inches long, will be tested for each 150 cubic yards of each class of concrete, with minimum of 6 specimens for each class of concrete placed; not less than 6 specimens for each half day's placement; and not less than 2 sets of 6 specimens for each structure.
    2) 1 cylinder will be broken at 7 days, 1 at 14 days, and 3 at 28 days. The 6th cylinder may be used to evaluate strength after 28 days if requested by the Engineer.
    3) Retain and store "6th cylinders" (tested and untested) at testing laboratory until 56 days. Break “6th cylinder” when directed by the Engineer.
g. Provide full access for Engineer to observe concrete sampling and testing at any time.

C. Test completed liquid containment structures listed in Section 01759 - Water Leakage Test for Concrete Structures for watertightness.

3.11 FIELD QUALITY CONTROL BY OWNER

A. Provide on-site inspection and field quality assurance for the Work of this Section as specified in Section 01450 - Quality Control.

B. Special tests and inspections: See Section 01455 - Regulatory Quality Assurance.

C. Field inspections:
1. Required inspections:
    a. Observe construction for conformance to the Contract Documents and the accepted submittals.
2. Records of inspections:
    a. Provide record of each inspection.
    b. Submit copies to Contractor upon request.

D. Field tests:
    1. Engineer may request, at any time, additional testing to confirm that materials being delivered and placed conform to the requirements of the Contract Documents.
        a. If such additional testing shows that the material does not conform to the specified requirements, Contractor shall pay the cost of these tests.
        b. If such additional testing shows that the materials do conform to the specified requirements, Owner will pay the cost of these tests.

3.12 NON-CONFORMING WORK

A. Remove and replace or repair non-conforming and defective work.
    1. Provide repairs having strength equal to or greater than specified concrete for areas involved.
    2. Provide replacement or repair of non-conforming work by means acceptable to the Engineer and at no additional cost to Owner.
    3. Project schedule will not be extended based on work to address non-conforming concrete.

B. Concrete not conforming to the specified requirements for properties of plastic concrete: Remove from the site and replace with conforming materials at no additional cost to Owner.
    1. Temperature: Do not use concrete having a temperature above or below the limits specified in this Section.
    2. Slump: Do not place concrete that does not conform to requirements for slump.
    3. Air entrainment: Do not use concrete that does not conform to requirements for percentage of entrained air.

C. Concrete not conforming to the specified requirements for compressive strength:
    1. Concrete is expected to reach a compressive strength equal to or greater than the minimum specified compressive strength f'c in Table 3 of this Section.
    2. Strength of concrete will be considered acceptable if following conditions are satisfied.
        a. Averages of all sets of 3 consecutive strength test results is greater than or equal to the specified compressive strength f'c.
        b. No individual strength test (average of 3 cylinders) falls below the strength specified in Table 6 of this Section.
        c. Where relationships between 7-day and 28-day compressive strength, or between 28-day and 56-day compressive strength, have been provided as part of the mix design submittals:
            1) 7-day strength may be considered as an indication of 28 day strength provided effects of temperature and humidity between 7 day and 28 day are taken into account.
            2) 28-day strength may be considered as indication of 56 day strength provided effects of temperature and humidity between 28 days and 56 days are taken into account.

Table 6: Strength Compliance Requirements	
Minimum Specified Compressive Strength, f'c (pounds per square inch)	**Lower Bound of an Individual Compressive Strength Test, (pounds per square inch)**
Less than 5,000	f'c – 500
Over 5,000	f'c – (0.10 x f'c)

3. Non-compliant strength tests.
    a. Mark non-compliant strength test reports to highlight the non-complying results, and immediately forward copies to all parties on the test report distribution list.
    b. Initial treatment may consist of additional curing of affected portion(s) followed by not less than 3 cores at each affected area, taken in accordance with ASTM C42 and ACI 318. Obtain Engineer's acceptance of proposed coring locations before proceeding with that work.
    c. Submit report of compressive strength testing for Engineer's review.
    d. If requested by the Engineer, provide additional cores, and obtain petrographic testing in accordance with ASTM C856. Submit results for Engineer's review.
    e. If additional curing does not bring the average strength of 3 cores taken in affected area to at least specified compressive strength f'c, designate such concrete in affected area will be considered defective.
    f. Engineer may require the Contractor to strengthen defective concrete by means of additional concrete, additional reinforcing steel, or replacement of defective concrete, all of the Contractor's expense.

D. Concrete sections or surfaces with honeycombing and voids:
    1. Provide repairs having surface appearance and finish consistent with that of the surrounding work and acceptable to the Engineer.
    2. Do not patch, repair, or cover defective Work without prior inspection by the Engineer.
    3. Preparation of concrete for repair:
        a. Make no repair until Engineer has accepted methods for preparing surfaces and for making and curing repairs.
        b. Chip out and key-in imperfections in the Work to make them ready for repair.
        c. Coat bonding surfaces and edges of repair area with one of the following bonding agents as accepted by the Engineer.
            1) Epoxy bonding agent as specified in Section 03071 - Epoxies.
            2) Epoxy resin/portland cement bonding agent as specified in Section 03072 - Epoxy Resin/Portland Cement Bonding Agent.
    4. Methods of repair:
        a. Dry pack mortar method:
            1) Use for holes having depth nearly equal to or greater than least surface dimension of hole, for cone-bolt holes, and for narrow slots cut for repair.
            2) Smooth Holes: Clean and roughen by heavy sandblasting before repair.
            3) Install dry-pack mortar as specified in Section 03600 - Grouting.

b. Cement mortar method:
    1) Use for holes too wide to dry pack and too shallow for concrete replacement; and for comparatively shallow depressions, large or small, that extend no deeper than nearest surface reinforcement.
    2) Install cement mortar as specified in Section 03600 - Grouting.
c. Concrete replacement:
    1) Use when holes extend entirely through the concrete section or when holes are more than 1 square foot in area and extend halfway or more through the section.
    2) Form, place, consolidate, and cure concrete of same mix as the surrounding work.

E. Leaking construction joints and cracks in concrete walls and slabs:
1. Repair cracks that develop in walls or slabs, and repair cracks that show any signs of leakage until all leakage is stopped.
2. Pressure inject visible cracks in the following areas, other than hairline cracks and crazing, with repair products and methods acceptable to the Engineer.
    a. Floors and walls of water bearing structures.
    b. Walls and overhead slabs of passageways and occupied spaces where the opposite face of the member is exposed to weather or may be washed down and where the opposite face does not receive a separate waterproofing membrane.
    c. Other items not specified to receive separate waterproofing membrane including slabs over water channels, wet wells, reservoirs, and other similar surfaces.
3. Continue pressure injection of cracks as specified until structure is watertight and remains watertight for not less than 1 year after date of Substantial Completion or date of final repair, whichever occurs later in time.

F. Leaking expansion joints in concrete walls or slabs that include waterstops:
1. Repair any signs of leakage until all leakage is stopped.
2. Pressure inject visible leaks with hydrophilic polyurethane foam resin as specified in Section 03933 - Hydrophilic and Hydrophobic Foam Polyurethane Resin Injection System.
3. Continue pressure injection along joints lines as specified until structure is watertight and remains watertight for not less than 1 year after date of Substantial Completion or date of final repair, whichever occurs later in time.

G. Walls and slabs at overhead channels that leak or sweat because of porosity or cracks too small for successful pressure injection with epoxy.
1. Seal on water or weather side by coating using surface-applied sealing system as specified in this Section.
2. Apply as recommended by manufacturer published instructions. Where concrete continues to sweat or leak, apply additional coats of surface-applied sealing system until the sweating or leaks stop.
3. Continue application of surface-applied sealing system until structure is watertight and remains watertight for not less than 1 year after date of Substantial Completion, or date of final repair, whichever occurs later in time.

END OF SECTION

ATTACHMENT A - MENZEL FORMULA AND NOMOGRAPH

MENZEL FORMULA AND NOMOGRAPH

Source: ACI 350R

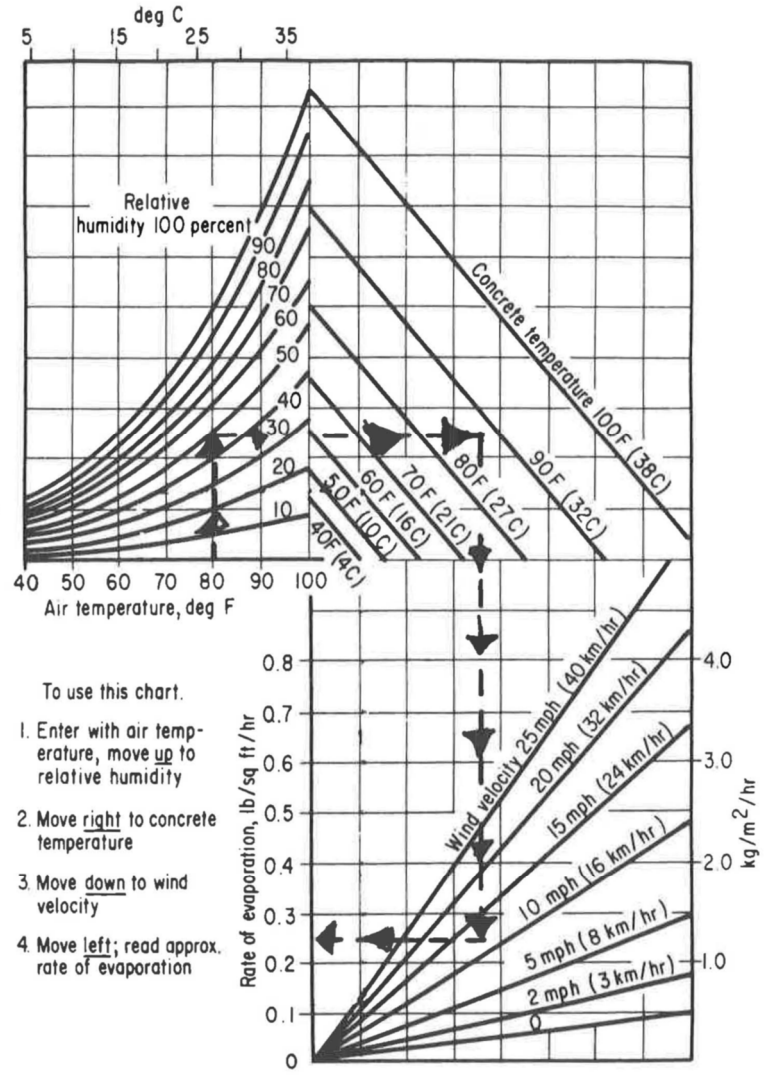


*Fig. 2.1.5—Effect of concrete and air temperatures, relative humidity, and wind speed on the rate of evaporation of surface moisture from concrete. This chart provides a graphic method of estimating the loss of surface moisture for various weather conditions. To use this chart, follow the four steps outlined above. If the rate of evaporation approaches 0.2 lb/ft²/h (1 kg/m²/h), precautions against plastic-shrinkage cracking are necessary (Lerch 1957). Wind speed is the average horizontal air or wind speed in mph (km/h) and should be measured at a level approximately 20 in. (510 mm) higher than the evaporating surface. Air temperature and relative humidity should be measured at a level approximately 4 to 6 ft (1.2 to 1.8 m) higher than the evaporating surface on its windward side shielded from the sun's rays (*PCA Journal *1957).*

ATTACHMENT B - COARSENESS FACTOR CHART

COARSENESS FACTOR CHART

Source: ACI 302.1R-15, Figure 8.9.2.2.

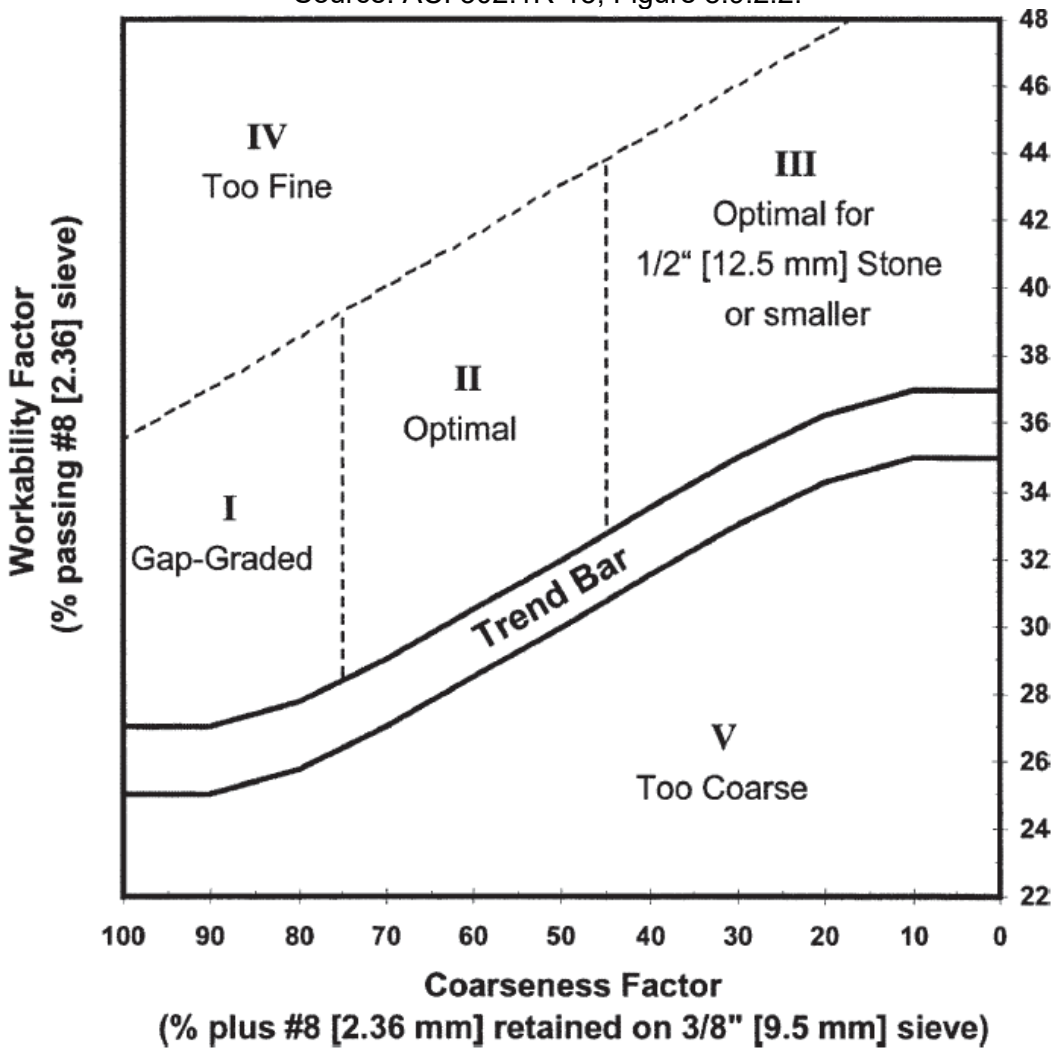
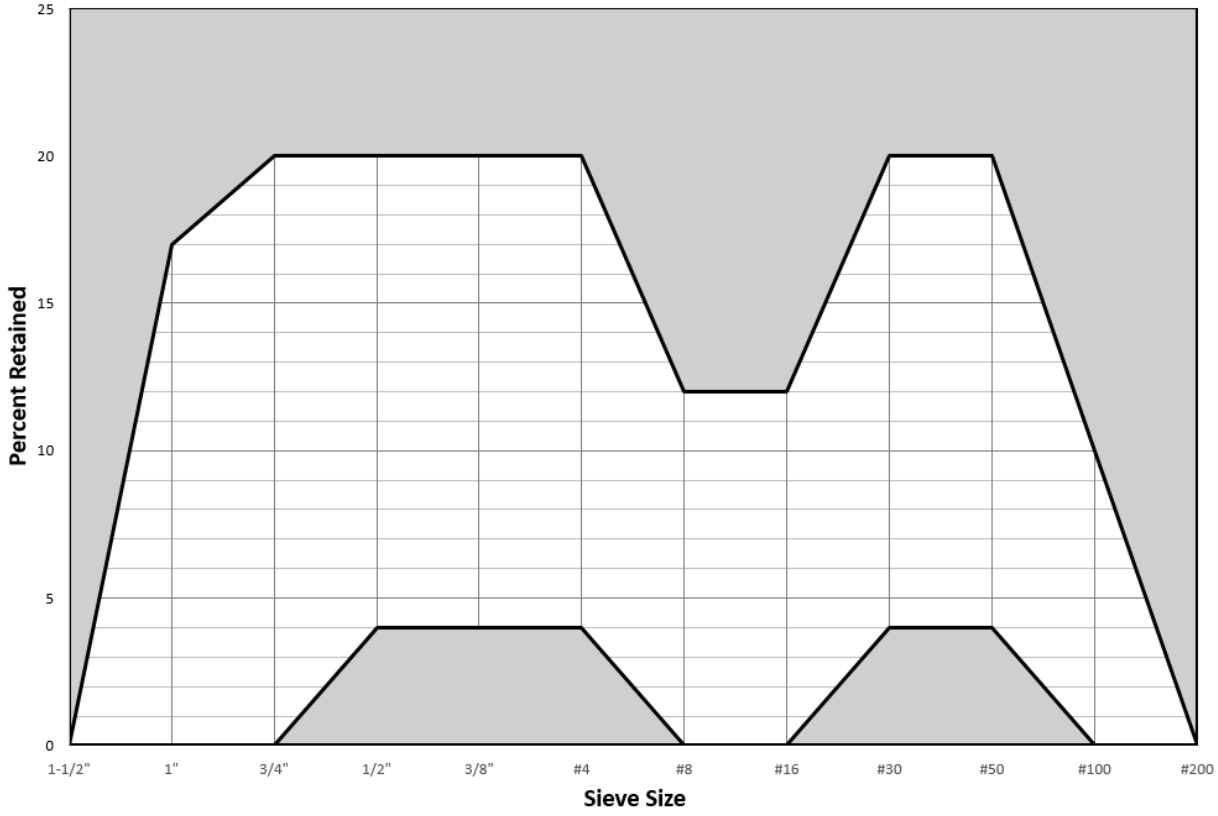


Fig. 8.9.2.2—Coarseness factor chart for evaluating potential performance of mixture.

ATTACHMENT C - COMBINED AGGREGATE GRADATION CHART

COMBINED AGGREGATE GRADATION CHART



ATTACHMENT D - CONCRETE PLACEMENT CHECKLIST

CONCRETE PLACEMENT CHECKLIST

Project: _____ Class of Concrete _____
Project No.: _____Test Cylinders Taken? Yes _____ No _____
Location of Placement _____
The Contractor certifies the above-proposed concrete placement is prepared as indicated and

Preparation Slab	Contractor	N/A
Compaction Subgrade		
Filter Fabric/Drain Rock-ABC/Separator Fabric		
Drain Rock, Pea Gravel & Void Form		
Starter Wall Forms		
Reinforcing Steel		
Screeds		

Embedded Items	Contractor	N/A
A. Anchor Bolts		
B. Water Stop		
C. Rebar		
D. Electrical		
E. Plumbing Rough-in		
F. Mechanical		
G. HVAC		

Concrete Placement Equip.	Contractor	N/A
A. Crane		
B. Buckets		
C. Hoppers		
D. Vibrators		
E. Elephant trunks		
F. Floodlights		
G. Pump Truck		

Building Department Notification	
Date:	Time:

Prep Wall Concrete	Contractor	N/A
Access To Work		
Ladders Secured		
Clean up and Washed Out		
Reinforcing Steel		

Forms	Contractor	N/A
A. Alignment & Grade		
B. Scaffolding		
C. Sleeves & Wall Castings		
D. Embedded Items		
E. Electrical		
F. Plumbing Rough-in		
G. Piping		

Record of Curing Conditions During Placement		
	Start	Finish
Date		
Time		
Weather		
Temperature		
Comments		

is in accord with the Contract Drawings and Specifications. The Contractor requests permission to begin placement of concrete on the date of _____ at _____. The estimated number of yards is: _____. The estimated duration of the placement is _____.

By: _____
Contractor

Released for placement by: _____
Engineer

SECTION 04220

CONCRETE UNIT MASONRY

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Concrete masonry units and accessories.

1.02 REFERENCES

A. American Concrete Institute (ACI):
   1. ACI 530.1 - Specification for Masonry Structures.

B. ASTM International (ASTM):
   1. C90 - Standard Specification for Loadbearing Concrete Masonry Units.
   2. C140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
   3. C426 - Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units.

1.03 DEFINITIONS

A. Mortar Smears: Mortar paste smeared across the permanent masonry construction during construction and absorbed into the masonry pores.

B. Mortar Splash: Mortar dropped splashed onto the permanent masonry construction at the base of the wall or off the scaffolding.

C. Mortar Tag: Excess mortar between masonry units worked out of the joints during tooling or striking.

D. Mortar Stains: Mortar paste left after mortar tags are removed.

1.04 SUBMITTALS

A. Product data:
   1. Submit manufacturer's product data for split face block.
   2. Submit manufacturer's product data for proposed cleaning agent.

B. Shop drawings: Include elevations of each wall indicating type and layout of units, including type of mortar joints, bond pattern, reinforcing steel, connecting dowels, joint reinforcement, grouted cells, and control joints.

C. Samples: Include samples of stretcher units in sufficient quantity to illustrate color range.

D. Test reports:
   1. Compressive strength.
   2. Linear shrinkage.

3. Moisture content as a percentage of total absorption.
4. Total absorption.
5. Unit weight.

E. Manufacturer's instructions:
   1. Submit printed or written recommendations from the masonry unit manufacturer of the cleaning procedures and cleaning agents appropriate for each type of masonry unit included in the work.

F. Quality assurance submittals:
   1. If requested by the Engineer, submit a record of the Installer's evidence of qualifications.
   2. If requested by the Engineer, submit a record of the Masonry Cleaner's evidence of qualifications.

1.05 QUALITY ASSURANCE

A. Qualifications:
   1. Installer qualifications:
      a. The mason shall hold an appropriate contractor's license in the State where the work will be constructed.
      b. The mason shall have not less than 5 years' experience and completed a minimum of 20 projects and at least 5 of which included the type of masonry units specified for this Work.
   2. Masonry cleaner qualifications:
      a. The masonry cleaner shall have not less than 5 years' experience and completed a minimum of 20 projects and at least 5 of which included the type of masonry units specified for this Work.

B. Mockup:
   1. A minimum 2 weeks to starting construction of masonry, construct minimum 4 foot inches by 4 foot inches square mockup. The mockup shall be constructed by the mason who will be performing the Work.
   2. Mockup is intended for use as the project standard of workmanship, construction, quality, appearance, and material selection.
   3. Use accepted materials containing each different kind and color of concrete masonry units to illustrate wall design.
   4. The mockup shall be constructed by the mason who will be performing the work.
   5. The mockup shall be cleaned with the exact equipment, products, and methods submitted and cleaned by the individual who will perform the Work.
   6. When accepted, mockup will be standard of comparison for remainder of masonry work.
      a. The mockup may be accepted by the Engineer with exceptions that will not be accepted in the final construction.
         1) In such cases, those areas of the mockup not accepted will be clearly identified by the Engineer.

7. When not accepted by the Engineer, construct another mockup.
8. Upon completion of Project, dispose of mockups in legal manner at offsite location.

C. Pre-installation conference: Conduct as specified in Section 01312 - Project Meetings.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Transport and handle concrete masonry units as required to prevent discoloration, chipping, and breakage.

B. Store masonry units off the ground in a dry location, covered and protected from absorbing moisture.
1. Locate storage piles, stacks, and bins to protect materials from heavy traffic.
2. If masonry units are delivered in shrink-wrapped packaging and condensation develops, remove shrink-wrap packaging.

C. Remove chipped, cracked, and otherwise defective units from jobsite upon discovery.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Cold weather requirements:
1. In accordance with building code as specified in Section 01410 - Regulatory Requirements, provide adequate equipment for heating masonry materials when air temperature is below 40 degrees Fahrenheit.

B. Hot weather requirements:
1. In accordance with building code as specified in Section 01410 - Regulatory Requirements, when ambient air temperature exceeds 100 degrees Fahrenheit, or when ambient air temperature exceeds 90 degrees Fahrenheit and wind velocity is greater than 8 miles per hour, implement hot weather protection procedures.
2. Wet mortarboard before loading and cover mortar to retard drying when not being used.
3. Do not spread mortar beds more than 48 inches ahead of placing masonry units.
4. Place masonry units within one minute of spreading mortar.

1.08 SEQUENCING AND SCHEDULING

A. Order concrete masonry units well before start of installation to ensure adequate time for manufacturing and minimum 28 days for curing and drying before start of installation. Protect from weather after curing period to avoid moisture increase.

PART 2 PRODUCTS

2.01 MANUFACTURED UNITS

A. Hollow load bearing concrete masonry units:
   1. Class: Class 3 in accordance with ASTM C90, Standard Level of Quality with minimum compressive strength of 1,900 pounds per square inch.
   2. Surface texture: Standard and **[split face][fluted][ ][with dense faces suitable for painting where scheduled to be painted]**.
   3. Color: Integral, **[Natural gray of concrete][Match existing][ ]**.
   4. Typical size: 8 inches wide by 8 inches high by 16 inches long, or other sizes as needed to minimize cutting.
   5. Special sizes and shapes: As required for window and door openings, bond beams, piers, lintels, control joints, and other special applications to minimize cutting.
   6. Manufacturers: One of the following or equal:
      a. **[ ]**.
      b. **[ ]**.

B. Anchor bolts: As specified in Section 05120 - Structural Steel.

C. Steel reinforcement: As specified in Section 04090 - Masonry Accessories.

D. Wall ties: As specified in Section 04090 - Masonry Accessories.

E. Wire joint reinforcement: As specified in Section 04090 - Masonry Accessories.

F. Loose fill insulation: As specified in Section 04090 - Masonry Accessories.

PART 3 EXECUTION

3.01 PREPARATION

A. Protection:
   1. Protect adjacent construction with appropriate means from mortar droppings and other effects of laying of concrete masonry units.

B. Surface preparation:
   1. Thoroughly clean foundations of laitance, grease, oil, mud, dirt, mortar droppings, and other matter that will reduce bond.

3.02 INSTALLATION

A. Forms and shores:
   1. Where required, construct forms to the shapes indicated on the Drawings:
      a. Construct forms sufficiently rigid to prevent deflection which may result in cracking or other damage to supported masonry and sufficiently tight to prevent leakage of mortar and grout.

b. Do not remove supporting forms or shores until the supported masonry has acquired sufficient strength to support safely its weight and any construction loads to which it may be subjected.
    1) Wait at least 24 hours after grouting masonry columns or walls before applying uniform loads.
2. Wait at least 72 hours before applying concentrated loads.

B. Concrete masonry units:
1. Provide Standard Level of Quality. Comply with the requirements of ACI 530.1 unless more restrictive requirements are contained in this Section.
2. Lay concrete masonry units dry.
3. Lay units in uniform and true courses, level, plumb, and without projections or offset of adjacent units.
4. Lay units to preserve unobstructed vertical continuity of cells to be filled with grout or insulation.
5. Align vertical cells to be filled with grout to maintain clear, unobstructed continuous vertical cell measuring not less than 2 by 3 inches.
6. Place mortar with full coverage of joints at webs of all cells and face shells.
7. Butter vertical head joints for thickness equal to face shell thickness of units, and shove joints tightly together so that mortar bonds to both masonry units.
8. Solidly fill joints from face of units to inside face of cells.
9. Lay units to desired height with joints of uniform thickness.
10. Bond shall be plumb throughout.
11. Lay units to avoid formation of cracks when units are placed. Keep cells of units as free of mortar as possible as masonry wall height increases.
12. When positions of units shift after mortar has stiffened, bond is broken, or cracks are formed, relay units in new mortar.
13. Remove mortar tags and smears daily with a non-metallic tool.
    a. Mortar tags and smears shall be removed after they initially set but shall not be permitted to remain more than 24 hours.
14. Where practical, protect completed work from mortar splash by placing thin plastic sheeting around the base of walls.
    a. Place sand, straw, sawdust or other similar material on the floor around the base of walls to protect floors and walls.
15. Turn scaffold planks over at the end of the workday to avoid mortar splashes from wet weather.
    a. Cover tops of walls at the end of the workday and other work stoppages to prevent entry of water into the partially completed masonry.
16. Seal cleanouts after inspection and before grouting.

C. Bond pattern:
1. Lay concrete masonry units in running bond pattern, unless otherwise indicated on the Drawings.

D. Mortar joints:
1. Make joints straight, clean, smooth, and uniform in thickness.
2. Tool exposed joints, slightly concave. Strike concealed joints flush.
3. Make vertical and horizontal joints 3/8-inch thick.
4. Where fresh masonry joins totally or partially set masonry, clean and roughen set masonry before laying new units.
5. Remove mortar that protrudes more than 1/2 inch into the cells of units that are to be grouted.

E. Wire joint reinforcement:
   1. Lap splice longitudinal wire joint reinforcement minimum 75 wire diameters.
   2. Place longitudinal wires in approximate centers of mortar beds with minimum 5/8-inch mortar cover on exposed faces.
   3. Provide intersecting masonry walls with prefabricated wire joint reinforcement tees.
   4. Rake intersecting joints 1/2 inch and caulk joints.

F. Grouting and reinforcement:
   1. Where horizontal and vertical bars are spliced and adjacent lap splices are separated by more than 3 inches, the lap splice length shall be 72 bar diameters. Where adjacent lap splices are separated by 3 inches or less, the lap splice length shall be increased by 1.3 times or the lap splices shall be staggered at least 24 bar diameters with no increase in length.
   2. Hold vertical reinforcing bars in position at top and bottom and at intervals not exceeding 200 bar diameters. Use steel wire bar positioners to position bars. Tie reinforcing bars to dowels with wire ties.
   3. Obtain acceptance of reinforcement placement before grouting.
   4. Fill all spaces and cells solidly with grout.
      a. Low-lift grouting:
         1) Hollow unit masonry to be grouted by the low lift method shall be constructed and grouted in lifts not exceeding 4 feet.
         2) Slushing with mortar will not be permitted.
      b. High-lift grouting:
         1) Hollow unit masonry shall be allowed to cure at least 24 hours before grouting.
         2) Grout shall be placed in lifts not to exceed 6 feet in depth.
         3) Each lift shall be allowed to set for 10 minutes after initial consolidation of grout before successive lift is placed.
         4) The full height of each section of wall shall be grouted in 1 day.
   5. Grout in cells shall have full contact with surface of concrete footings.
   6. When grouting stops for 1 hour or longer, form horizontal construction joints by stopping grout placement 1-1/2 inches below top of uppermost unit containing grout.
   7. After placement, consolidate grout using mechanical immersion vibrators designed for consolidating grout.
   8. Placement:
      a. Use a hand bucket, concrete hopper, or grout pump.
      b. Place grout in final position within 1-1/2 hours after mixing. Place grout so as to completely fill the grout spaces without segregation of the aggregates.
      c. Do not insert vibrators into lower grout placements that are in a semi-solidified state.
      d. Remove grout spills immediately by hand washing with a bucket and brush.

G. Cutting concrete masonry units:
   1. When possible, use full units of the proper size in lieu of cut units. Cut units as required to form chases, openings, for anchorage, and for other appurtenances.
   2. Cut and fit units with power-driven carborundum or diamond disc blade saw.

H. Control joints:
   1. Provide in masonry walls at locations indicated on the Drawings.
   2. Make full height and continuous in appearance.
   3. Run bond beams and bond beam reinforcing bars continuously through control joints.
   4. Insert control joint filler in joints as wall is constructed.
   5. Apply sealant as specified in Section 07900 - Joint Sealants.

I. Openings and lintels:
   1. Use lintel block units where underside of lintel will be exposed.
   2. Provide minimum of 8-inch bearing at each end of lintel.
   3. Embed reinforcing bars minimum 24 inches or 48 bar diameters, whichever is longer, into wall past edges of openings or as indicated on the Drawings:
      a. At corners, provide 90-degree bend with equivalent total embedment.

J. Steel door frames:
   1. Anchor and fully grout jambs and head of steel doorframes connected to concrete unit masonry.
   2. Fill frames with grout as each 2 feet of concrete unit masonry is laid.

K. Anchor bolts:
   1. Hold anchor bolts in place with template during grouting to ensure precise alignment.
   2. Do not cut or ream members being anchored or use other means to accommodate misaligned anchor bolts in roof deck support angles.

L. Enclosures:
   1. Where concrete masonry units enclose conduit, pipes, stacks, ducts, and similar items, construct chases, cavities, and similar spaces as required, whether or not such spaces are **i**ndicated on the Drawings.
   2. Point openings around flush mounted electrical outlet boxes with mortar, including flush joints above boxes.
   3. Do not cover enclosures until inspected and when appropriate, tested.

M. Other embedded items:
   1. Build in wall plugs, accessories, flashings, pipe sleeves, and other items required to be built-in as the masonry work progresses.

N. Patching:
   1. Patch exposed concrete masonry units at completion of the Work and in such manner that patching will be indistinguishable from similar surroundings and adjoining construction.

O. Water curing:
   1. Protect concrete masonry units from drying too rapidly by frequently fogging or sprinkling so walls will always be visibly damp for minimum 3 days.

P. Miscellaneous:
   1. Build in required items, such as anchors, flashings, sleeves, frames, structural steel, lintels, anchor bolts, and metal fabrications, as required for complete installation.

Q. Water repellent:
   1. Apply water repellent as specified in Section 07190 - Water Repellents.

R. Anti-graffiti coating:
   1. Apply anti-graffiti coating as specified in Section 07190 - Water Repellents.

S. Grouting equipment:
   1. Grout pumps:
      a. Do not pump grout through aluminum tubes.
      b. Operate pumps to produce a continuous stream of grout without air pockets.
      c. Upon completion of each days pumping, eject grout from pipeline without contamination or segregation of the grout:
         1) Remove waste materials and debris from the equipment.
         2) Dispose of waste materials, debris, and all flushing water outside the masonry.
   2. Vibrators:
      a. Internal vibrators shall maintain a speed of not less than 5,000 impulses per minute when submerged in the grout.
      b. Maintain at least 1 spare vibrator, at the site at all times.
      c. Apply vibrators at uniformly spaced points not further apart than the visible effectiveness of the machine.
      d. Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation.

3.03 CONSTRUCTION

A. Site tolerances: Lay masonry plumb, true to line, and with courses level. Keep bond pattern plumb throughout. Lay masonry within the following tolerances:
   1. Maximum variation from the plumb in the lines and surfaces of columns, walls, and in the flutes and surfaces of fluted or split faced blocks:
      a. In adjacent masonry units: 1/8 inch.
      b. In 10 feet: 1/4 inch.
      c. In any story or 20 feet maximum: 3/8 inch.
      d. In 40 feet or more: 1/2 inch.
   2. Maximum variations from the plumb for external corners, expansion joints, and other conspicuous lines:
      a. In any story or 20 feet maximum: 1/4 inch.
      b. In 40 feet or more: 1/2 inch.
   3. Maximum variations from the level or grades indicated on the Drawings for exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:
      a. In any bay or 20 feet maximum: 1/4 inch.
      b. In 40 feet or more: 1/2 inch.
   4. Maximum variations of the linear building lines from established position in plan and related portion of columns, walls, and partitions:
      a. In any bay or 20 feet maximum: 1/2 inch.
      b. In 40 feet or more: 3/4 inch.
   5. Maximum variation in cross sectional dimensions of columns and in thickness of walls:
      a. Minus: 1/4 inch.
      b. Plus: 1/2 inch.

3.04 FIELD QUALITY CONTROL

A. Site tests:
   1. Owner will have tests performed by an independent laboratory.
   2. Have minimum 3 concrete masonry units of each type proposed for Project tested in accordance with ASTM C90, C140, and C426 to verify conformance to Specifications.
   3. Tests shall include compressive strength, linear shrinkage, moisture content as percent of total absorption, total absorption, and unit weight.

B. Special inspection:
   1. Special inspection shall be as specified in Section 01455 - Regulatory Quality Assurance.
   2. Owner will employ a qualified masonry special inspector for continuous special inspection of the masonry work. Acceptance by a state or municipality having a program of examining and certifying masonry inspectors will be considered adequate qualifications. The masonry inspector shall be at the site during all masonry construction and perform the following duties:
      a. Review Drawings and Specifications and meet with the Contractor to discuss requirements before work commences.
      b. Before masonry work commences, Contractor and the Contractor's Quality Control Representative shall attend meeting with Engineer to review the requirements for surveillance and quality control of the masonry work.
      c. Check brand and type of cement, lime (if used), and source of sand.
      d. Verify that foundation is clean, rough, and ready to receive units.
      e. Check reinforcing steel dowels for correct location, straightness, proper alignment, spacing, size, and length.
      f. Observe field proportioning of mortar. Visually check aggregate to determine uniformity of grading, cleanliness, and moisture.
      g. Verify that joints are full of mortar and kept tight during work. Inspect grout cells to verify that fins will not interfere with grouting. Verify that masons keep grout cells clean of mortar droppings and inspect to determine compliance.
      h. Continuously observe placing of grout.
      i. Perform or supervise performance of required sampling and testing.
   3. Keep complete record of inspections. Report daily to the Building Official, Contractor's Quality Control Representative, Engineer, and Owner the progress of the masonry inspection.

3.05 FINAL CLEANING

A. General:
   1. Final cleaning shall be performed within 7 to 14 days after construction of masonry work.
   2. Protect adjacent materials and equipment that may be damaged by cleaning.
   3. Pre-wet masonry before applying cleaning agent, but do not saturate masonry.
   4. Remove mortar stains, smears, and splash, efflorescence, and grout stains on exposed surfaces with the submitted cleaning agent as directed by the masonry unit manufacturer’s recommendations.
   5. Do not use muriatic acid as cleaning agent.

6. Cleaning agents shall be applied when the masonry surface and air temperatures are at least 50 degrees Fahrenheit.
    a. Dilute cleaning agents in accordance with manufacturer's recommendations.
    b. Do not allow cleaning agents to dry on the masonry.
7. Clean wall from the top to the bottom, without overlapping areas being cleaned for consistency.
8. If pressure cleaning equipment is used, the following limitations shall be observed:
    a. Apply cleaning agent to pre-wetted wall with low pressure (less than 50 pounds per square inch).
    b. Use a 25° to 50° flared-tip nozzle (not a pointed tip).
    c. Maintain a consistent distance from the spray nozzle to the masonry surface no closer than 12 inches.
        1) Masonry cleaner shall use a combination of pressure, nozzle, and distance from tip to masonry that does not damage the masonry surface.
9. Rinse cleaning agents off the wall with potable water.
10. Dispose of debris, refuse, and surplus material offsite legally.

3.06 PROTECTION

A. Provide temporary protection for exposed masonry corners subject to damage.

B. Bracing:
    1. Unless wall is adequately supported by permanent supporting elements so wall will not overturn or collapse, adequately brace masonry walls over 8 feet in height to prevent overturning and to prevent collapse.
    2. Keep bracing in place until permanent supporting elements of structure are in place.

C. Limited access zone:
    1. Establish limited access zone prior to start of masonry wall construction.
    2. Zone shall be immediately adjacent to wall and equal to height of wall to be constructed plus 4 feet by entire length of wall on unscaffolded side of wall.
    3. Limit access to zone to workers actively engaged in constructing wall. Do not permit other persons to enter zone.
    4. Keep zone in place until wall is adequately supported or braced by permanent supporting elements to prevent overturning and collapse.

END OF SECTION

SECTION 07220

ROOF AND DECK INSULATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Roof and deck insulation and associated accessories.

1.02 REFERENCES

A. ASTM International (ASTM):
   1. A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   2. D41- Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
   3. D312 - Standard Specification for Asphalt Used in Roofing.

B. National Roofing Contractors Association (NRCA).

C. Underwriters Laboratories, Inc. (UL).

1.03 SUBMITTALS

A. Product data.

B. Samples. Include 6-inch square samples of each type and thickness of insulation required.

C. State thickness and R-value of insulation to be provided at each building.

D. Manufacturer's installation instructions: Include the following:
   1. Indicate special environmental conditions required for installation.
   2. Indicate adhesive recommendations.
   3. Indicate fastener recommendations and attachment pattern to meet specified requirements.
   4. Indicate installation techniques.

E. Certificates:
   1. Certify that products meet or exceed specified requirements.
   2. Certify that insulation is approved by manufacturer for use with specified roofing materials.

F. Manufacturer's field reports.

G. Warranty.

1.04 QUALITY ASSURANCE

A. Manufacturer qualifications: Manufacturer of proposed product for minimum 5 years with satisfactory performance record.

B. Installer qualifications:
   1. Manufacturer-approved installer of products similar to specified products on minimum 5 projects of similar scope as Project with satisfactory performance record.
   2. Committed to complying with manufacturer's specifications and NRCA recommendations.
   3. Committed to assuming undivided responsibility for roof insulation, roofing membrane and sheet metal flashing, and trim associated with roofing.

C. Product compatibility: Provide roofing manufacturer approved roof insulation.

D. Pre-installation conference: Conduct as specified in Section 01312 - Project Meetings.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products in accordance with manufacturer's instructions.

B. Label asphalt containers with certification of full compliance with requirements of ASTM D312, Table 1, and indicating equiviscous temperature, finished flowing temperature, and flash point.

C. Store roof system materials on pallets or dunnage at least 4 inches above ground and suitably covered to protect from weather.

1.06 SEQUENCING AND SCHEDULING

A. Apply no more insulation than can be completely covered with roofing membrane on the same day.

B. When installation of insulation and roof membrane cannot be completed within same day, install temporary water cutoffs at end of day's work and remove cutoffs prior to resumption of work.

1.07 WARRANTY

A. Manufacturer's warranty: Minimum 10 years to correct defective roofing materials, including installation.

B. Roofer's warranty: Minimum 2 years to correct defective workmanship.

PART 2 PRODUCTS

2.01 MATERIALS

A. Base felt: ASTM D4601, Type II; glass mat coated with filled asphalt and surfaced one side with mineral non-blocking agent; minimum 27 pounds per square foot:
   1. Manufacturers: One of the following or equal:
      a. John Manville, Inc., GlasBase.
      b. Atlas Roofing Corp., equivalent product.

B. Vapor retarder: ASTM D2178, Type IV; asphalt impregnated glass fiber sheet with nominal tensile strength 30 percent higher than required by ASTM D2178 for Type IV felts:
   1. Manufacturers: One of the following or equal:
      a. John Manville, Inc., GlasPly Premier.
      b. Atlas Roofing Corp., equivalent product.

C. Composite roof insulation:
   1. Closed cell polyisocyanurate foam core bonded to 1/2-inch perlite on one side and a fiberglass reinforced facer on the other side.
   2. Utilizing environmentally compliant blowing agent.
   3. Manufacturers: One of the following or equal:
      a. Johns Manville, Inc., Tapered Fesco Foam.
      b. Atlas Roofing Corp., Tapered ACFoam Composite.

2.02 ACCESSORIES

A. Screw fastener system for steel decks:
   1. Self-drilling and self-tapping, zinc plated or stainless steel screws, sized for 1/2- to 3/4-inch exposure on exposed to view underside of deck, with minimum 3-inch square or diameter ribbed steel stress plates, hot-dip galvanized with minimum G-60 coating in accordance with ASTM A123.
   2. Manufacturers: One of the following or equal:
      a. Tru Fast.
      b. TW Buildex.

B. Base felt fasteners:
   1. Manufacturers: One of the following or equal:
      a. Berryfast, Tapefast.
      b. Bostitch, Disc-A-Matic Systems.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that deck is properly graded to outlets.

B. Verify that deck surfaces are clean, dry, and where required, coated with primer.

3.02 INSTALLATION OVER STEEL DECK

A. Install roof insulation in accordance with manufacturer's specifications.

B. Apply first layer of roof insulation with long joints continuous, either parallel or at right angles to ribs of deck.

C. Form joints parallel to ribs over solid bearing.

D. Stagger end joints.

E. Secure with approved mechanical fasteners in approved pattern:
   1. Space fasteners as recommended by insulation manufacturer.
   2. Drive fasteners through tin caps or plastic fastener/cap assemblies, unless they are provided with integral flat cap not less than 1 inch across.
   3. Install screw fastener system in top rib of steel deck in accordance with manufacturer's instructions. Where underside of metal deck is exposed to view, size fasteners to penetrate deck from 1/2- to 3/4-inch, unless otherwise recommended by fastener manufacturer.

F. Vapor retarder:
   1. Apply one 18 inch wide layer of vapor retarder, then continue with full 36 inch widths, lapping each course 2 inches over preceding one.
   2. Install each felt so felt is firmly and uniformly set, without voids, into hot asphalt applied just before felt at nominal uniform 23 pounds per square over entire surface.
   3. Turn up edges of felts on, but not connected to, vertical surfaces and extend beyond roof edges for coverage sufficient to permit minimum 4-inch return over top surface of insulation.

G. Do not leave insulation exposed to weather.

3.03 FIELD QUALITY CONTROL

A. Roof insulation which becomes wet or damaged shall be removed and replaced with solid, dry insulation, unless installer provides written acceptance of the damaged insulation from the roofing manufacturer, whose warranty shall cover the system.

B. Inspections: Roof membrane manufacturer, whose warranty shall cover complete roof assembly, shall provide supervision and inspection necessary to secure warranty.

END OF SECTION

SECTION 07415

STANDING SEAM SHEET METAL ROOFING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Preformed metal roofing, fascia, and associated accessories.

1.02 REFERENCES

A. ASTM International (ASTM):
   1. A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   2. B32 - Standard Specification for Solder Metal.
   3. D2626 - Standard Specification for Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing.

B. NSF International (NSF).

1.03 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Shop drawings: Include thicknesses and dimensions of parts, fastening and anchoring methods, details and locations of seams, joints, and other provisions for thermal movement. Show plans and elevations at minimum scale of 1/4 inch to 1 foot, and details at minimum scale of 3 inches to 1 foot.

C. Product data: Include standard color and finish options.

D. Samples: Include 8-inch square samples of color and finish on specified substrate.

E. Manufacturer's installation instructions.

F. Certificates: Manufacturer's approval of installer and shop drawings.

G. Maintenance data.

H. Warranty.

1.04 QUALITY ASSURANCE

A. Installer qualifications: Manufacturer-approved installer of products similar to specified products on minimum 5 projects of similar scope as Project with satisfactory performance record.

B. Exposed sheet metal material used for roofing including roofing panels, flashings, closures, and other trim shall be product of 1 manufacturer.

C. Other materials shall be products approved or recommended by roofing system manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products in accordance with manufacturer's recommendations.

1.06 WARRANTY

A. Roofing: Warrant to maintain roof, including flashings, in watertight condition and to maintain finish free from change in color or physical deterioration for minimum 5 years limited to ordinary wear and tear by elements or defects due to faulty materials and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Preformed metal roofing:
   1. One of the following or equal:
      a. Metal Sales Manufacturing Corp., Box-Batten Standing Seam Panels.
      b. IMSA Building Products.

2.02 DESIGN AND PERFORMANCE CRITERIA

A. Design and manufacture roof decking in accordance with the Building Code as specified in Section 01410 - Regulatory Requirements:
   1. Live load design: 20 pounds per square foot.
   2. Uplift for a wind: As specified in Section 01614 - Wind Design Criteria.

2.03 PREFORMED METAL ROOFING

A. System: Batten type, sheet steel roofing system including fascia, flashing, and sealants.

B. Batten spacing: 12 inches on center.

2.04 EXPOSED COMPONENTS

A. Sheet steel: ASTM A653, G90 minimum coating designation, minimum 24 gauge.

B. Finish: PVDF Kynar 500.

C. Surfaces must be prepared in accordance with coating manufacturer's recommendations.

D. Color: As selected by Owner from manufacturer's standard colors.

2.05 ACCESSORIES

A. Underlayment: ASTM D2626, asphalt-saturated and coated organic felt, minimum 28 pounds.

B. Hold-down clips: Stainless steel of type that will allow thermal movement of roof panels.

C. Closures: System manufacturer's standard neoprene blocks shaped to fit roof metal profile.

D. Solder: ASTM B32 alloy composition SN 50.

E. Fasteners:
   1. Nails, screws, rivets, and other fasteners: Stainless steel or alloy appropriate to roofing metal.
   2. Nails: Ringed or twisted shank type, of lengths required.
   3. Screws: Stainless steel pan head wood or sheet metal screws for use with hold-down clips.

F. Sealant: As specified in Section 07900 - Joint Sealants, unless recommended otherwise by panel manufacturer.

2.06 FABRICATION

A. Panels:
   1. Fabricate with upturned edges to form standing seam joints with minimum 1-1/2-inch high edges.
   2. Fabricate to extend from eaves to ridge in a single length, with no end laps.

B. Battens: Approximately 1-1/2 inches square, and evenly spaced approximately 12 inches on center.

C. Ridge, hips, eaves, rakes, fascia, coping, and other exposed flashings: Form of sheet steel matching roofing to provide weathertight roofing system.

D. Form sheets, battens, strips, cleats, valleys, ridges, edge treatments, integral flashings, gutters, downspouts, and other components to profiles indicated on the Drawings and required for permanent leakproof construction.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify governing dimensions at building.

B. Verify that substrate is firm, dry, and free of foreign materials.

3.02 PREPARATION

A. Clean and repair adjoining surfaces when necessary for proper installation of preformed metal roofing panels.

3.03 UNDERLAYMENT

A. Apply single-ply of underlayment, lapped shingle fashion, with Kraft paper side up, 3-inch head laps and 6-inch side laps, and cover with slip sheet similarly lapped.

B. Hold underlayment in place with minimum number of fasteners.

C. Install no more underlayment than can be covered by metal roofing in a single day.

3.04 ROOFING

A. Install roofing in accordance with manufacturer's recommendations.

B. Lay out pattern to place batten seams equidistant from corners and aligned with seams on other side of hip or ridge.

C. Start installation from eaves.

D. Secure roofing panels in place with concealed clips and fasteners.
   1. Exposed fasteners through roof panels, batten covers, and flashings shall not be used.

E. Locate clips in joints within 6 inches of panel ends.

F. At eaves, cut upturned edges and bend panel down to form fascia.

G. At intersections of roof slope with ridge and hips, turn up edges of roof panels 1 inch.

H. Form cross seams with 3/4-inch fold-under on lower end and 2-inch fold-over on upper end.

I. Slit folds in cross seams at each corner 1 inch in from batten to form tab.

J. Hook hold-down cleats, fold on lower end of panel into fold on upper end of underlaying panel.

K. Exposed batten ends to have neoprene closures or watertight cap.

L. Form valleys of sheets not exceeding 10 feet in length.

M. Lap joints 6 inches in direction of drainage.

N. Extend valley sheet minimum of 6 inches under roofing sheets.

O. At valley, double fold valley and roofing sheets and secure with cleats spaced 18 inches on center.

P. Install ridge and hip covers securely in place using Z closer clips and fasteners.

Q. Seal joints where necessary for watertightness.

R. Completed roof shall be watertight.

S. Exposed surfaces shall be free of dents, scratches, abrasions, stains, and other visible defects.

END OF SECTION

SECTION 07722

ROOF HATCHES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Roof hatches.

1.02 SUBMITTALS

A. Product data: Indicate general construction, configurations, jointing methods, and when applicable.

B. Shop drawings: Show locations, sizes, fastening methods, and installation details.

C. Manufacturer's Installation Instructions.

1.03 WARRANTY

A. As specified in Section 01783 - Warranties and Bonds.

B. Special warranty:
   1. Duration: 5 years warranty on product defects.

PART 2 PRODUCTS

2.01 ROOF HATCHES

A. Manufacturers: One of the following or equal:
   1. The Bilco Co.
   2. Babcock-Davis Associates.

2.02 BI-FOLD DOUBLE LEAF FOR EQUIPMENT ACCESS

A. Size:
   1. Equipment access applications:
      a. Nominal size: 60 inches by 60 inches.
      b. Cover opening angle: 90 degrees.

B. Cover and curb:
   1. Material:
      a. Exterior surface and curb material:
         1) Minimum 11-gauge aluminum.
      b. Interior surface material:
         1) Minimum 18-gauge aluminum liner.
         2) Fully covering cover insulation.

2. Cover:
    a. Corners:
        1) 3-inch beaded flange and welded.
        2) Weathertight corners.
    b. Insulation:
        1) Nominal 1-inch thick fiberglass.
3. Curb:
    a. Height: Minimum 12 inches.
    b. Insulation: 1-inch thick fiberboard on outside.
    c. Flange: Minimum 3-1/2-inch with holes for fasteners, and welded, weathertight corners.
4. Curb and roofing interface:
    a. Metal roofing:
        1) Conform to configuration of roofing with self-draining feature to prevent water damming between ribs of roof panels, and welded, weathertight corners.

C. Finish:
1. Aluminum hatches: Mill finish.

D. Hardware:
1. Heavy pintle hinges.
2. Compression spring operators enclosed in telescopic tubes.
3. Positive snap latch with turn handles, both inside and outside.
4. Padlock hasps, both inside and outside.
5. Gasket:
    a. EPDM rubber gasket adhered to the liner.
6. Automatic hold-open arm with red vinyl grip handle capable of 1-hand release.
7. Enclosed 2-point spring latch as recommended by manufacturer.

E. Latch hardware:
1. Hardware including latch assembly, inside and outside padlock hasps, arm guide bracket, lifting mechanism bracket, hinges, hinge pins, hold open arm, lock strike casting, springs, spring tubes, shoe castings, and fasteners.
2. Type 316 stainless steel.

PART 3 EXECUTION

3.01 INSTALLATION

A. Hatch quantities and locations shall be as indicated on the Drawings.

B. Install roof hatches in accordance with manufacturer's instructions.
1. Coordinate with installation of roofing system and related flashing.
2. Provide weathertight installation.

C. Paint hatch as specified in Section 09960 - High-Performance Coatings.

END OF SECTION

SECTION 08110

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Steel Fire Resistive Rated and Non-Fire Resistive Rated:
   1. Doors.
   2. Door frames.

1.02 REFERENCES

A. American National Standards Institute (ANSI):
   1. A250.6 - Hardware on Steel Doors (Reinforcement Application).
   2. A250.8 - Recommended Specification for Standard Steel Doors and Frames.

B. ASTM International (ASTM):
   1. A653 - Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   2. A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
   3. A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
   4. A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

C. National Association of Architectural Metal Manufacturers (NAAMM)/Hollow Metal Manufacturers Association (HMMA):
   1. HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames.

D. National Fire Protection Association (NFPA):
   1. 80 - Standard for Fire Doors and Other Opening Protectives.
   2. 252 - Standard Methods of Fire Tests of Door Assemblies.

E. Steel Door Institute (SDI):
   1. SDI-111 - A Steel Doors and Frame Details.
   2. SDI-117 - Manufacturing Tolerances Standard Steel Doors and Frames.

F. Underwriters' Laboratories, Inc., (UL):
   1. UL 10C - Positive Pressure Fire Tests of Door Assemblies.

1.03 SUBMITTALS

A. Product data.

B. Shop drawings: Show the following with references to the Engineer's door marks and hardware groups:
   1. Location of door and frame types.
   2. Details of fabrication, including core construction, glass lights, louvers, weatherstripping, and factory finish for each door.
   3. Cutouts and reinforcements for hardware.
   4. Methods of installation and anchorage to adjacent construction.

C. Certificates documenting:
   1. Fire-rated units have been successfully tested as specified in this Section.

D. Manufacturer's instructions: Submit manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

A. Testing agency qualifications: Approved by ultimate enforcing authority for the Project; regularly engaged in inspection of materials and workmanship at factory.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Before delivery, identify type and size of each door and frame in such a way that markings will not damage finish.

B. Preassemble doorframes in shop and deliver to Project site with spreader bar at sill or tie them in pairs to form box.

C. Protect doors and frames with resilient packaging sealed with heat shrunk plastic. Break seal on-site to permit ventilation.

D. Protect doors and frames during shipment and storage to prevent warping, bending, and corrosion.

1.06 SEQUENCING AND SCHEDULING

A. Ensure timely delivery of reviewed hardware schedule and hardware templates such that no delay occurs in the work of the Contract.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sheet steel: ASTM A1008, commercial quality, level, cold rolled steel, or ASTM A1011, hot rolled, pickled and oil rolled steel. Galvanize by hot-dip process with zinc-coating in accordance with ASTM A924 or with ASTM A653 and the coating designation A60 or G60.

B. Clips, bolts, screws, and rivets: sized as recommended by manufacturer.

C. Primer: Rust- inhibitive epoxy primer compatible with high-solids epoxy finish coating system as specified in Section 09960 - High-Performance Coatings.

D. Touch-up materials: Primer as recommended by manufacturer.

E. Door hardware: As specified in Section 08710 - Door Hardware.

F. Grout: As specified in Section 04220 - Concrete Unit Masonry.

2.02 DOOR AND FRAME TYPES

A. Interior and exterior doors: ANSI 250.8, Grade III, Model 3, or NAAMM HMMA 810 Type A and NAAMM HMMA 861, flush steel rib-stiffened, minimum 16-gauge face sheets.

B. Interior and exterior frames: ANSI 250.8 or NAAMM HMMA 861, fully welded frames HMMA 861, except minimum 14-gauge sizes and shapes as indicated on the Drawings.

2.03 FABRICATION OF FRAMES

A. Galvanize all frames installed in exterior openings.

B. Frames: Sheet steel, integral type, welded continuous to full depth of frames with minimum 5/8-inch deep stops, unless otherwise indicated on the Drawings.

C. Hardware reinforcements: Fabricate according to SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Jamb Anchors: As required for adjacent wall construction, minimum 3 per jamb, unless otherwise indicated on the Drawings.

E. Floor anchors: Fixed type, except where adjustable anchors are indicated on the Drawings, 1 per jamb, with minimum 2 holes for anchorage. Where floor fill occurs, terminate bottom of frames at indicated finished floor level and support by adjustable extension clips resting on and anchored to structural slabs.

F. Anchors at masonry: Adjustable strap and stirrup, minimum 16-gauge corrugated or perforated steel at maximum of 30 inches on center and extending minimum 8 inches into masonry.

G. Anchors at previously placed concrete: Countersink machine screws through the frame into expansion devices spaced at maximum 30 inches on center.

H. Anchors at structural steel framing: Welded or otherwise securely fastened with stainless steel screws.

I. Masonry angle stiffeners: Factory welded into heads of frames for installation in openings more than 48 inches wide.

2.04 FABRICATION OF DOORS

A. Galvanize all doors installed in exterior openings.

B. Reinforce face sheets with steel rib stiffeners, spaced at maximum 6 inches apart, and securely attached to face sheets by spot welds at maximum 5 inches on center.

C. Fill voids between face sheets and stiffeners with fiberglass insulation having a minimum density of 0.8 pounds per cubic foot.

D. Edges: Full weld without visible joints. Bevel striking edge 1/8 inch in 2 inches.

E. Door cores:
   1. Stiffeners: Vertical steel ribs formed from minimum 22-gauge plain sheet steel, spaced at maximum 6 inches apart and securely attached to face sheets by spot welds at maximum 5 inches on center.
   2. Core fillers: Insulation, minimum 0.60 pound density noncombustible type, installed in spaces between stiffeners for full height of door; labeled door core material shall conform to requirements of labeling authority.

F. Tops and bottoms of doors: Close with continuous recess steel channel of minimum 16-gauge, extending full width of door and spot welded to both faces.

G. Tops and bottoms of exterior doors: Flush closing channels welded to make tops and bottoms waterproof with weep holes for escape of moisture.

H. Hardware reinforcements: Fabricate according to SDI A250.6 with reinforcing plates from same material as door face sheets.

I. Astragals:
   1. Install on active leaf of double doors in accordance with UL listing requirements for fire resistive ratings as indicated on the Drawings, and for exterior pairs of doors.
   2. Do not install on doors swinging in pairs with rating of 90 minutes or less in means of egress where both leaves are required to provide building code required exiting widths.
   3. Do not provide astragal cutouts for hardware operations.

J. Astragal clearances for fire resistive rated doors:
   1. Door bottoms at doors designated to receive non-combustible threshold: Not to exceed 3/8 inch between threshold and door bottom.
   2. Door bottoms where there is no threshold: Maximum clearance between door and floor not to exceed 1/2 inch.
   3. Door bottoms at doors designated to receive combustible floor coverings: Not to exceed 1/2 inch between floor covering and door bottom.
   4. Clearance between door and frame and between meeting edges of pairs of doors: Not to exceed 1/8 inch.

K. Astragal clearances for non-fire resistive rated doors: Same as fire resistive rated doors, unless otherwise indicated on the Drawings.

2.05 FABRICATION OF FIRE RATED DOORS AND FRAMES

A. Fabricate to meet requirements of the building code as specified in Section 01410 - Regulatory Requirements, UL 10C, UL 102, and NFPA 252, except hose stream test shall not be required for opposite swing double egress exit doors and for doors of fire endurance rating of less than 45 minutes with or without approved glass lites.

B. Temperature rise requirements of doors at exit enclosures and exit passageways: Maximum transmitted temperature end point of less than 450 degrees Fahrenheit

above ambient at end of 30 minutes when tested in accordance with the building code as specified in Section 01410 - Regulatory Requirements.

C. Apply approved testing agency labels on fire rated doors and frames.

D. Fabricate oversized fire rated doors in accordance with requirements for ratings indicated on the Drawings.

2.06 ACCESSORIES

A. Silencers:
   1. Drill single leaf doorframe jamb stops for minimum 3 silencers.
   2. Drill double-leaf doorframe head stops for minimum 2 silencers.
   3. Do not drill doorframes for silencers when weatherstripping is to be installed.

2.07 FINISHING

A. Thoroughly clean surfaces of oil, grease, and other impurities; touch-up abraded galvanizing; and chemically etch.

B. Fill irregularities and sand smooth finish surface. Apply 1 coat of manufacturer's standard rust inhibitive baked-on primer.

C. Finish painting: High solids epoxy polyurethane system:
   1. Interior and exterior doors and interior doors in corrosive environments: As specified in Section 09960 - High-Performance Coatings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine reviewed hardware schedules and verify proper coordination of hardware and doors and frames.

B. Examine opening locations and verify the following:
   1. Correctness of dimensions, backing, or support conditions.
   2. Absence of defects that would adversely affect frame or door installation.

3.02 INSTALLATION

A. Install doors and frames in accordance with approved shop drawings and manufacturer's instructions.

B. Frames:
   1. Set accurately in position, plumb, align, and attach securely to structure.
   2. Set in place before construction of adjacent masonry or framed walls.
   3. Anchor frames to previously placed concrete.
   4. Set frames before removing spreader bars.
   5. Fully grout frames in masonry as the Work progresses.
   6. Grout frames at concrete through keyways provided at head and jambs.

C. Doors:
   1. Install at correct openings, ensure smooth swing and proper closure with frame.

D. Fire resistive frames and doors:
   1. Install to conform to NFPA 80 for fire resistive rated class as indicated on the Drawings.

E. Door hardware:
   1. Install in accordance with Section 08710 - Door Hardware.
   2. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

F. Separate or isolate dissimilar metals with neoprene gaskets, sleeves, and washers, or with coatings acceptable to the Engineer.

3.03 TOLERANCES

A. Manufacturing and installation tolerances: As indicated on the Drawings or in conformance to SDI 117 as minimum.

3.04 ADJUSTING AND CLEANING

A. Prime coat touch-up: Immediately after installation, sand smooth and touch-up rust areas, and other areas where primer has been damaged, with prime touch-up paint.

B. Make adjustments as required for correct, proper, and free function and smooth operation without binding of hardware or doors and frames.

C. Protect doors and frames from damage to surface or profile.

END OF SECTION

SECTION 08332

OVERHEAD COILING DOORS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Non-fire rated insulated overhead coiling doors.

1.02 REFERENCES

A. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1000 V Maximum).

B. ASTM International:
   1. A123 - Standard specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   2. A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
   3. A666 - Standard specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
   4. A924 - Standard Specification for General Requirements of Steel Sheet, Metallic-Coated by the Hot-Dip Process (Referenced by ASTM A653).

1.03 DEFINITIONS

A. NEMA:
   1. Type 4 enclosure in accordance with NEMA 250.
   2. Type 4X enclosure in accordance with NEMA 250.
   3. Type 12 enclosure in accordance with NEMA 250.

1.04 SUBMITTALS

A. Product data:
   1. General: Submit data completely describing products, including rough-in diagrams.
   2. Electrical operators: Submit complete manufacturer's data for all components for electric door operators. Show motor size and characteristics. Show manufacturer's verification that motor has been adequately sized for each size and type of door required. Submit electrical schematic diagrams.

B. Shop drawings:
   1. Drawings showing complete installation details, required clearances, relation to building structure, complete electrical rough-in requirements required for installation of motor operators for doors and for connection of such doors to fire alarm system, referenced to the door mark number.
   2. Show location and size of access doors required to perform maintenance on doors and auxiliary equipment.

C. Samples: Submit samples of finishes for finish selection.

D. Quality control submittals:
   1. Manufacturer's instructions:
      a. Installation instructions for each type and size of door, including manufacturer's data, operating instructions, and maintenance data.
      b. Furnish installer copy of diagrams and installation instructions.

E. Contract closeout submittals:
   1. Project record documents:
      a. Operation and maintenance data: Provide manufacturer's operation and maintenance data for each different type of door specified, complete with manufacturer's list of recommended spare parts and their prices, electrical schematic diagrams, and name and address of nearest maintenance organization approved by door manufacturer.
      b. Warranty: Provide manufacturer's standard warranty.

1.05 QUALITY ASSURANCE

A. Regulatory requirements:
   1. Wind loading as specified in Section 01614 - Wind Design Criteria.
   2. Seismic requirements for door anchorage and support systems as specified in Section 01612 - Seismic Design Criteria.
   3. Provide electrical materials in NEMA Type enclosures as specified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Packing, shipping, and storage: Protect doors during shipment and storage to prevent warping, bending, and corrosion.

B. Deliver materials only after proper facilities are available: Provide clean dry surfaces or platform as required and protect from deterioration and foreign matter.

1.07 PROJECT CONDITIONS

A. Field measurements: Field verify all opening dimensions and clearances prior to fabricating doors. Fitting doors to openings is the responsibility of the Contractor.

1.08 SEQUENCING AND SCHEDULING

A. Inserts and anchorages: Furnish inserts and anchoring devices which must be set into concrete or built into masonry. Provide setting drawings, templates, and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay to the Contract.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Design requirements:
   1. Compatibility with space and service requirements:
      a. Doors and equipment items provided shall be compatible with space limitations specified and indicated on the Drawings.

b. Make modifications to doors and equipment items necessary to conform with space limitations or with utility services specified for rough-in.
c. Provide items complete including all necessary ancillary equipment as may be required for complete and trouble-free operation.

2. Maintenance requirements: For ease of maintenance, provide overhead coiling doors complying with following requirements:
   a. Provide each door assembly as complete unit produced or supplied by a single manufacturer, including frames, sections, brackets, operating mechanisms, hardware, except hardware items specified in Section 08710 - Door Hardware, and all necessary accessories for installation of complete in openings indicated.
   b. Unless otherwise specified, all doors of particular type throughout the entire project shall be as manufactured or supplied by a single manufacturer.

2.02 MANUFACTURED UNITS

A. Manufacturers: One of the following or equal:
   1. Overhead Door Corp.
   2. Wayne-Dalton Corp.
   3. The Cookson Co., Inc.

B. Aluminum overhead coiling door:
   1. Mounting: Face of wall. Location as indicated on the Drawings.
   2. Operation: As indicated on the Drawings.
   3. Curtain:
      a. Exterior Slats: Minimum 18-gauge B & S or heavier aluminum alloy manufacturer's standard, interlocking flat-faced slats with ends of alternate slats fitted with metal end locks to hold curtain in alignment.
      b. Bottom bar: Fitted with 2 equal-sized aluminum angles minimum 1/8-inch thick, with lift handle and cylindrical lock with housing capable of receiving cylinder as specified in Section 08710 - Door Hardware at either end.
   4. Weatherstripping:
      a. Bottom bar: Manufacturer's standard, provided with a flexible PVC bulb type astragal to ensure a consistent seal along the floor. Extrusion designed to interlock with door curtain.
      b. Door jambs: Manufacturer's standard, wool or nylon pile, vinyl extrusion seals.
      c. Hood: Manufacturer's standard neoprene baffle.
   5. Guides: Steel galvanized in accordance with ASTM A123, formed of roll formed steel channels and angles or structural angles of sufficient depth to provide a groove of adequate depth on each jamb to hold curtain firmly in guides under design wind pressure.
   6. Brackets: Steel galvanized in accordance with ASTM A123, steel plate with permanently sealed ball bearings designed to enclose ends of coil and provide support for counterbalance pipe at each end.
   7. Barrel and counterbalance mechanism: Steel pipe of sufficient size to carry door load with maximum deflection of 0.03 inch per foot of opening width and counterbalanced by helical springs, oil tempered torsion type designed with minimum safety factor of 1.25, and having cast iron barrel plugs that anchor springs to tension shaft and pipe.

8. Hood: Fabricated minimum 0.050-inch thick aluminum, designed to enclose curtain coil and counterbalance mechanism.
9. Galvanized.

C. Insulation:
1. Interior slats: Material to match exterior slats as specified in previous article, interlocking flat-faced slats, manufacturer's standard size with ends of alternate slats fitted with metal end locks to hold curtain in alignment.
2. Insulation: CFC-free Polyethylene foam yielding a minimum R-value of 6.20.

D. Door operators:
1. Chain operator: Unless otherwise indicated on the Drawings, use at doors 56 square feet or larger in area. Provide a continuous hand chain and gearing on coil side of door.

2.03 ACCESSORIES

A. Fasteners: Sizes and types as recommend by reviewed door manufacturer.

2.04 FINISHES

A. Slats, hood and bottom bar:
1. Aluminum: As selected from manufacturer's standard dark bronze anodized finish.

B. Guides and bracket plates:
1. Galvanized steel: manufacturer's standard rust inhibitive prime coat in a flat black finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of conditions: Examine openings to receive overhead coiling doors and verify:
1. Dimensions and correctness of backing or support conditions.
2. Absence of defects that would adversely affect installation.

B. Do not start the work until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Verify dimensions and design for each opening.

B. Coordinate details with other work supporting or adjoining coiling doors.

C. Furnish fastening devices as required to mount doors properly.

3.03 INSTALLATION

A. Install doors in strict accordance with manufacturer's installation instructions, unless specifically otherwise indicated on the Drawings.

B. Install assemblies plumb, square, and level at their proper elevations and in their proper planes.

C. Securely anchor assemblies to interior face of openings, in manner that provides full opening clearance, perfectly aligned and adjusted for smooth operation.

D. Interface with other products: Separate or isolate dissimilar metals with neoprene gaskets, sleeves, or washers, or with an acceptable coating.

3.04 ADJUSTING

A. Verify that door assemblies are securely anchored to structure, guides are perfectly aligned, and doors are adjusted for smooth operation.

B. Upon completion of installation, ensure doors are free from warp, twist, or distortion and are lubricated and properly adjusted to operate freely.

3.05 CLEANING

A. Thoroughly clean surfaces of grease, oil, and other impurities.

B. Replace any damaged or otherwise disfigured doors with new prior to final acceptance.

3.06 DEMONSTRATION

A. Provide Owner's maintenance employees with minimum of 8 hours of maintenance instruction.

3.07 PROTECTION

A. Protect installed doors from damage until final acceptance.

END OF SECTION

SECTION 09523

ACOUSTICAL PANELS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Acoustical panels and accessories:
   1. Wood fiber panels, and associated materials and accessories.
   2. Acoustical wall and ceiling panels.

1.02 REFERENCES

A. ASTM International (ASTM):
   1. C514 - Standard Specification for Nails for the Application of Gypsum Board.
   2. C645 - Standard Specification for Nonstructural Steel Framing Members.
   3. C1002 - Standard Specification for Application and Finishing of Gypsum Board.
   4. E1264 - Standard Classification for Acoustical Ceiling Products.

1.03 SUBMITTALS

A. Product data: Include sound absorption data, cutting and fabrication, and installation details for panel systems.

B. Shop drawings: Include panel layout and mounting details:
   1. Indicate panel layout; show locations of mechanical grills, lighting, access panels, sprinkler heads, and other items affecting ceiling installation.

C. Test reports: Results of sound absorption coefficient testing by independent acoustical laboratory.

D. Manufacturer's installation instructions: Including installation instructions for suspended grid system and adhesives.

E. Samples:
   1. Submit full range of manufacturer's standard colors for color selection.
   2. Submit 12 inches square samples for each type and size acoustical unit required.
   3. Submit sample of installation system: 1 full unit.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store wood fiber panels in dry place:
   1. Wrap panels with moisture-proof material.
   2. Lay flat on pallets.
   3. Allow for air circulation under cover.
   4. Store within areas in which panels will be applied for minimum 24 hours prior to installation.

1.05 SITE CONDITIONS

A. Deliver panels when building is closed in and in cold seasons, heated.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Performance requirements: Noise Reduction Coefficient (NRC) of minimum 85, minimum sound absorption coefficient of 2 by 8 foot panels mounted on 1-1/2 inch furring with insulation at following octave band center frequencies:
   1. 125 hertz: 0.24.
   2. 250 hertz: 0.57.
   3. 500 hertz: 1.17.
   4. 1,000 hertz: 0.87.
   5. 2,000 hertz: 0.93.
   6. 4,000 hertz: 0.87.

2.02 PERFORATED ACOUSTICAL METAL WALL PANELS

A. Manufacturer: One of the following or equal:
   1. Acoustic Systems, Sound Sorb.
   2. Eckel Industries, Inc., Eckoustic Functional Panels.

B. Metal facing: 0.032 inches minimum; coated aluminum, ribbed to provide impact resistance.

C. Perforation ratio: Not less than 23 percent.

D. Panel size: 30 by 96 inches.

E. Absorber:
   1. Fiberglass or mineral wool wrapped in heat-sealed polyethylene sheet for indoor applications.
   2. Polyethylene thickness 1.5 mils.
   3. Perforation ratio 10 percent within 2 percent both sides.
   4. Blanket; semi rigid, not less than 2 inch, density of approximately 1.5 pounds per cubic foot.

F. Perforated metal facing shall be furred out on metals channels by 2 inches.

G. Mounting brackets: Minimum 4; Type 316 stainless steel.

H. Adsorption factors:

Frequency Band	125	250	500	1000	2000	4000	NRC
Wall Panel	**[0.34]**	**[1.11]**	**[1.48]**	**[1.15]**	**[0.74]**	**[0.56]**	**[1.10]**
	[.031]	**[.085]**	**[1.43]**	**[1.49]**	**[1.41]**	**[1.50]**	**[1.30]**

PART 3 EXECUTION

3.01 INSTALLATION

A. Install acoustical panels in accordance with manufacturer's instructions.

B. Anchor furring to concrete or masonry walls securely.
   1. Anchor horizontally at 12 inches above floor, at 24 inches on center, at ceiling, and vertically at ends.

C. Install insulation between furring.
   1. Hold insulation in place until installation of panels.

D. Place panels vertically on walls, perpendicular to direction of furring, with maximum 1/16-inch space between panels.

E. Paint nail or screw head white.
   1. Nail or screw panels to furring in manufacturer's recommended pattern.
   2. Countersink nails or screws 1/16 inch.

F. Do not cover columns and beams with panels.
   1. Hold panels back 2 inches from columns.

G. When panels require field cutting, make sharp and perpendicular cuts using jigs.

H. Make neat cutouts for pipes, supports, and other projections from wall.
   1. Install metal trim around perimeter of panels.
   2. Fasten trim to edge furring with aluminum nails.
   3. Miter corners.

3.02 SCHEDULE

A. Install wall panels as scheduled below:

Location	Coverage		
	Wall Panels	Ceiling Panels	Total Treated Area
Equipment Building Basement(1)	90 percent of walls noted	80 percent of total basement	---
Blower Building RAS/WAS Room(1)	500 square feet minimum	---	1,500 square feet
Blower Building Blower Room	500 square feet minimum	---	1,500 square feet
Thickener Building(1)	750 square feet minimum	---	2,000 square feet minimum
Digester 1, 2 Control Room	--	1,000 square feet minimum	1,500 square feet
Digester 3 Control Room	--	900 square feet minimum	1,200 square feet

Location	Coverage		
	Wall Panels	**Ceiling Panels**	**Total Treated Area**
Boiler Room	500 square feet minimum	---	1,500 square feet
Operations Center Lower Level Maintenance Workshop	---	100 percent of total ceiling area	Within 785 square feet
Notes: (1) Installation of acoustical panels is included as an allowance item.			

END OF SECTION

SECTION 10910

LOUVERS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Stationary weather louvers.
   2. Stationary acoustical louvers.

1.02 REFERENCES

A. Air Movement and Control Association International, Inc. (AMCA):
   1. 500-L - Laboratory Methods of Testing Louvers for Rating.
   2. 500-D - Laboratory Methods of Testing Dampers for Rating.
   3. 511 - Certified Ratings Program - Product Rating Manual for Air Control Devices.

B. ASTM International (ASTM):
   1. D4385 – Standard Practice for Classifying Visual Defects in Thermosetting Reinforced Plastic Pultruded Products.
   2. D2584 - Standard Test Method for Ignition Loss of Cured Reinforced Resins.

C. Underwriters Laboratories, Inc. (UL).

1.03 SUBMITTALS

A. Shop drawings: Include dimensions, anchorage details, and relationships to adjacent materials.

B. Product data.

1.04 QUALITY ASSURANCE

A. Provide louvers with the following, unless otherwise specified:
   1. AMCA certification and rating in accordance with AMCA 511 for air performance and water penetration.

PART 2 PRODUCTS

2.01 GENERAL

A. Louver types: Louvers are marked on the drawings with a letter L followed by a number referring to a louver type in this Section. Individual louver size and airflow rates are as indicated on the Drawings.

B. Accessories:
   1. Provide installation clips and flanged or jamb-mounting styles suitable for the mounting locations as indicated on the Drawings.
   2. Provide extended sills for louvers indicated as installed recessed from the exterior wall surface.
   3. Provide stainless steel fasteners unless noted otherwise.
   4. Corrosion protection.
   5. Provide gravity damper for all outside air intake and exhaust louvers unless noted otherwise.

C. Protective coatings for aluminum in contact with concrete or masonry:
   1. Manufacturers: One of the following or equal:
      a. Koppers Co., Inc.
      b. Tarmastic 100.
      c. Porter Coatings.

2.02 DESIGN AND PERFORMANCE REQUIREMENTS

A. Performance: In accordance with AMCA 511 when tested in accordance with AMCA 500.

B. Designed for 20 pounds per square foot wind load.

2.03 STATIONARY ACOUSTICAL LOUVERS, TYPE L-3

A. Manufacturers: One of the following or equal:
   1. Greenheck, Model AFA-801.
   2. Ruskin Co., Model ACL645.
   3. Airolite Co., Model T91.

B. Requirements:
   1. Type: Stationary acoustical louver with louver depth as indicated on the Drawings.
   2. Material: Minimum 0.080-inch thick extruded or formed aluminum for frame and blades.
   3. Frame: 8-inch deep formed aluminum frame with 0.100-inch nominal wall thickness.
   4. Blades: 0.080-inch formed aluminum exterior surface; blades positioned at 45 degree angle and spaced approximately 6 inches center to center.
   5. Screens: 3/4-inch mesh by 0.05-inch aluminum or stainless steel bird screen with removable frame.
   6. Pressure drop: Maximum 0.13-inch water column pressure drop at 1,000 feet per minute free area velocity for intake louvers.
   7. Free area: Minimum 25 percent.

8. Finish: Kynar finish; color as selected.
9. Acoustical performance: Attenuation at least as follows for the depth of louver indicated:

Frequency (hertz)	Attenuation (dB)			
	4-inch Depth	6-inch Depth	8-inch Depth	12-inch Depth
125	11	8	11	8
250	9	9	11	14
500	11	12	13	17
1,000	15	16	19	22
2,000	17	20	21	21
4,000	16	18	20	21
8,000	16	18	23	20

PART 3 EXECUTION

3.01 INSTALLATION

A. Install louvers in accordance with manufacturer's instructions; caulk all frames to make weathertight.

B. Install louvers for machinery, engines, and similar equipment to allow easy louver removal for machinery or engine removal through the louver opening space without louver projections on floors or walls.

C. Anchor louvers to concrete or masonry with concrete anchors through jambs.

D. Corrosion protection:
   1. Aluminum in contact with concrete or masonry: Apply 2 coats bitumastic black solution.
   2. Aluminum in contact with dissimilar metal, except stainless steel: Isolate from dissimilar metal with neoprene gaskets, sleeves, or washers. Utilize stainless steel fasteners.

E. Field-testing: As specified in Section 15954 - Testing, Adjusting, and Balancing for HVAC.

END OF SECTION

SECTION 11242

LIQUID CHEMICAL METERING PUMPS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Skid-mounted positive displacement progressing cavity pumps; accessories, drives, and control panel requirements for pumping chemical solutions.

1.02 REFERENCES

A. American Bearing Manufacturer's Association (ABMA):
   1. 9 - Load Ratings and Fatigue Life for Ball Bearings.
   2. 11 - Load Ratings and Fatigue Life for Roller Bearings.

B. ASTM International (ASTM):
   1. D 883 - Definition of Terms Relating to Plastics.
   2. D 2240 - Test Method for Rubber Property - Durometer Hardness.
   3. D 2563 - Recommended Practice for Classifying Visual Defects in Glass Reinforced Plastic Laminate Parts.
   4. D 2583 - Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

C. International Society of Automation (ISA):
   1. ISA5.4 - Instrument Loop Diagrams.

D. National Electrical Code (NEC).

E. National Electrical Manufacturer's Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1000 V Maximum).

F. NSF International (NSF):
   1. 61 - Drinking Water System Components - Health Effects.

1.03 DEFINITIONS

A. NEMA: Type 4X enclosure in accordance with NEMA 250.

1.04 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data: As specified in Section 15050 - Common Work Results for Mechanical Equipment.
   1. Design data, test reports, certificates, manufacturer’s instructions, manufacturer’s field reports:
      a. Chemical feed pumps:
         1) For each pump type, submit calibration charts and tables relating flow rate.

2) Submit hydraulic modeling results for each pumping system.
   a) Confirm scheduled values or recommend new pressure setpoints for the pressure relief valves listed in the Pump Schedule.
3) Submit calculations for each metering pump showing the suitability of each pump for the suction and discharge conditions of each application point.
4) Submit calculations recommending dimensions of pulsation dampener indicated on the Drawings.

C. Shop drawings: As specified in Section 15050 - Common Work Results for Mechanical Equipment.
   1. Provide a list of parameters, ratings, or other characteristics where the proposed chemical feed systems deviate from the requirements.
   2. Dimensions, including anchor bolt layout, materials of construction, size, weight, and performance data.
   3. Drawings: Provide electrical and instrumentation drawings showing coordination with electrical control devices operating in conjunction with the associated feed system.
   4. Dimensioned inlet and outlet connections.
   5. Current NSF 61 Certification for components to be in contact with associated chemical or potable water.
   6. Provide data showing chemical compatibility and history of service with the associated chemical for materials in the system.
   7. Control panel views showing equipment arrangement, doors, equipment layout inside the panel and dimensional information.
   8. Internal interconnecting wiring diagrams showing terminal strips and external devices connected to the panel as specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.
   9. Loop drawings for analog and discrete signals in accordance with ISA5.4.
   10. Complete schematic and diagrams including terminal block and wire identification numbers and device location symbols consistent with the Contract Documents.
   11. Panel bill of material with detailed description of components and equipment data sheets.
   12. Field cable numbers and terminations.
   13. Manufacturer's Representative's qualifications as specified in Section 01756 - Commissioning.
   14. Manufacturer's certificate stating that the materials of construction are compatible with the pumped fluid.
   15. Manufacturer's Certificate of Source Testing as specified in Section 01756 - Commissioning.
   16. Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 01756 - Commissioning.
   17. Calibration curves for each pump relating stroke length to flow rate shall be supplied.
   18. Capacity control shall be 0 to 100 percent with delivery repeatable within plus or minus 1 percent accuracy over at least a 10 to 1 range.
   19. Motor and VFD supplier shall carefully review the intended application of the VFD and certify in writing that sizes provided are adequate for continuous or intermittent operations (whichever is the most severe operating condition).

D. Calculations: As specified in Section 15050 - Common Work Results for Mechanical Equipment.

E. Vendor operation and maintenance manuals: As specified in Section 01782 - Operation and Maintenance Manuals.
   1. Provide information on each piece of equipment, including instrumentation.
   2. Provide all safety considerations relating to operations and handling of the associated chemical.
   3. Maintenance data shall include all information and instructions required by plant personnel to keep equipment properly cleaned, lubricated, and adjusted so that it functions economically throughout its full design life.
   4. Lubrication charts and tables of alternate lubricants.
   5. Name, address, and phone number of manufacturer and manufacturer's local service representative.

F. Commissioning submittals:
   1. Provide Manufacturer's Certificate of Source Testing as specified in Section 01756 - Commissioning.
   2. Provide Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 01756 - Commissioning.

1.05 WARRANTY

A. System shall be covered by a 2-year warranty against defects in materials and workmanship. Warranty period shall commence after on-site acceptance of equipment by Owner. In addition, system shall be subject to the following provisions:
   1. If Owner is dissatisfied with system performance within 30 days of start-up by manufacturer's authorized representative, system may be returned for full refund, provided system has received reasonable use and care.
   2. If Owner and manufacturer's authorized representative determine, at time of start-up, that the system is improperly sized for the application, or if another system by the same manufacturer would be more suitable for any reason, the system will be exchanged at no penalty. Owner will be charged or credited only the difference between the original and replacement systems, plus costs of shipping and handling. Owner will not be billed for restocking the original system, nor for the second visit by the representative to start up the replacement.

1.06 DELIVERY, STORAGE AND HANDLING

A. Packing, shipping, handling and unloading:
   1. Pack for shipping and outdoor storage at the project site for up to 6 months.
      a. Apply temporary corrosion protective coatings to unpainted components and pack components to protect from the elements.
   2. Ship pump and drive completely assembled.
      a. VFD shall be shipped unwired to the motor for field wiring.

PART 2 PRODUCTS

2.01 GENERAL

A. A single pump manufacturer shall furnish and coordinate all drives and pump components specified in this Section, including motors, gears, couplings, supports, and other specified accessories and appurtenances to ensure compatibility and integrity of the individual components.

B. The manufacturer of the pumps shall have sole-source responsibility for furnishing the complete assemblies and meeting the specified performance requirements.

C. The packaged chemical feed system shall be BRAVO pre-engineered systems manufactured and marketed by SEEPEX, Inc.

D. Metering pump drives shall be SEEPEX IMP series manufactured by SEEPEX, Inc.

E. System multi-pump controllers shall be SEEPEX TOUCH controller as manufactured by SEEPEX, Inc.

F. Dry run prevention control system shall be the SEEPEX Universal metering pump run dry protection as manufactured by SEEPEX, Inc.

1.01 CHEMICAL FEED SYSTEMS EQUIPMENT

A. Materials:
   1. All materials of construction shall be as scheduled and must be suitable for constant contact with the chemical solution to be pumped and take into account current potable water practices.
      a. Sodium hypochlorite:
         1) Dry chemical formula: NaOCl.
         2) Solution concentration: 12.5 percent by weight.
         3) Solution specific gravity: 1.175.

B. Pump Casing:
   1. Material: as scheduled.
   2. NPT connections shall be provided at both the inlet and discharge ports of the pump. The suction side shall be 1-inch FNPT and the discharge shall be 1/2-inch FNPT.

C. Stator and Rotor:
   1. Each pump shall be a minimum single-stage design employing a single helix rotor operating in a double helix stator. The convolutions shall be configured to form a cavity between the rotor and stator which shall progress from the pump's inlet to discharge port with the operation of the rotor.
   2. The fit between the rotor and stator at the point of contact shall compress the stator material sufficiently to form a seal and to prevent leakage from the discharge back to the inlet end of the pumping chamber.
   3. The stator shall be molded with a seal integral to the stator elastomer preventing the metal stator tube and the bonding agent from the elastomer

from contacting the pumped liquid. Separate Gaskets or "O" rings may not be used to form this seal.

4. The rotor and drive train shall be warranted for 3 years from manufacturer regarding materials and workmanship.

D. Joints:
   1. Each pump rotor shall be driven through a positively sealed and lubricated pin joint.
   2. Constructed of high speed steel, air hardened. The joint shall be grease lubricated with a high temperature PTFE filled synthetic grease, covered with an elastomeric sleeve and positively sealed with hose clamps constructed of Hastelloy C where required.

E. Bearings:
   1. Bearing type: Mount shaft in 2 sets of antifriction tapered roller bearings or radial ball bearings meeting ABMA standards and adequate to withstand radial or axial thrust forces and complying with following:
      a. Inboard set: Single.
      b. Outboard set: Dual.
      c. Shaft expansion: Make provisions in shaft and bearing mounting to prevent distortion of shaft due to temperature expansion.
   2. Bearing lubrication: Grease with external grease fittings.
      a. Size sufficiently to safely absorb heat energy normally generated in bearing under maximum ambient temperature of 60 degrees Celsius.
      b. Equip with grease relief pipe.
   3. Bearing life: Minimum L10 life of 100,000 hours at rated design point but not less than 24,000 hours in accordance with ABMA 9 or 11 at bearing design load imposed by pump shutoff with maximum sized impeller at rated speed.

F. Shaft Seal:
   1. Shaft shall be sealed using mechanical seals.
   2. The mechanical seal and all other wetted tool rotating parts shall be able to be removed from the pump without disassembly of the pump or gear motor bearings.
   3. Mechanical seals shall be with silicon carbide faces with metal parts and elastomers compatible with the pumped liquids.

G. Electrical Service:
   1. Motors: Provide motors as specified in Section 16222 - Low Voltage Motors up to 500 Horsepower and as specified in this Section:
      a. Revolutions per minute: As scheduled:
      b. Enclosure: As scheduled.
      c. Electrical characteristics: As scheduled.
      d. Efficiency, service factor, insulation, and other motor characteristics: As specified in Section 16222 - Low Voltage Motors up to 500 Horsepower.
      e. Motor accessories: As specified in Section 16222 - Low Voltage Motors up to 500 Horsepower and in this Section.
      f. Coordinate motors with the variable frequency drive manufacturer to ensure compatibility between the motor and variable frequency drive.
         1) Coordinate pump starting torque requirements to ensure supplied variable frequency drive provides sufficient starting torque capacity for all operational conditions.

2. Provide a Local Control Panels (LCP) for the chemical feed system. LCPs shall include a single non-regulated 120 volt, single phase power source.
    a. This power is drawn from the main plant power grid and is not filtered.
    b. It is subject to random noise and voltage spikes, and voltage fluctuations of up to plus or minus 15 percent.
    c. The manufacturer shall furnish a complete LCP including, but not limited to, the following:
        1) NEMA Type 4X, Type 316 stainless steel, size as required.
        2) Main circuit breaker.
        3) Individual circuit breakers for each branch circuit.
        4) Motor overcurrent protection and starters for each motor.
        5) VFD drives as required.
        6) Control transformer, sized as required and fused in accordance with NEC.
        7) Switches, push buttons, pilot lights and indicators as required.
        8) Contacts for analog and discrete inputs and outputs as indicated in the P&ID drawings and Control Descriptions.
        9) Instruments, control devices, and other devices as required to perform the operations indicated in the Control Descriptions and indicated on the Drawings.

H. Variable Speed Drive:
1. The integral variable speed drive must incorporate the following manual operator interfaces:
    a. Start membrane button.
    b. Stop membrane button.
    c. UP button to increase pump speed.
    d. DOWN button to decrease speed.
    e. Forward / Reverse button (disabled from factory, but can be re-enabled in setup).
    f. Red, 8-segment, 3.1 LED digital display.
    g. Mode button to access and change user configuration parameters.
2. The metering pump controller must include the following inputs and output capabilities:
    a. Remote two-wire start/stop discrete input.
    b. Remote analog speed reference input.
        1) 0-20 mA current signal.
        2) 4-20 mA DC current signal.
        3) 0-10 VDC signal.
        4) 2-10 VDC signal.
        5) Speed potentiometer input.
    c. Three programmable discrete input signals.
    d. One programmable discrete output.
    e. One programmable (NO/NC) dry-contact relay rated for 2 Amps up to 24 VDC resistive and 3 Amps 85-265 VAC resistive.
    f. One programmable analog output:
        1) 0-10 VDC.
        2) 2-10 VDC.
        3) 0-20 mA DC (into 500 Ω load).
        4) 4-20 mA DC (into 500Ω load).
3. The metering pump controller must incorporate the capability of using a remote mounted sensor/transmitter to create a closed-loop control system

complete with integral PID controller. Such options could be, but not limited to pH, ORP, flow, residuals, turbidity, color, etc.

4. The metering pump controller shall be able to be controlled via the following communication bus strategies:
   a. CANOpen.
   b. DeviceNet.
   c. Ethernet/IP / TCP/IP / Modbus TCP/IP.
   d. RS485 / Modbus RTU / Lecom.
   e. Profibus-DP.
5. The integral metering pump drive shall have the capability of performing 16-segment speed segmentation with separate acceleration/ deceleration profiles and programmable repetitions of sequences.
6. The pumps, along with associated integral drive controller, display and membrane keypad shall be of the close-coupled design as provided by the pump manufacturer. The metering pump controller shall be designed to work solely with the pump and motor to deliver up to 350:1 speed performance and flow performance up to 1000:1 without requiring encoders or blower cooling.
7. Each pump shall incorporate a run dry protection sensor to protect the pump from running dry in the event of chemical loss. The run dry system shall be specifically designed by the pump manufacturer to prevent the pump from running dry due to inadequate chemical supply. The integral drive and run dry sensor shall have been designed to work together to prevent any damage to the pump from the absence of process fluid. The run dry protection system shall be installed by the factory and tested to stop the metering pump controller when fluid loss is detected to eliminate pump damage. The sensor utilized shall be universal and must not be subject to chemical compatibility issues with the pumped product and must be able to be used any chemical application. The sensor must be capable of being used with chemicals that are conductive and non-conductive.
8. The pump and metering pump drive shall be designed together and be optimized to operate the motor over a speed range of up to 350:1 from maximum speed. Drives and motors that have not been specifically tested and certified optimized (by the pump / motor manufacturer) for performance with one-another will not be considered. Under no circumstances will off-the-shelf variable speed drives and motors be considered since their performance and reliability together cannot be confirmed.

I. Controls:
   1. The pre-packaged chemical feed system shall complete with an advanced multi-pump process controller with the following features:
      a. The pre-packaged chemical feed system controller shall have color touch screen operator interface that measures 5.7-inch diagonally.
      b. The pre-packaged feed system controller shall be user configurable completely using the interface of the controller to add or remove functionality as required. Proposals that include PLCs or programmable controllers that require PC interfaces, cords or proprietary software to be installed on a PC will not be permitted.
      c. The pre-packaged feed system controller will automatically interface with the IMP controlled pumps using Modbus RTU control using RS485. This interface makes controlling up to 4 pumps very simple. Additionally, pumps can be added quickly without the need for new programming of additional software. Only two wires will need to be connected to have

complete access to each individual pump operating parameters. This also makes sure that all of the advanced pumps controller's analog and discrete I/O are available for field integration.

d. The pre-packaged feed system controller shall feature the following additional interfaces for field integration:
   1) Qty. 4 analog process inputs:
      a) 4-20 mA DC.
      b) 0-20 mA DC.
      c) 0-10 VDC.
      d) 2-10 VDC.
      e) Thermistor / RTD.
   2) Qty. 4 analog process outputs (4-20 mA DC).
   3) Qty. 16 discrete process inputs that are 24 VDC tolerant.
   4) Qty.15 relay outputs rated for 5 Amps resistive load each.
   5) Qty. 1 isolated 5-wire CANbus communications.

e. The pre-packaged feed system controller shall feature an enclosure UV Protected and carries NEMA 4X area classification. The enclosure shall be constructed of FRP or UV stabilized polycarbonate.

f. The pre-packaged chemical feed control system shall be compliant with current UL508A standard CULUS, which supersedes previous UL and CSA requirements.

g. The pre-packaged chemical feed system controller shall feature the following pre-programmed control strategies built into the basic controller:
   1) Open-loop ratio control.
   2) Lead/Lag multi-pump control strategies.
   3) Tank level control.
   4) Cake pump level control.
   5) Closed-loop ratio control.
   6) Closed-loop cascade control.
   7) Loss of weight control.
   8) Feed-forward process control.
   9) Standard PID Control (flow, pressure, temperature, pH, Cl2 residuals, ORP, charge density, total suspended solids, color control, scale removal, etc.).

J. Skid System:
   1. Wall-mounted structure which shall include a means of mounting a drip pan that includes a drain connection.
   2. The system shall be a duplex configuration constructed with pumps in a duty/standby configuration (1 duty / 1 standby).
   3. All piping shall be schedule 80 CPVC. Threaded fittings are not acceptable.
   4. The O-rings utilized in the valves, piping, unions, etc. shall be FPM.

K. Supports:
   1. Provide pump and driver supported on a common base.
   2. Design anchor bolts to withstand a minimum of 1.5 times the maximum imposed operating loads or 1.0 times the imposed seismic loads, whichever is greater.

2.02 ACCESSORIES

A. Pressure relief valves:
   1. In-line design, size as indicated on the Drawings and required by this Section. Valves shall be suitable for the service flow and pressure specified in this Section.
   2. The pump supplier shall provide all pressure relief valves associated with the chemical system.
   3. Materials shall be compatible with the associated chemical and concentration.
   4. Set pressures shall be factory set at the levels scheduled in this Section. Valve settings shall be externally adjustable from 0 to 75 pounds per square inch.
   5. Provide 3-port configuration for all pressure relief valves where piping back to a tank or connection to drain piping is indicated on the Drawings.
   6. Manufacturer: One of the following or equal:
      a. Plast-O-Matic.
      b. Griffco.

B. Calibration columns:
   1. Manufacturers: One of the following or equal:
      a. Valcom.
   2. Materials:
      a. Materials shall be compatible with the pumped liquid and concentration specified in this Section, and suitable for outdoor use and exposure.
   3. Characteristics:
      a. Furnish and install calibration columns, 1 for each chemical metering pump, on each chemical pump's inlet line as indicated on the Drawings and specified in this Section.
         1) Columns shall be translucent.
      b. Provide top cap threaded connection with vent piped to floor to prevent entry of foreign materials and to direct spillage or overflow.
      c. End connections shall be threaded.
      d. Capacities and graduations shall be as indicated in the schedule in this Section.

C. Degassing Valves:
   1. Furnish and install degassing valve(s) on the sodium hypochlorite chemical metering pump discharge lines as indicated on the Drawings.
   2. Degassing valve shall be installed as recommended by the manufacturer with vent piping directed to the floor of skid.
   3. All wetted materials should be PVDF.
   4. Manufacturer: The degassing valves shall be manufactured by Plast-O-Matic Model DGV and supplied by the pump manufacturer.

D. Additional accessories:
   1. Additional accessories required for the system but not required to be supplied by the pump manufacturer include:
      a. Diaphragm seals as specified in Section 17401 - Pressure/Vacuum Measurement: Diaphragm and Annular Seals, except as modified in this Section:
         1) Materials shall be compatible with the pumped liquid at the specified concentration and suitable for outdoor use and exposure.

b. Pressure switches as specified in Section 17403 - Pressure/Vacuum Measurement: Switches.
c. Pressure gauges as specified in Section 17404 - Pressure/Vacuum Measurement: Gauges.
d. Isolation valves as specified in Section 15111 - Ball Valves for suction and discharge piping as indicated on the Drawings. All ball valves shall be vented-ball type.
e. Provide drain valves for suction and discharge piping.

2.03 NAMEPLATES

A. Each pump, gearbox, and motor shall have, securely affixed in a conspicuous location, a stainless steel nameplate with raised letters providing the manufacturer's model, serial number, tag number, flow capacity, output pressure, and other pertinent data.

2.04 SPARE PARTS AND SPECIAL TOOLS

A. Spare parts: Furnish the following spare parts packed and labeled for warehouse storage:
1. Pump thrust bearing set.
2. Pump radial bearing set.
3. Stators: 1 every type.
4. Mechanical seal: 1 every size and type.
5. 1 complete spare parts kit for each pump motor/drive/controller provided.
6. 1 spare parts kit for each size and type of pressure relief and degassing valve.
7. An initial supply of all oils, greases, and lubricants required to start operations. Supply an amount of these materials equivalent to 1 year of continuous operation for each system.

B. Special tools: Deliver 1 set for each furnished pump type and size needed to assemble and disassemble pump system.

PART 3 EXECUTION

3.01 COMMISSIONING

A. As specified in Section 01756 - Commissioning and this Section.

B. Manufacturer services:
1. Provide certificates:
a. Manufacturer's Certificate of Source Testing.
b. Manufacturer's Certificate of Installation and Functionality Compliance.
2. Manufacturer's Representative onsite requirements:
a. Installation: 1 trip, 2 days minimum.
b. Functional Testing: 2 trips, 2 days minimum each.
3. Training:
a. Maintenance: 2 hours per session, 1 session.
b. Operation: 2 hours per session, 2 sessions.
c. Electricians and I/C Staff: 2 hours per session, 1 session.
4. Process operational period:
a. As required by Owner or Contractor.

C. Source testing: As specified in Pump Schedule.

D. Functional testing: As specified in Pump Schedule.

3.02 PUMP SCHEDULE

A. Pump Schedule:

Tag Numbers	
General Characteristics	
Service	**12.5 percent Sodium Hypochlorite**
Skid Quantity	1
Pump Quantity per Skid	2
Pumped Fluid Temperature Range, degrees Fahrenheit	85-105
Pump Characteristics	
Bearing Lubrication	Grease
Shaft Seal Type	Mechanical Seal
Coupling Type	Spacer
Speed Control	Constant Torque Variable Frequency Drive
Max Speed, rpm	1,800
Design Point (At Maximum Revolutions per Minute):	
Flow Range, gallons per hour (gph)	1-3
Max Pressure, psig	100
Pump Materials	
Pump Rotor	Titanium
Pump Stator	FKM
Pump Body	CPVC
Pump Plug-In Shaft	Titanium
Mechanical Seal	Titanium
Driver Characteristics	
Driver Type	Motor with VFD
Coupling Type	Close Coupled
Minimum Driver Horsepower	0.5
Motor Characteristics (when motor is driver type)	
Inverter Duty Rated	Yes
Motor Voltage/Phases/Hertz	120/1/60
Enclosure Type	NEMA 4X

Tag Numbers	
Source Testing	
Test Witnessing	Not Witnessed
Performance Test Level	1
Vibration Test Level	1
Noise Test Level	1
Functional Testing	
Performance Test Level	1
Vibration Test Level	1
Noise Test Level	1

END OF SECTION

SECTION 11247

PACKAGED FLUORIDE SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Requirements for complete and operational dry chemical feed and dilution system.

1.02 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data: As specified in Section 15050 - Common Work Results for Mechanical Equipment.
   1. List of materials, list of equipment, including a complete list of parts and supplies with current unit prices and sources of supply.
      a. List of parts recommended by the manufacturer to be replaced after 1 and 3 years of service.
   2. Detailed specifications and shop drawings with both isometric and orthogonal views of the proposed installation, including dimensions, weights, and complete parts list.

C. Hydraulic characteristics of the mixer.

D. Shop drawings: As specified in Section 15050 - Common Work Results for Mechanical Equipment:
   1. Detailed specifications and drawings containing complete piping and flow diagrams of the proposed installation, including dimensions, weights.
      a. Drawing shall show proposed anchorage of equipment and appurtenances and equipment relationship to other parts of the work including clearances for installation.
   2. Wiring, control schematics, and control logic diagrams for electrical and control components furnished.

E. Calculations: As specified in Section 15050 - Common Work Results for Mechanical Equipment.

F. Vendor operation and maintenance manuals: As specified in Section 01782 - Operation and Maintenance Manuals.

G. Commissioning submittals:
   1. Provide Manufacturer's Certificate of Source Testing as specified in Section 01756 - Commissioning.
   2. Provide Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 01756 - Commissioning.

1.03 WARRANTY

A. System shall be covered by a 2-year warranty against defects in materials and workmanship. Warranty period shall commence after on-site acceptance of equipment by Owner. In addition, system shall be subject to the following provisions:
   1. If Owner is dissatisfied with system performance within 30 days of start-up by manufacturer's authorized representative, system may be returned for full refund, provided system has received reasonable use and care.
   2. If Owner and manufacturer's authorized representative determine, at time of start-up, that the system is improperly sized for the application, or if another system by the same manufacturer would be more suitable for any reason, the system will be exchanged at no penalty. Owner will be charged or credited only the difference between the original and replacement systems, plus costs of shipping and handling. Owner will not be billed for restocking the original system, nor for the second visit by the representative to start up the replacement.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The following or equal:
   1. Prominent, Fluoride Upflow Saturator System.

2.02 DESIGN AND PERFORMANCE CRITERIA

A. General: Provide integrated equipment package capable of automatically metering, diluting, and blending chemical with water.

B. Design requirements:
   1. The chemical feed system is a sodium fluoride (NaF) make-up and storage system. The solution tank and chemical feed system described are intended to form a single integrated system. The following services will be available to the chemical feed system:
      a. Electrical power: 120 volt, 60 hertz, 1 phase.
      b. Softened water: 5 gallons per minute at 30 pounds per square inch minimum.
   2. The system shall be designed for feeding up to 1.5 mg/L of fluoride to a maximum water well flow rate of 1,800 gpm at a pressure of 90 psig.
   3. The saturator tank, solution tank, metering pump, water feed system, control panel, and related components shall be mounted within the secondary containment. The complete unit shall fit in the location indicated on the Drawings.

2.03 MATERIALS

A. Materials and components shall be compatible with the chemical service and complaint with NSF/ANSI 61.
   1. Chemical Service: Sodium Fluoride.
      a. Concentration: 4 percent.

b. Specific Gravity: 1.165.
c. pH: 11.5-13.0.

B. All wetted components shall be non-metallic to prevent corrosion.

2.04 COMPONENTS

A. Saturator Tank:
1. Material: Linear polyethylene.
2. Capacity: 55 gallons.
3. Tank Lid: Hinged type.
4. The tank shall be designed to hold 300 pounds of sodium fluoride.

B. Distribution Header:
1. The water shall be distributed through the bottom of the tank using a PVC distribution header with perforated lateral pipes.
2. The saturator shall be of the automatic up-flow type, providing a distribution header at the bottom of a tank, allowing water to flow up through a layer of granular sodium fluoride to provide a saturated solution of approximately 4 percent NaF.

C. Sodium Fluoride Solution Tank:
1. Material: Linear polyethylene.
2. Capacity: 70 gallons.
3. Tank shall be equipped with an ultrasonic level switch for automatic control of the saturator operation. Ultrasonic level switch shall be Flowline Echopod DS 14-00.

D. Sodium Fluoride Metering Pump:
1. Manufacturer: One of the following or equal:
a. Prominent, Sigma 1 Series.
2. Characteristics: Chemical proportioning simplex pumps of the positive displacement, non-loss motion design, mechanical diaphragm type.
3. Repeatability: Plus or minus 2 percent of full scale at constant hydraulic conditions.

Quantity (each)	Max. Strokes/ min	Capacity/pump (min/max gph)	Max. Press. (psig)	Power Supply	Input Signal
1 pump	88	1.35/6.2	100	120 VAC	4-20 A

4. Pump gearbox drive:
a. Pump gear box shall be constructed of steel, nodular iron or cast aluminum and be water resistant and suitable for outdoor installation. Pump and gear box housing shall be sealed in an outer plastic housing.
b. Gear box shall be oil bath lubricated.
c. Identify each pump with a corrosion resistant nameplate, securely affixed in a conspicuous location. Nameplate information to include pump tag number, equipment model number, flow capacity, output pressure and electrical data.
d. All fasteners shall be Type 316 stainless steel.
5. Drive and motor:
a. Type: Each chemical metering pump shall be 120 VAC motor-driven through a flexible coupling or direct connected to the pump if

manufacturer's standard. Pumps and motors shall be mounted on floor mountable base plates:

1) Couplers: Manufacturers: One of the following or equal:
    a) Dodge, Para-flex.
    b) Falk, Type WA.

b. Each pump shall be equipped with an integral variable speed drive (VSD). The VSD shall be a VFD-AC variable speed drive. The drive shall be suitable for continuous heavy-duty service and shall be suitable for controlling the motor to be furnished.
c. The drive shall have 100:1 constant torque speed range.
d. The drive shall respond automatically to a remote set point speed signal (4-20 mA). The drive shall provide a 4-20 mA speed signal output proportional to pump output for remote indication. The speed signal output shall be measured independently of the remote set point speed signal. The drive shall also receive a remote start/stop signal (discrete dry contact) and provide discrete signals (discrete dry contact) for pump, failure alarm, diaphragm leak alarm, speed indication, and run indication. The manufacturer shall furnish required additional components for the drive to function as described herein and shown on the Drawings.
e. The motor shall have TEFC enclosure with horsepower of not less than the minimum specified rating.
f. The motor and VFD drive supplier shall carefully review the intended application of the variable speed drive and certify in writing that sizes provided are adequate for continuous or intermittent operations (whichever is the most severe operating condition).

6. Liquid end:
    a. Pumps with flat composite mechanically activated diaphragms shall be Teflon faced, fiber reinforced and bonded to an elastomeric support with a steel backing plate.
    b. The liquid end shall be sealed by means of an O-ring of material, if required, compatible with listed chemical solutions.
    c. The liquid end shall have either single ball or cartridge type check valves. Check valves shall compression seal to the pump head and pipe connections via an O-ring seal.
    d. A secondary diaphragm shall seal the liquid end completely from the gear box and drive unit, preventing cross contamination.
    e. The liquid end of each metering pump shall be fitted with a leak detection system to detect early stage diaphragm failure. The detection system shall be an electro optical sensor, mounted on the liquid end in a NEMA 4X enclosure. Upon actuation, the leak detector shall STOP the pump, light a locally visible LED, and sound a remote alarm.

E. Water Feed System:
    1. The incoming water line shall be supplied with a manual shutoff valve, water feed solenoid valve, flow control needle valve, filter, and backflow/anti-siphon valve.
    2. Water Flowmeter/Totalizer: Sensor shall be Signet Model 3-2000-21 with Signet Model 3-9900-1 flow transmitter.

F. Solution tank mixer:
    1. A mixer shall be provided and mounted onto the solution tank for mixing the chemical and water into a solution.

2. The mixer operation shall be controlled by level switches in the solution tank and by an adjustable timer.
3. Impeller and shaft material shall be 316 stainless steel.
4. The mixer shall be driven by a 1,500 revolutions per minute, 1/20 horsepower, 115 volt, 60 hertz, single-phase TEFC electric motor.

G. Secondary Containment:
1. The entire system shall be housed in a single piece structure made of polypropylene.
2. The structure shall also serve as a secondary containment unit.
3. Containment structure will have a high level switch to detect a breach event that is captured in the unit. The level switch will activate an alarm at the control panel.
4. Containment structure shall be anchored with 316SS anchor bolts.
5. Provide leak detection device within containment.

H. Supports:
1. Design and provide equipment supports for the entire unit to withstand the seismic loads. The design seismic loads are specified in Section 01612 - Seismic Design Criteria.

I. Controls:
1. Provide controls, indicator lights, and switches at a local control panel as specified in Sections 17100 - Control Strategies and 17101 - Specific Control Strategies, or shown on instrumentation drawings, and as specified in Section 17710 - Control Systems: Panels, Enclosures, and Panel Components.

2.05 ACCESSORIES

A. Backpressure Valves:
1. Adjustable pressure range of 0 to 150 psi.
2. Materials shall be compatible with the associated chemical and concentration.
3. Pressure Setpoint: Externally adjustable without removing valve from piping system. Set valve to open at half the pump discharge pressure at operating point, or as indicated on the Drawings.
4. Manufacturer: One of the following or equal:
a. Plast-O-Matic.
b. Griffco.

B. Pressure relief valves:
1. In-line design, valves shall be suitable for the service flow and pressure specified in this Section.
2. The pump supplier shall provide all pressure relief valves associated with the chemical system.
3. Materials shall be compatible with the associated chemical and concentration.
4. Set pressures shall be factory set at the levels scheduled in this Section. Valve settings shall be externally adjustable from 0 to 75 pounds per square inch.

5. Provide 3-port configuration for all pressure relief valves where piping back to a tank or connection to drain piping is indicated on the Drawings.
6. Manufacturer: One of the following or equal:
    a. Plast-O-Matic.
    b. Griffco.

C. Flow Monitor:
1. Type III Metering Monitor located on the pump discharge piping.
2. Materials: PVDF/FPM.
3. Manufacturer: One of the following or equal:
    a. Prominent.

D. Additional accessories:
1. Additional accessories required for the system but not required to be supplied by the pump manufacturer include:
    a. Diaphragm seals as specified in Section 17401 - Pressure/Vacuum Measurement: Diaphragm and Annular Seals, except as modified in this Section:
        1) Materials shall be compatible with the pumped liquid at the specified concentration and suitable for outdoor use and exposure.
    b. Pressure switches as specified in Section 17403 - Pressure/Vacuum Measurement: Switches.
    c. Pressure gauges as specified in Section 17404 - Pressure/Vacuum Measurement: Gauges.
    d. Isolation valves as specified in Section 15111 - Ball Valves for suction and discharge piping as indicated on the Drawings.

PART 3 EXECUTION

3.01 INSTALLATION

A. Field finishes:
1. Protect motors.
2. Clean equipment and prepare shop primer.
3. Apply field primer and coating systems in the field as specified in Section 09960 - High-Performance Coatings requirements.

B. Contractor to flush out potable water line until water discharged from line is clear and free of debris, before conducting disinfection of the line as specified in Section 01757 - Disinfection.

C. Identification of the health, flammability, and reactivity of hazardous materials shall be affixed to each chemical storage drum, as specified in Section 10400 - Signage.

3.02 COMMISSIONING

A. As specified in Section 01756 - Commissioning and this Section.

B. Manufacturer services:
1. Provide certificates:
    a. Manufacturer's Certificate of Source Testing.
    b. Manufacturer's Certificate of Installation and Functionality Compliance.

2. Manufacturer's Representative onsite requirements:
    a. Installation: 1 trip, 2 day minimum.
    b. Functional Testing: 1 trip, 2 day minimum each.
3. Training:
    a. Electrical maintenance: 4 hours per session, 2 sessions.
    b. Mechanical maintenance: 4 hours per session, 2 sessions.
    c. Operation: 2 hours per session, 2 sessions.
4. Process operational period.
    a. As required by Owner or Contractor.

C. Source testing:
1. Test as specified in Section 15958 - Mechanical Equipment Testing.
2. Fluoride System:
    a. Test witnessing: Not witnessed.
    b. Conduct Level 1 General Equipment Performance Test.
    c. Conduct Level 1 Vibration Test.
    d. Conduct Level 1 Noise Test.
3. Electrical Instrumentation and Controls:
    a. Test witnessing: Not witnessed.
    b. Conduct testing as specified in Section 17950 - Commissioning for Instrumentation and Controls.

D. Functional testing:
1. Functional testing of the entire system to be conducted following installation and cleaning of the units.
2. Fluoride System:
    a. Test witnessing: Witnessed.
    b. Conduct Level 2 General Equipment Performance Test.
    c. Conduct Level 2 Vibration Test.
    d. Conduct Level 2 Noise Test.
3. Electrical Instrumentation and Controls:
    a. Test witnessing: Witnessed.
    b. Conduct testing as specified in Section 17950 - Commissioning for Instrumentation and Controls.
    c. Manufacturer's representative shall provide a calibration check.

END OF SECTION

SECTION 11313

VERTICAL TURBINE PUMPS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Vertical turbine pumps with radial, mixed flow, or axial (propeller) type impellers and drivers as scheduled.

1.02 REFERENCES

A. American Bearing Manufacturers Association (ABMA):
   1. 9 - Load Ratings and Fatigue Life for Ball Bearings.
   2. 11 - Load Ratings and Fatigue Life for Roller Bearings.

B. American Society of Mechanical Engineers (ASME):
   1. B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, and 250.
   2. B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through 24.

C. American Water Works Association (AWWA):
   1. C205 - Standard for Cement-Mortar Protective Lining and Coating for Steel Water Pipe, 4-Inch (100 mm) and Larger-Shop Applied.

D. ASTM International (ASTM):
   1. A 48 - Standard Specification for Gray Iron Castings.
   2. A 53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   3. A 108 - Standard Specification for Steel Bars, Carbon and Alloy, Cold-Finished.
   4. A 276 - Standard Specification for Stainless Steel Bars and Shapes.
   5. A 278 - Standard Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650 degrees Fahrenheit (350 degrees Celsius).
   6. A 283 - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
   7. A 516 - Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate-and Lower-Temperature Service.
   8. A 582 - Standard Specification for Free-Machining Stainless Steel Bars.
   9. A 743 - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application.
   10. B 148 - Standard Specification for Aluminum Bronze Sand Castings.
   11. B 505 - Standard Specification for Copper Alloy Continuous Castings.
   12. B 584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
   13. F 593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
   14. F 594 - Standard Specification for Stainless Steel Nuts.

E. Hydraulic Institute (HI):
   1. 2.1-2.2 - Vertical Pumps for Nomenclature and Definitions.
   2. 2.3 - Vertical Pumps for Design and Application.
   3. 2.4 - Vertical Pumps for Installation Operation and Maintenance.
   4. 2.6 - Vertical Pump Tests.
   5. 9.1-9.5 - Pumps - General Guidelines for Types, Definitions, Application, and Sound Measurement and Decontamination.

F. International Standards Organization (ISO):
   1. ISO 9001 Certified.

1.03 DEFINITIONS

A. Pump head (total dynamic head, TDH), flow capacity, pump efficiency, net positive suction head available (NPSHa), and net positive suction head required (NPSHr): As defined in HI 2.1-2.2, 2.3, 2.6, and 9.1-9.5 and as modified in the Specifications. The pump head and efficiency are evaluated at the outlet of the discharge head and include the net losses in the pump column and discharge.

B. Flow, head, efficiency, and motor horsepower specified in this Section are minimums unless stated otherwise.

C. Suction head: Gauge pressure available at pump intake flange or bell in feet of fluid above atmospheric.

D. Tolerances: This Section and related sections contain tolerances that may be more stringent than Hydraulic Institute Standard tolerances. Where tolerances are not mentioned, Hydraulic Institute Standards 2.1-2.2, 2.3, 2.4, and 9.1-9.5 shall apply.

1.04 SYSTEM DESCRIPTION

A. Components: Pump, driver, motors, and drive arrangements as specified or as scheduled with shafts, columns, barrels, intermediate bearings, seals or packing, couplings, base plates, guards, supports, anchor bolts, necessary valves, gauges, taps, lifting eyes, stands, and other items as required for a complete and operational system.

B. Design requirements:
   1. Pump performance characteristics:
      a. As specified in the Pump Schedule.
      b. Performance tolerances shall be the same as the test tolerances specified in Section 15958 - Mechanical Equipment Testing.
      c. Pump curve shall be continuously rising throughout the design conditions listed in the pump schedule.
   2. Motor characteristics: As specified in the Pump Schedule.

1.05 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Torsional analysis: Submit as specified in Section 15050 - Common Work Results for Mechanical Equipment when scheduled.

1.06 QUALITY ASSURANCE

A. General: As specified in Section 15050 - Common Work Results for Mechanical Equipment.

B. Provide pumps specified in this Section from same manufacturer. Require pump manufacturer to furnish and coordinate pump, driver, drive, and pump components including barrel/can as scheduled and to provide written installation and checkout requirements.

C. Pump manufacturer must be ISO 9001 certified.

1.07 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 15050 - Common Work Results for Mechanical Equipment.

1.08 PROJECT CONDITIONS

A. Environmental requirements: As specified in Section 01610 - Project Design Criteria.

1.09 SEQUENCING AND SCHEDULING

A. Coordinate work with restrictions as specified in Section 01110 - Summary of Work.

1.10 WARRANTY

A. As specified in Section 00700 - General Conditions.

1.11 MAINTENANCE

A. Special tools: Deliver 1 set for each furnished pump type and size needed to assemble and disassemble pump system.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. One of the following or equal:
   1. National Pump Company: model as scheduled.
   2. Flowserve; similar to model as scheduled.
   3. Peerless Pump; similar to scheduled model.
   4. Sulzer/Johnston Pumps; similar to scheduled model.
   5. Weir/Floway; similar to scheduled model.

2.02 MATERIALS

A. General: Materials in the Pump Schedule shall be the type and grade as specified in this Section, and shall be in conformance with all applicable ASTM Standard specifications.

2.03 GENERAL PUMP CONSTRUCTION

A. Type: Industrial, heavy duty, vertical turbine, centrifugal type pumps meeting performance requirements and features as scheduled and as specified.

B. Discharge Head: Custom fabricated discharge head with NEMA C-Face motor mount, pressure rated base flange, and pressure rated discharge flange fabricated from Type 316L stainless steel in conformance with ASTM A 312. Provide access to the pump shaft seal and coupling through the center section of the discharge head, with hinged guard, and NPT drain connections, and welded lifting lugs on either side of the head to facilitate crane removal. All components shall be fabricated from Type 316 SST.

C. Discharge flange: ASME B16.1 or B16.5 drilled; rated for 1.5 times the pump shutoff head at 120 degrees Fahrenheit.

D. Discharge head base flange: ASME B16.1 or B16.5 drilled; rated for 1.5 times the pump shutoff head at 120 degrees Fahrenheit. Provided NPT threaded taps on both sides of flange for downhole control valve hydraulic fittings and trickle flow connections as shown on the drawings.

E. Discharge nozzles: Provide 1/2-inch NPT taps for pressure gauges; install nipple and gauge with block valve.

F. Bearings:
   1. Design driver/motor bearings to support the line shaft assembly and rated for ABMA L_{10} life of 40,000 hours at Design Rated Point flow and head in accordance with ABMA 9 or ABMA 11.
   2. Design motor to withstand continuous duty full load thrust and momentary upthrust that may occur during pump on/off or other operations.

G. Fasteners: Provide Type 316 stainless steel fasteners in accordance with ASTM F 593 or ASTM F 594.

2.04 PUMP SUCTION ASSEMBLY

A. Pump suction assembly: Provide suction bell. Provide anti-vortex baffles and strainer when scheduled.

B. Design suction bells and provide strainers and anti-vortex baffles to minimize solids plugging and vortexing. Screens to have a flow area at least 4 times the suction pipe area.

C. Materials:
   1. Pump suction bell: As scheduled.
   2. Anti-vortex baffles: Same material as scheduled for pump suction bell.
   3. Pump suction bell bearing: As scheduled.
   4. Pump suction strainer: When strainer scheduled, provide Type 316 stainless steel.

2.05 PUMP IMPELLER BOWL ASSEMBLIES

A. Pump impeller assembly:
   1. Type: As scheduled.
   2. Maximum number of vanes: As scheduled.
   3. Number of stages: As scheduled.
   4. Required balance: In conformance with the Hydraulic Institute Standards.
   5. Method of securing impellers to shafts: Keyed and secured by a bronze nut locked in place or locked by other methods acceptable to the Engineer. Provide any special tools required for removal and installation of pump impellers.
   6. Provisions for adjustment of axial clearance: Make such adjustment through use of motor adjusting nut or adjustable coupling.
   7. Impeller thrust: When appropriate for the specified impeller type, provide hydraulically balanced impeller to minimize down thrust.

B. Intermediate and discharge impeller cases:
   1. Material: As scheduled.
   2. Attached with bolting.

C. Pump impeller bowl bearings: Provide bearing for each impeller; material as scheduled.

D. Diffusion vanes: Provide vanes cast into bowl.

E. Suction bowl bearings:
   1. Provide bronze sleeved bearings with self-contained lubrication system filled with graphite type non-soluble grease when grease lubrication scheduled; provide bearing with sand cap.
   2. When service is potable water, provide non-toxic grease approved by the Food and Drug Administration for use in potable water.

F. Design with smooth water passages to reduce clogging by stringy or fibrous materials on impellers or shafting.

G. Design replaceable wear rings for both the bowl and impeller on each impeller bowl.

H. Design capable of passing solids with a sphere size as scheduled or larger.

2.06 LINE SHAFTS

A. Provide line shaft type and lubrication type as scheduled and as specified in this Section.

B. Open line shaft, product lubricated:
   1. Shaft and couplings:
      a. Provide keyed shaft type mechanical couplings with key or set screw locking of shaft couplings.
      b. Shaft threaded connections are not allowed.
   2. Bearings and bearing retainers: Provide bearings and retainers spaced as scheduled, but not to exceed 10 feet; provide at least 1 bearing for each line

shaft length; provide grease fitting for top bearing extended to outside any guards when grease lubrication specified.

3. Materials:
   a. Shaft and couplings: As scheduled; where hard faced steel shaft is specified, hard face at sleeve bearings to 550 Brinell minimum.
   b. Bearings and bearing retainers: As scheduled.

C. Strength: Able to withstand minimum 1.5 times maximum operating torque and other loads.

D. Sleeves: Provide shafting with hardened sleeves where shafts pass through bearings or stuffing boxes as scheduled; Brinell 550 or higher for hardened shaft; when the specified mechanical seals cannot be installed on a hardened shaft, hardened shafts are not required in the area of the mechanical seal.

E. Design pump line shafting in interchangeable lengths as scheduled, but not to exceed 10 feet; shaft lengths to match scheduled pump column lengths.

F. Coupling strength: Design driver to pump line shaft coupling of sufficient length and strength to maintain line shaft alignment.

G. Adjustment:
   1. Design a means to adjust shaft position to adjust impeller position.
   2. For motor driven units with solid shaft motors, design driver to pump line shaft coupling to allow adjustment of the impeller position.
   3. For motor driven units with hollow shafts, an adjusting nut may be provided at the top of the motor shaft.

H. Spacer coupling: When mechanical seals are scheduled, provide an adjustable spacer coupling to allow removal of the seal without driver removal.

2.07 PUMP COLUMN PIPE

A. Pump column pipe: Thickness and material as scheduled.

B. For each ASR well pump: Provide a suction pipe assembly which shall be connected to the flanged inlet of the pump bowl assembly. Each suction pipe assembly shall consist of a downhole control valve (V980), and inline check valve (V635) as described in the Valve Schedule on the mechanical drawings; an inlet cone strainer shall be provided on the inlet side of the check valve as shown on the detail on the mechanical. Provide the hydraulic control lines to the downhole valve as per the manufacturer's instructions and as shown on the mechanical drawings.

C. Head connection: Design with flanged and bolted connection to discharge head and flanged and bolted connection to impeller assembly to permit removal of impeller bowl assembly without disturbing the column or discharge connections.

D. Design Working Pressure: Design to withstand a design working pressure not less than 1.20 times the maximum shutoff total dynamic head with the maximum diameter impeller at the maximum operating speed plus the maximum suction static head.

E. Pressure test: Design to withstand a 5 minute hydrostatic test pressure not less than 1.5 times the design working pressure; perform test at source.

F. Lengths and connections: Design with maximum 10 foot length, or less if scheduled, interchangeable column sections with flanged or threaded with registered fit screwed connections as scheduled.

G. Diameter: Design column inside diameter for no more than 4 feet of fluid friction loss per 100 feet of column length.

2.08 PUMP DISCHARGE HEAD ASSEMBLY

A. Design the fabricated discharge head for pressure-rated base connection to the top of wellhead casing fittings shown on the drawings.

B. Design the discharge vertical to horizontal flow transition as a smooth pipe elbow or from a minimum of 3 pipe pieces mitered to form the elbow.

C. Design discharge head to mate with the driver as scheduled.

D. Head and base plate construction: Sufficient strength, weight, and thickness to provide accurate alignment, prevent excessive deflection and support the drive motor.

E. Stuffing box and seal:
   1. Design the discharge head with a stuffing box to accommodate packing or mechanical seals as scheduled.
   2. Packing: When packing scheduled, provide stuffing box arranged for packing (sized for bronze lantern ring and 6 packing rings minimum); provide hollow shaft motor with top adjusting nut.
   3. Mechanical seal: When scheduled, provide stuffing box suitable for the specified seal and provide a solid shaft or hollow shaft motor with spacer coupling, as scheduled.
   4. Drain: Provide drain, minimum 3/4 inch size, for pump stuffing box leakage, together with drain line to the pump can or wet well or to nearest equipment drain as shown on the Drawings.

F. Discharge vent: Provide 3/4 inch NPT threaded high point vent on discharge; install pipe nipple with threaded gate valves in vent.

G. Materials: As scheduled.

H. Pump discharge head base flange connection to top of wellhead flange connection shall be rated for a minimum operating pressure of 50 psi.

2.09 EQUIPMENT GUARDS

A. Provide equipment safety guards as specified in Section 15050 - Common Work Results for Mechanical Equipment.

B. Shop fabricate pump discharge head per Section 05120 Structural Steel and Section 05500 Metal Fabrications.

2.10 DRIVERS

A. Horsepower:
   1. As scheduled.
   2. Listed driver horsepower is the minimum to be supplied.
      a. Increase driver horsepower if required to prevent driver overload while operating at any point of the supplied pump operating head-flow curve including runout.
      b. When scheduled driver is a motor, increase motor horsepower if required to prevent operation in the service factor.
      c. Make all structural, mechanical, and electrical changes required to accommodate increased horsepower.

B. Motors: Provide motors as specified in Section 16010 - Electrical and as specified in this Section:
   1. RPM: As scheduled:
   2. Enclosure: As scheduled.
   3. Electrical characteristics: As scheduled.
   4. Efficiency, service factor, insulation, and other motor characteristics: As specified in Section 16010 - Electrical.
   5. Motor accessories: As specified in Section 16010 - Electrical and in this Section.
   6. Coordinate motors with the variable frequency drive manufacturer to ensure compatibility between the motor and variable frequency drive.

C. Other drivers: As scheduled and as specified in sections listed in the Schedule.

D. Non-reverse ratchets: When scheduled, provide driver with non-reverse ratchets or pin mechanism to prevent reverse rotation of the pump and driver during recharge operations for the ASR well pumps.

2.11 SUPPORTS

A. Strength: Design pump discharge head and driver (motor or engine) supports to withstand a minimum of 1.5 times the maximum imposed operating loads or the imposed seismic loads, whichever is greater.

B. Resonant frequency: Design supports in conjunction with the pump, shafting, drivers, bearings, and other components to avoid natural resonant frequencies, either torsional, radial, or axial as specified in Section 15958 - Mechanical Equipment Testing.

C. Coordinate pump and drive system supports with the foundation designs as shown on the Drawings.

2.12 FINISHES

A. Prepare surfaces and apply protective coatings as specified in Section 09960 - High-Performance Coatings.

2.13 SOURCE QUALITY CONTROL

A. Witnessing: Source or factory testing shall be witnessed by the Engineer or Owner when scheduled; provide advanced notice of source testing as specified in Section 15958 - Mechanical Equipment Testing.

B. Equipment performance test: Test level as scheduled; test as specified in Section 15958 - Mechanical Equipment Testing.

C. Vibration test: Test level as scheduled; test as specified in Section 15958 - Mechanical Equipment Testing.

D. Noise test: Test level as scheduled; test as specified in Section 15958 - Mechanical Equipment Testing.

E. Motor factory tests: Test as specified in Section 16010 - Electrical.

F. Hydrostatic pressure tests: As specified for components in this Section.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions and as specified in Section 15050 - Common Work Results for Mechanical Equipment.

B. Install pump discharge head per Section 05120 - Structural Steel and Section 05500 - Metal Fabrications.

3.02 FIELD QUALITY CONTROL

A. Witnessing: All field-testing shall be witnessed by the Engineer; provide advanced notice of field-testing as specified in Section 15958 - Mechanical Equipment Testing.

B. Inspection and checkout: As specified in Sections 15958 - Mechanical Equipment Testing.

C. Equipment performance test: Test level as scheduled; test as specified in Section 15958 - Mechanical Equipment Testing.

D. Vibration test: Test level as scheduled; test as specified in Section 15958 - Mechanical Equipment Testing.

E. Noise test: Test level as scheduled; test as specified in Section 15958 - Mechanical Equipment Testing.

F. Operational testing: As specified in Section 01756 - Commissioning.

G. Provide quality control as specified in Section 01450 - Quality Control.

3.03 MANUFACTURER'S FIELD SERVICES

A. Require manufacturer to inspect system before initial start-up and certify that system has been correctly installed and prepared for start-up as specified in this Section and in Sections 15958 - Mechanical Equipment Testing.

B. Training: As specified in Section 01756 - Commissioning.

3.04 PUMP SCHEDULE

Tag Numbers	WD37-PUMP-28101	WD37-PUMP-35101
General Characteristics:		
Service	ASR Well Pump Well-9	ASR Well Pump Well-18
Quantity	1	1
First Named Manufacturer's Model Number	TBD	TBD
Maximum Noise, dBA at 3 feet	85	85
Torsional Analysis	Required	Not Required
Minimum Pumped Fluid Degrees Fahrenheit	60	60
Normal Pumped Fluid Degrees Fahrenheit	70	70
Maximum Pumped Fluid Degrees Fahrenheit	85	85
Pump Characteristics:		
Minimum Number of Stages	3	3
Impeller Type	Enclosed	Enclosed
Pump Impeller Bowl Bearing Lubrication	Pumped Liquid	Pumped Liquid
Suction Bowl Bearing Lubrication	Pumped Liquid	Pumped Liquid
Suction Strainer	Type 316 SST	Type 316 SST
Line Shaft Type	Open	Open
Minimum Line Shaft Bearing Spacing, Feet	10	10
Line Shaft Lubrication	Pumped Liquid	Pumped Liquid
Discharge Shaft Seal Type	Single Mechanical	Single Mechanical
Pump Column	12-inch 304 SST	12-inch 304 SST
Pump Column Connection Type	Nitronic 60 threaded Coupling	Nitronic 60 Threaded Coupling
Column Flange Fasteners	Type 18-8 SST Hex Bolt Sets	Type 18-8 SST Hex Bolt Sets
Maximum Column Section Lengths, Feet	10	10
Minimum Overall Length of Column Pipe, Shafting and Appurtenances	300-ft (Note 3)	300-ft (Note 3)
Shaft Coupling Type	Spacer	Spacer
Speed Control	Variable Frequency Drive	Variable Frequency Drive

Tag Numbers	WD37-PUMP-28101	WD37-PUMP-35101
Maximum Pump rpm	1,800	1,800
Minimum Pump rpm	1,300	1,300
Rated Design Point (at 95% of Maximum Revolutions per Minute): (See Note 1)		
Flow, gpm	2,750	1,800
Head, feet	494	450
Minimum Efficiency, Percent	81	81
Other Conditions: (See Note 1)		
Shut Off Head, Feet (maximum)	TBD	TBD
Maximum NPSHr at Specified Flow, Feet	TBD	TBD
Minimum NPSHa at Specified Flow, Feet	TBD	TBD
Minimum Suction Static Head, Feet	50-foot Submergence (including 10-foot DHCV *Baski)*	50-foot Submergence (including 10-foot DHCV *Baski)*
Pump Materials:		
Suction Nozzle or Bell	Vesconite H/L	Vesconite H/L
Suction Bell Bearing	Vesconite H/L	Vesconite H/L
Bowl and Suction Cases	Vesconite H/L	Vesconite H/L
Impeller	Bronze	Bronze
Impeller Bearing	Vesconite H/L	Vesconite H/L Rubber
Impeller Shaft Key	316 SST	316 SST
Head Shaft	ASTM 276 Type 416 SST	ASTM 276 Type 416 SST
Impeller Shaft	ASTM 276 Type 416 SST	ASTM 276 Type 416 SST
Line Shaft and Coupling	ASTM 276 Type 416 SST	ASTM 276 Type 416 SST
Line Shaft Bearings	Vesconite	Vesconite
Shaft Sleeve	Hardened	Hardened
Column Material and Thickness, Inch or Schedule	304 SST	304 SST
Fabricated Discharge Head/Driver Stand (Note 4)	316 SST with 18-inch base, 12-inch discharge flange (Verify Flanged or welded Base and DIA with mechanical drawings)	316 SST with 18-inch base, 12-inch discharge flange (Verify Flanged or welded Base and DIA with mechanical drawings)

Tag Numbers	WD37-PUMP-28101	WD37-PUMP-35101
Fabricated Discharge Head Base Flange Connections (Note 5)	(2) 1/4-inch NPT nipples (for downhole control valve (1) 1 1/4-inch NPT nipple for trickle flow	(2) 1/4-inch NPT nipples (for downhole control valve (1) 1 1/4-inch NPT nipple for trickle flow
Discharge Head Bearing	Vesconite	Vesconite
Discharge Stuffing Box	316 SST	316 SST
Driver Characteristics:		
Driver Type	Motor	Motor
Drive Arrangement	Vertical, Coupled Non-Reverse Ratchet (Note 2)	Vertical, Coupled Non-Reverse Ratchet (Note 2)
Non-Reverse Ratchets	Required	Required
Minimum Driver Horsepower	500	300
Maximum Driver rpm	1,800	1,800
Motor Characteristics (when motor is driver type):		
Inverter Duty Rated	Yes	Yes
Motor Voltage/Phases/Hertz	460/3/60	460/3/60
Enclosure Type	TEFC	TEFC
Motor Shaft Type	Hollow	Hollow
Source Quality Control Testing:		
Test Witnessing	Not Witnessed	Not Witnessed
Performance Test Level	1	1
Vibration Test Level	1	1
Noise Test Level	1	1
Field Quality Control Testing:		
Performance Test Level	1	1
Vibration Test Level	1	1
Noise Test Level	1	1

END OF SECTION

SECTION 13208

POLYETHYLENE TANKS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Polyethylene storage tanks made from crosslinked polyethylene resin.

1.02 REFERENCES

A. American Concrete Institute (ACI):
   1. 318 - Building Code and Commentary.

B. American Society for Mechanical Engineers (ASME):
   1. B16.4 - Gray Iron Threaded Fittings.
   2. B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through 24.

C. ASTM International (ASTM):
   1. D638 - Standard Test Method for Tensile Properties of Plastics.
   2. D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
   3. D1505 - Standard Test Method for Density of Plastics by the Density-Gradient Technique.
   4. D1525 - Standard Test Method for Vicat Softening Temperature of Plastics.
   5. D1693 - Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.
   6. D1998 - Standard Specification for Polyethylene Upright Storage Tanks.
   7. D2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.

D. National Fire Protection Association (NFPA):
   1. 30 - Flammable and Combustible Liquid Code.

E. National Electrical Manufacturer's Association (NEMA).

F. Occupational Safety and Health Administration (OSHA):
   1. 29 CRF Part 1910 - Occupational Safety and Health Standards.

G. NSF/ANSI Standard 61 – Drinking Water System Components.

1.03 SUBMITTALS

A. Fabrication drawings for each tank including:
   1. Dimensions.
   2. Tank wall thickness.
   3. Materials of construction.
   4. Tank fittings.

5. Tank appurtenances.
6. Tank restraint system.
7. Tank resin and hoop stress data.

B. Chemical compatibility sheet to include:
   1. Chemical to be stored.
   2. Percentage of chemical.
   3. Temperature of chemical.

C. Engineering design calculations of restraint and anchoring system signed by a civil or structural engineer registered in the state where the project is located.

D. Installation instructions.

E. Warranty.

F. Certification to certify that each tank is suitable for the specified chemical service, no degradation within warranty period, including tank fittings and gasket material.

G. Proof of qualification: Provide lists of installation and contact information with same type of application and chemical used.

H. Color charts for proposed coating systems.

1.04 WARRANTY

A. Manufacturer warranty against defects:
   1. Tank: 5 years full warranty. Prorated warranties are not acceptable.
   2. Heat tracing system if scheduled: 10 years.

1.05 QUALITY ASSURANCE

A. Qualification of manufacturer: Manufacturer with experienced personnel, physical facilities, and management capacity sufficient to produce custom-made rotationally molded polyethylene tanks of the size, exposure, and chemical services specified for minimum 5 years with satisfactory performance record.

PART 2 PRODUCTS

2.01 SCOPE OF SUPPLIES

A. Provide all materials, labor, equipment, and hardware to provide all polyethylene storage tanks with specified fittings and accessories, seismic and wind load restraint systems, anchor bolts, and flange flexible connectors for complete installation in the positions and orientations indicated on the Drawings.

2.02 MANUFACTURERS

A. One of the following or equal:
   1. Poly Processing Co.

2.03 DESIGN AND PERFORMANCE CRITERIA

A. Tanks: As scheduled.

B. Tank wall thickness: Calculated in accordance with ASTM D1998 using design specific gravity as scheduled. Note that design specific gravity may be higher than specific gravity of tank contents.

C. Design requirements:
   1. The minimum required wall thickness of the cylindrical shell at any fluid level shall be determined by the following equation, but shall not be less than 0.187 inches thick:

      T = P x O.D./2 SD = 0.433 x S.G. x H x O.D./2 SD
      T = wall thickness, in.
      SD = hydrostatic design stress, psi
      P = pressure (.433 x S.G. x H), psi
      H = fluid head, ft.
      S.G. = specific gravity, g/cm^3
      O.D. = outside diameter, in.

D. The hydrostatic design stress shall be determined by multiplying the hydrostatic design basis, determined by ASTM D2837 using rotationally molded samples, with a service factor selected for the application.
   1. The hydrostatic design stress is 600 pounds per square inch at 73 degrees Fahrenheit for Type I and Type II materials.
   2. The tank shall have a stratiform (tapered wall thickness) wall.

E. The hydrostatic design stress shall be derated for service above 100 degrees Fahrenheit and for mechanical loading of the tank.

F. The minimum design specific gravity shall be 1.9.

G. The minimum required wall thickness for the cylinder straight shell must be sufficient to support its own weight in an upright position without any external support.
   1. Flat areas shall be provided to allow locating large fittings on the cylinder straight shell.

H. The top head must be integrally molded with the cylinder shell.
   1. The minimum thickness of the top head shall be equal to the top of the straight wall.
   2. The top head of tanks with 2,000 or more gallons of capacity shall be designed to provide a minimum of 1,300 square inches of flat area for fitting locations.

I. Tanks with 2,000 or more gallons of capacity shall have a minimum of 3 lifting lugs integrally molded into the top head.
   1. The lifting lugs shall be designed to allow erection of an empty tank.

J. The tank shall be designed to provide a minimum of 4 tie-down lugs integrally molded into the top head.
   1. The tie-down lugs shall be designed to allow tank retention in wind and seismic loading situations without tank damage.

K. Tank shell thickness:
   1. In accordance with ASTM D1998, Section 6.1.
   2. Design tank wall thickness for liquid with specific gravity as specified.
   3. Provide adequate thickness at all fittings and connection points for mounting of fittings to the tank without damage to the tank or causing excessive deflection.
   4. Maximum allowable hoop stress used in tank wall thickness calculations per ASTM D1998 shall be based on test data in accordance with ASTM D2837.

L. Seismic and wind load restraint system:
   1. Seismic design criteria: As specified in Section 01612 - Seismic Design Criteria.
   2. Wind design criteria: As specified in Section 01614 – Wind Design Criteria.
   3. Consist of Type 316 stainless steel angles or brackets equally spaced around the tank perimeter anchored into the concrete tie down cable.
   4. If the restraint system includes the use of tensioning and adjustment devices, such as turnbuckles, provide easy adjustment of the cables at the time of construction and as required in the future.
      a. Hardware shall be provided to attach cables to anchored brackets at the base of the tank.
   5. The tank shall be designed to provide a minimum of 4 tie-down lugs integrally molded into the top head.
      a. The tie-down lugs shall be designed to allow tank retention in wind and seismic loading situations without tank damage.
      b. Anchor bolts shall be provided by the Contractor per the instructions and the base plates for the system.

2.04 TANK MATERIALS

A. High-density crosslinked polyethylene (XLPE)

B. Resin:
   1. Manufacturers: One of the following or equal:
      a. PAXON, grade 7204 resin for crosslinkable polyethylene.

C. The material used shall be virgin polyethylene resin as compounded and certified by the manufacturer.
   1. Tanks shall be made from crosslinked polyethylene resin as manufactured by ExxonMobil Chemical, or resin of equal physical and chemical properties.
   2. Resin choice would be based on the specific application, chemical to be stored and concentration.

D. Ultraviolet stabilizer:
   1. The polyethylene resin material shall contain a minimum of a UV 8 stabilizer as compounded by the resin manufacturer.
   2. Pigments may be added but shall not exceed 0.25 percent (dry blended) of the total weight.

E. Free of holes, blisters, crazing, cracking, delamination, undispersed raw materials, and any sign of contamination from foreign matter.
   1. The finished tank wall shall be free of visual defects such as foreign inclusions, air bubbles, pinholes, pimples, crazing, cracking, and delaminations.
   2. All cut edges where openings are cut into the tanks shall be trimmed smooth.

F. Resin shall meet or exceed the following properties:
   1. Mechanical Properties of Type 1 of Tank Material: Current XLPE Resin:

Property	ASTM	Value
Density (Resin)	D1505	0.938-0.946 g/cc
Tensile (Yield Stress 2-inch/min)	D638	3,000 psi
Elongation at Break (2-inch/min.)	D638	>300 percent
ESCR (100 percent Igepal, Cond. A, F50)	D1693	>1000 hours
ESCR (10 percent Igepal, Cond. A, F50)	D1693	>1000 hours
Vicat Softening Temperature,	D1525	250
Flexural Modulus	D790	100,000 psi

G. Gel test:
   1. Inner portion of tank wall:
      a. Not less than 65 percent.
      b. ASTM D1998 requirements.
   2. Entire wall thickness: Not less than 80 percent.

H. Restraint system:
   1. Metal components, including anchor bolts:
      a. Type 304 stainless steel.
      b. The Anchor bolts shall be supplied by the tank manufacturer.
      c. The drawings and calculations for the seismic system shall be submitted for review.
   2. Concrete anchors or flush shells shall not be used.

2.05 FITTINGS

A. Terminate in socket, threaded, or flanged connections:
   1. Flanges: 150 pound ASME B 16.5.
   2. Double flanged CPVC bolted fittings with encapsulated stainless steel or Hastelloy bolts.
   3. Threaded connections: ASME B 16.4.

B. Fittings at upper tank sidewall or top:
   1. Compression threaded type, long shank, polyvinyl chloride flanged fittings with deep cut threads (not injection molded thread) and with dual wide nuts.
   2. The bulkhead fittings shall be constructed of PVC, PP, or other specified material.
   3. Gaskets shall be a minimum of 1/4 inch thickness and constructed of 60-70 durometer Viton™ or other specified material.

C. Fittings on tank top:
   1. Bosses molded into the tank.
   2. Fittings shall be vertical.
   3. The top head shall be integrally molded with the cylinder shell.

4. The minimum thickness of the top head shall be equal to the top of the straight wall.
5. The top head of tanks with 2,000 or more gallons of capacity shall be designed to provide a minimum of 1,300 square inches of flat area for fitting locations.

D. Flanged outlet drain fitting in the lower tank sidewall: Integrally molded into the bottom knuckle of the tank to allow full drainage of tank contents.

E. Fittings and appurtenances for each tank:
   1. Sodium Hypochlorite Tank:
      a. 1 minimum 2-inch flanged inlet nozzle entering the tank in the top.
      b. 1 minimum 2-inch full outlet/drain nozzle, integrally molded with tank wall.
      c. One 3-inch flanged overflow nozzle.
      d. One 4-inch flanged roof nozzle for mounting of tank level sensor.
         1) One 4-inch flanged roof nozzle for mounting of tank level gauge.
      e. One 3-inch flanged roof vent.
      f. One 18 inch flanged type or molded screw type manway lid on top of the tank.
      g. Manway shall be sealed and shall be constructed of the same material as tank.
      h. The bolts shall be Hastelloy.
      i. The gaskets shall be per tank manufacturer recommendation for the chemical stored.
   2. Backwash Waste Tank:
      a. One Inlet: 6-inch, entering the tank in the top using bulkhead fitting on flat or runway.
      b. One Outlet/Drain: 4-inch, integrally molded with tank wall and terminated with flange.
      c. One Overflow: 6-inch, on tank sidewall with internal piping elbow turned up and terminated at or above tank sidewall height.
      d. One Level Sensor: 4-inch flanged roof nozzle for mounting of tank level sensor.
      e. One Vent: 8-inch flanged roof vent using mushroom vent assembly.
      f. One Manway: 24-inch, bolted with 10” mushroom lid with hinge.
      g. Manway shall be sealed and shall be constructed of the same material as tank.
      h. The bolts shall be 316 SST.
      i. The gaskets shall be EPDM.
      j. Liquid Level Gauge: Provide connections to drain and overflow for level gauge. Use clear PVC pipe with ball valve isolation and low and high spots along liquid level gauge.
   3. Provide flanged flexible connectors for each of the following fittings:
      a. Sodium Hypochlorite Tank:
         1) The flanged 2 inch inlet nozzle on each tank.
         2) The flanged 2 inch outlet/drain nozzle on each tank.
         3) The flanged 3 inch roof vent on the tank.
            a) Wetted materials shall be selected by the tank manufacturer or vendor for the chemical service.
            b) Provide all mounting hardware and supports.
         4) Manufacturers: One of the following or equal:
            a) Red Valve, Redflex expansion joints with 3 arches.
            b) Snyder, Flexmaster.

b. Proco, 445 BD.Backwash Waste Tank:
    1) For all connections unless noted otherwise including Inlet, Outlet/Drain, and Overflow.
    2) Not required for Level Sensor or Vent.
    3) Manufacturers: One of the following or equal:
        a) Polyprocessing, EPDM Expansion Joint, 316 SST hardware, PVC, and matched to connection type on tank nozzle.

2.06 ACCESSORIES

A. Finish coating:
1. Waterproof and ultraviolet light resistant.
2. Acrylic enamel or latex mastic.
3. 2 coats.
4. Minimum dry film thickness: 5 mil.
5. Color: Selected by Engineer.

B. Level gauge:
1. Provide each tank with:
    a. Level gauge shall be a magnetic flap type or "reverse float type" made of 2 inch polyvinyl chloride or PVDF stilling well tube.
    b. Float.
    c. Polypropylene rope.
    d. Clear polyvinyl chloride sight tube.
2. Materials: Suitable for the specified chemical service for the individual tanks.
3. Tank level staff gauge:
    a. Resistant to abrasion and corrosion.
    b. Mounted on the tank adjacent to the indicator.
    c. Calibrated in nominal 100 gallon increments.

C. Tank vents:
1. Each tank shall be properly vented for the type of material and flow rates expected.
2. Vents must comply with OSHA Part 1910 normal venting for atmospheric tanks or other accepted standard, or shall be as large as the filling or withdrawal connection, whichever is larger but in no case less than 2 inches nominal inside diameter with screening.

D. Leak Detection:
1. The leak detector unit shall consist of a proximity sensor, a welded 2 inch fpt connection, a 2 inch bung plug with a 3/4 in strain relief, and an indicator box. The sensor is placed in the interstitial space between the primary and secondary tanks approximately 1 inch above the tank bottom. The indicator box shall be Nema 4 rated and factory pre-wired for 110 VAC power. All connections shall be labeled to prevent errors in field installation. The indicator box will show a green light when power is on and the sensor is not detecting a liquid. The light is a push to test light allowing the operator to test for power outage or malfunction.

E. Internal fill/down pipes:
1. Internal down pipes shall be prepared per the customer approved drawings and specifications. All internal down pipes shall be supported at 5 foot

maximum intervals with a support structure welded to the inside of the primary tank. The support design may utilize a PVDF clamp. All internal down pipes shall be constructed of CPVC.

2.07 TANK FABRICATION

A. Rotationally molded construction in accordance with ASTM D1998.

B. Provide for each tank the following shop finishing:
   1. Shipping label identifying:
      a. Tank tag number.
      b. Chemical service.
   2. Coating:
      a. Coat each tank and appurtenances after installation as specified in Section 09960 - High-Performance Coatings.
      b. Color: Selected by the Engineer.
   3. Permanent labels:
      a. Identification label.
      b. NFPA label specifically coded for the tank contents in accordance with NFPA 30.
      c. Paint or affix label onto the tank wall to be clearly visible from outside the tank enclosure.

2.08 TESTING

A. Each tank shall be leak tested by the manufacturer prior to shipment by filling with clean water for a period of at least 4 hours with all fittings installed and blinded.
   1. There shall be no measurable drop in liquid surface.
   2. Any leaks shall be noted and repaired and the tank shall be re-tested for an additional 4 hours minimum.
      a. Reason for leak and method of repair shall be recorded and submitted to the Engineer.
   3. Any defects or leaks that have not been adequately repaired will be cause for rejection of the tank.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:
   1. Transportation, handling, storage of the tanks, and installation shall be in accordance with the manufacturer's printed instructions.
   2. Repair any damage to tank components or the insulation due to transportation or installation.
   3. Install piping to tank with sufficient flexibility to allow tank movement of 1 inch in any direction without damage to piping.

B. All tank fitting attachments shall be equipped with flexible couplers or other movement provisions provided by the tank customer.
   1. The tank will deflect based upon tank loading, chemical temperature and storage time duration.

2. Tank piping flexible couplers shall be designed to allow 4 percent design movement.
3. Movement shall be considered to occur both outward in tank radius and downward in fitting elevation from the neutral tank fitting placement.

3.02 FIELD QUALITY CONTROL

A. Manufacturer's field service:
   1. Inspect the installed tanks for proper installation.
   2. Instruct Owner's personnel on operations and maintenance of the tanks.

3.03 SCHEDULE

A. Tank Schedule as follows:

Tag Number		
Service	Sodium Hypochlorite at 12.5 percent solution	Backwash Waste
Chemical pH	3.5	7-9
Chemical Specific Gravity	1.33	1.0 – 1.05
Tank Design Specific Gravity	1.9	1.9
Number of Tanks	1	1
Usable Capacity, each	1,000 gallons	4,300 gallons
Type of Tank	Cross-linked polyethylene (XLPE) with medium density liner	Cross-linked polyethylene (XLPE)
General Design	Flat bottom, dished top, double wall	Flat bottom, dished top, single wall, integrally molded flanged outlet
Installation	Vertical	Vertical
Diameter (feet)	6 feet-5 inches	11 feet- 11 inches
Height (feet)	7 feet-1 inch	6 feet – 11 inches

B. Tank Fitting locations shall be as shown on the drawings.

END OF SECTION

SECTION 13447

ELECTRIC ACTUATORS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Electric motor-driven actuators for valves and gates.

1.02 REFERENCES

A. American Water Works Association (AWWA):
   1. C504 - Standard for Rubber-Seated Butterfly Valves.
   2. C542 - Standard for Electric Motor Actuators for Valves and Slide Gates.

B. FM Global (FM).

C. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1000 V Maximum).

1.03 DEFINITIONS

A. NEMA:
   1. Type 4X enclosure in accordance with NEMA 250.
   2. Type 6P enclosure in accordance with NEMA 250.
   3. Type 7 enclosure in accordance with NEMA 250.

1.04 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures and Section 15050 - Common Work Results for Mechanical Equipment.

B. Provide a complete list/schedule of all actuators being provided with their associated tag names as indicated on the design drawings and/or specifications, service process area and the size of the valve they are actuating.

C. Product data:
   1. Electrical ratings:
      a. Voltage and number of phases.
      b. Starting and running current.
      c. Voltage levels and source for control and status.
   2. Description of integral control interface.
   3. Remote control station components (If applicable).
   4. Environmental ratings, including NEMA enclosure rating and submergence capabilities.
   5. Gear ratios for both manual and motorized actuation.
   6. Opening and closing directions.
   7. Allowable starts per hour.
   8. List of all included options and accessories.

9. Full travel times.
10. Gearbox data including gear ratio, and gearbox efficiency.

D. Shop drawings:
   1. Wiring diagrams:
      a. Include all options and expansion cards furnished with each actuator.
   2. Dimensioned drawings of each valve and actuator combination.
   3. Dimensioned drawings of each valve gearbox.
   4. Electric motor data.

E. Calculations:
   1. Operating torque.
   2. Maximum torque calculations for seating and unseating.
   3. Maximum operating torque at starting and normal operation.
   4. Indicate factor of safety for all torque calculations.
   5. Signed by Professional Engineer registered in the State of California.

F. Provide draft vendor operation and maintenance manual as specified in Section 01782 - Operation and Maintenance Manuals:
   1. Include a list of all configurable parameters, and the final values for each.
   2. Include a troubleshooting chart covering the complete valve and controls/electrical power systems, showing description of trouble, probable cause, and suggested remedy.

G. Commissioning submittals:
   1. Provide Manufacturer's Certificate of Source Testing as specified in Section 01756 - Commissioning.
      a. Affidavit in accordance with AWWA C542.
   2. Provide Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 01756 - Commissioning.

H. Project closeout documents:
   1. Provide final vendor operation and maintenance manual as specified in Section 01782 - Operation and Maintenance Manuals.

1.05 WARRANTY

A. Provide warranty as specified in Section 01783 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers for lines 4 inch and larger:
   1. One of following or equal:
      a. Rotork Controls Inc. IQ3 Range:
         1) IQ for multi-turn applications.
         2) IQT for quarter-turn applications.
      b. Limitorque Corp.:
         1) Accutronix MX for multi-turn applications.
         2) Accutronix QX quarter-turn applications.

2.02 CHARACTERISTICS FOR ACTUATORS ON LINES 4 INCHES AND LARGER

A. Provide actuators complete and operable with all components and accessories required for operation.

B. Power supply:
   1. Voltage and phases as indicated in the Motorized Actuator Schedule.
   2. Valve or gate motion independent of power supply phase rotation.
   3. Provide an internal backup power source or mechanical indicator to maintain settings and track valve position when main power is off.
   4. The actuators shall incorporate all major components such as the motor, starter, local controls, terminals, etc. housed within a self-contained, sealed enclosure.

C. Size actuator to move gates or valves from full open to closed position within the time indicated in the Motorized Actuator Schedule:
   1. If an operating time is not indicated on the Motorized Actuator Schedule, size the actuator to move gates or valves at minimum 12 inches per minute under maximum load. Measure rate of closure for valves at maximum diameter of disc, plug, or ball.
   2. Size actuators so that gear boxes are not required where possible.

D. Control interface:
   1. Configuration:
      a. Provide a non-intrusive, non-contacting interface for configuring all input and output settings, control values, ranges, torque switch settings, valve positions switch settings, and options.
         1) Configurable from a handheld configuring tool or input devices on the actuator.
   2. Local interface, integral to actuator:
      a. Non-intrusive, non-contacting selector switches:
         1) LOCAL-STOP-REMOTE:
            a) Motor actuator operation is prevented with the switch in STOP.
         2) OPEN-CLOSE:
            a) Controls the valve when LOCAL-STOP-REMOTE is in LOCAL.
            b) Spring return to center.
            c) Configurable between maintained (actuator runs until end of travel, high torque, or a LOCAL-STOP-REMOTE is switched to STOP) and momentary (actuator stops when lever is released).
      b. Local display:
         1) Valve fully open and fully closed indicators.
         2) Numerical display showing actual valve or gate position in percent of travel.
   3. Remote control station - LCP:
      a. Provide remote control stations for all actuators located more than 5 feet above finished floor/grade or where indicated on the Drawings in the Schedule.
         1) NEMA rating to match those to the associated Actuator Schedule.
            a) Where the rating is not listed, use NEMA Type 4X enclosures for non-hazardous areas, and explosion-proof (XP) Class I Division 1 for hazardous areas.

b) All pilot devices shall 30 millimeters, and pilot lights shall be illuminated by LEDs.
2) LOCAL-STOP-REMOTE selector switch.
3) LOCAL mode control devices:
a) Operate valve when LOCAL-STOP-REMOTE integral to actuator is in REMOTE and LOCAL-STOP-REMOTE on remote control station is in LOCAL.
b) OPEN-STOP-CLOSE maintained switch or OPEN, STOP, and CLOSE pushbuttons where Maintained operation is indicated in the Actuator Schedule.
c) OPEN-CLOSE spring-return switch or OPEN and CLOSE pushbuttons where momentary operation is indicated in the Actuator Schedule.
4) Pilots lights to indicate valve position:
a) Fully open.
b) Fully closed.

4. Coatings:
a. Material requirements:
1) Factory prime and coat with an ISO 12944 classification coating of C5M (Marine, offshore estuaries with high salinity) coating with 15 year durability.
2) Touch-up damaged coatings with manufacturer provided coating repair kit.
b. Application requirements:
1) Painting shall commence within four hours of blast cleaning.
2) Each paint coat within the system is to be applied in accordance with the paint manufacturer's instructions.
3) Paint thickness shall be checked for each coat on each actuator.
c. Qualification requirements:
1) Operators shall be experienced and proficient in surface preparation and coating application techniques.
2) Personnel shall have relevant knowledge of health and safety hazard, use of protective equipment, coating materials, mixing and thinning coatings, coating pot life, surface requirements etc.
3) Personnel carrying out inspection or verification shall be certified as NACE coating inspector or equivalent such as ICorr.

5. Control inputs:
a. Capable of using discrete 120 VAC rated control inputs when using a remote control station (LCP) and discrete 24 VDC rated control inputs when there is no remote control station (LCP).
b. Controls the valve when LOCAL-STOP-REMOTE is in REMOTE.
c. Isolated inputs capable of operating from external control voltage source or internal power supply.
d. Provide the following inputs:
1) OPEN.
2) CLOSE.
3) STOP.
e. OPEN and CLOSE inputs configurable between maintained (actuator runs until end of travel, high torque, or a STOP input) and momentary (actuator stops when command is removed).

6. Status outputs:
    a. Monitor relay output: Dry contact, normally closed, opens when actuator is not in REMOTE or in the event of any internal fault or alarm condition.
    b. Dry contact outputs configured for the functions indicated on the Drawings. Provide the following outputs for all actuators:
        1) Fully closed.
        2) Fully open.
        3) LOCAL-STOP-REMOTE in REMOTE position.
    c. All output contacts rated for 5 amps, 120 VAC, and 24 VDC.
7. Analog input:
    a. Provide a 4-20 milliampere analog input for analog modulating valves when indicated on the Drawings.
    b. Modulate valve to maintain position based on analog input value.
    c. Maximum input impedance 250 ohms.
8. Analog output:
    a. Provide an isolated 4-20 milliampere analog output when indicated on the Drawings.
        1) Loop power sourced from the actuator power supply.
        2) Capable of driving into a load up to 500 ohms.
        3) Output proportional to process value(s) indicated on the Drawings.
        4) Valve or gate position.
        5) Operating torque.

E. Features:
1. Time delay on reversal: Incorporate time delay between stopping actuator and starting in opposite direction to limit excessive current, torque, and heating from instantaneous reversal.
2. Data logging:
    a. Store diagnostic data and reference data.
    b. Time-stamped historical operating data, including number of operations.
    c. Torque profiles showing actual torque at each valve position through the operating range:
        1) Store reference data (recorded during commissioning) and data from last operation.
3. Provide display of logged data on the actuator, or provisions to download to a personal computer.

F. Materials:
1. Construct motorized actuators of materials suitable for the environment in which actuator is to be installed.
    a. Enclosure ratings:
        1) As scheduled with the following requirements.
            a) All actuators will be double sealed for corrosion protection rated at ip68.
        2) NEMA 4X for all actuators located outside of Class 1 areas.
        3) All others shall be rated FM -Class I Groups B,C & D and Class II E, F, & G.

G. Motors:
1. Specifically designed for valve actuator service with high starting torque, totally enclosed non-ventilated construction.

2. Torque ratings equal to or greater than that required for valve seating and dynamic torques with a 25 percent factor of safety.
    a. Design requirements for rubber-seated AWWA butterfly valves:
        1) Design actuators for maximum gate or valve operating torque, in accordance with and using safety factors required in AWWA C504 and AWWA C542.
            a) Valve actuator torque requirement for open-close service: Not less than the required valve-seating and dynamic torques under design operating conditions in accordance with AWWA C504.
            b) Valve actuator torque requirement for modulating service: Not less than twice the required valve dynamic torque under design operating conditions in accordance with AWWA C504.
    b. Design requirements for slide gates, gate valves, knife gate valves, globe valves, and diaphragm valves:
        1) Design valves and actuators for maximum operating torque, in accordance with and using safety factors required in AWWA C542.
        2) Design for the maximum torque and thrust running load over the full cycle.
        3) Maximum torque or thrust rating: The actuator stall torque or maximum thrust output shall not exceed the torque or thrust capability of the valve or gate, as determined by the valve or gate manufacturer.
3. Capable of being removed and replaced without draining the actuator gear case.
4. Motor bearings shall be amply proportioned of the anti-friction type and permanently lubricated.
5. Rated for operating under the following conditions without exceeding temperature limits with ambient temperature of 40 degrees Celsius.
    a. Continuous operation for 15 minutes or twice the open-to-close operating time (whichever is greater) at normal operating torque or 33 percent of maximum torque (whichever is greater).
    b. 60 starts per hour for open/close service or 1,200 starts per hour for modulating service.
6. Provide the following motor protection features:
    a. Jammed valve (no valve motion detected through a time delay).
    b. High motor temperature (sensed by an embedded thermostats).
    c. High torque.
    d. Single phasing protection.

H. Enclosures:
1. Actuator housing ratings as indicated in the Motorized Actuator Schedule.
2. Stainless steel external fasteners.
3. Provide o-ring seals for each of the following areas:
    a. Between the terminal compartment and the internal electrical elements.
    b. Between the mechanical and electrical portions to protect from the ingress of oil, and to protect the mechanical components of oil from dust and moisture when the electrical terminal is open.
4. Provide actuators with the following minimum enclosure ratings as scheduled:
    a. NEMA Type 4X enclosure for general applications.

b. NEMA Type 6P rated for actuators in underground vaults or where possible submergence is indicated in the Drawings.
    1) Suitable for a minimum of 48 hours submerged under 3 meters of water.
c. NEMA Type 7 certified by FM for Class I, Division 1, Groups C, D, E, F, and G, for actuators installed in Class I, Division 1 and 2 areas.

I. Position sensing:
1. Electronic and adjustable using a solid-state encoder wheel.
    a. Mechanical limit switches and potentiometers are not acceptable.
2. Capable of retaining position and monitoring valve or gate motion when valve is manually actuated and when main power is not present.
3. Valve range and position switch outputs field adjustable.

J. Torque sensing:
1. Torque shutdown setting: 40 percent to 100 percent rated torque:
    a. Adjustable in 1 percent increments.
2. Torque display: 0 to 100 percent-rated torque.
3. Capable of interrupting control circuit during both opening and closing and when valve torque overload occurs.
4. Electrical or electronic torque sensing:
    a. Extrapolating torque from mechanically measured motor speed is not acceptable due to response time.
5. Independent of variations in frequency, voltage, or temperature.
6. The actuator shall store actual operational torque curves for retrieval by plant maintenance staff.
7. Provide a temporary inhibit of the torque sensing system during unseating or during starting in mid-travel against high inertia loads.
8. Provide visible verification of torque switch status without any housing disassembly.

K. Manual actuators:
1. Hand wheel for manual operation.
    a. Maximum 80-pound pull on rim when operating gate or valve under maximum load.
    b. Provide pull chain when motorized actuator is located more than 6 feet above floor surface.
        1) Chain shall be of sufficient length to reach approximately 4 feet above the operating level.
        2) Where the chain obstructs an aisle or walkway, provide holdback or other means to ensure chain does not create a nuisance or hazard to operating personnel.
2. Declutch lever: Padlockable, capable of mechanically disengaging motor and related gearing and freeing hand wheel for manual operation.

L. Gearing: Hardened alloy steel spur or helical gears and self-locking, alloy bronze worm gear set.
1. Accurately cut to ensure minimum backlash.

M. Bearings:
1. Anti-friction bearing with caged balls or rollers throughout.
2. Sealed-for-life type thrust bearings housed in a separate thrust base.

N. Drive bushing:
   1. Easily detachable for machining to suit the valve stem or gearbox input shaft.
   2. Positioned in a detachable base of the actuator.

O. Lubrication:
   1. Provide totally enclosed actuator gearing with oil or grease filled gear case suitable for operation at any angle.
   2. Actuators requiring special or exotic lubricants are not acceptable.

2.03 SPARE PARTS AND SPECIAL TOOLS

A. As specified in Section 01600 - Product Requirements.

B. Spare parts:
   1. Provide the following (minimum 10 percent of total number of actuators of each model type furnished, but not less than 1 for each model of actuator furnished):
      a. Stem nut.
      b. Worm shaft subassembly.
      c. Drive sleeve subassembly.
      d. Complete actuator seal kit.
      e. Actuator gearbox oil (sufficient quantity to fill 4 gearboxes).
      f. Encoder.
      g. Control module.
   2. Provide 1 spare motor for each size motor furnished.

C. Setting tool:
   1. If required for setting or configuring the actuator, provide a handheld setting tool. Provide a handheld setting tool capable of non-intrusive calibration and interrogation of the actuator.
      a. Furnish 1 setting tool for every 10 actuators.
      b. Capable of communicating with PC-based configuration software, and transferring the following in either direction between the computer and programmer and setting tool, and between the setting tool and actuator.
      c. Actuator configurations:
         1) Capable of storing up to 10 different configurations.
      d. Diagnostic data:
         1) Capable of storing 4 complete sets of diagnostic data.

PART 3 EXECUTION

3.01 GENERAL

A. As specified in Section 15050 - Common Work Results for Mechanical Equipment.

B. Position visual indicators so that they are most easily visible.

3.02 COMMISSIONING

A. As specified in Section 01756 - Commissioning, Section 15958 - Mechanical Equipment Testing, and this Section.

B. Manufacturer services:
   1. Provide certificates:
      a. Manufacturer's Certificate of Source Testing:
         1) Proof-of-Design and Performance Test Reports in accordance with AWWA C542.
      b. Manufacturer's Certificate of Installation and Functionality Compliance.
   2. Manufacturer's Representative on-site requirements:
      a. Installation: 2 trips, 2-day minimum each.
      b. Functional testing: 2 trips, 2-day minimum each.
   3. Training:
      a. Maintenance: 4 hours per session, 2 sessions.
      b. Operation: 2 hours per session, 2 sessions.

C. Source testing:
   1. Design and Performance Test Reports in accordance with AWWA C542.
   2. Test each actuator with a simulated load.
      a. Simulate a typical valve load.
   3. Electrical Instrumentation and Controls:
      a. Test witnessing: not witnessed.
      b. Conduct testing as specified in Section 17950 - Commissioning for Instrumentation and Controls.

D. Functional testing:
   1. Installed actuator:
      a. Test witnessing: Witnessed.
      b. Conduct Level 2 General Equipment Performance Tests.
      c. Conduct Level 2 Vibration Tests.
      d. Conduct Level 2 Noise Tests.
   2. Electrical Instrumentation and Controls:
      a. Test witnessing: Witnessed.
      b. Conduct testing as specified in Section 17950 - Commissioning for Instrumentation and Controls.

3.03 INTELLIGENT ACTUATOR SCHEDULE

A. Provide actuators indicated on the Drawings:
   1. Major process actuators are listed in the Valve Actuator Schedule indicated on the Drawings.
      a. The Schedule does not include all number and types of actuators required for the Project.

B. Abbreviations relating to type:
   1. BFV = Butterfly Valve.
   2. BV = Ball Valve.

C. Abbreviations relating to actuator type:
   1. O/C = Open and Close Service.
   2. MOD = Modulating Service.

D. Abbreviations relating to controls:
   1. A = Analog (4-20 mA) control, modulating duty.
   2. D = Discrete control, modulating duty.
   3. D-O/C = Discrete Open/Close.

END OF SECTION

SECTION 15050

COMMON WORK RESULTS FOR MECHANICAL EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Basic design and performance requirements for building mechanical equipment and process mechanical equipment.

1.02 REFERENCES

A. American Gear Manufacturer's Association (AGMA) Standards:
   1. 6001-E08 - Design and Selection of Components for Enclosed Gear Drives.

B. American Bearing Manufactures Association (ABMA) Standards:
   1. 9 - Load Ratings and Fatigue Life for Ball Bearings.
   2. 11 - Load Ratings and Fatigue Life for Roller Bearings.

C. American Petroleum Institute (API):
   1. 682 - Shaft Sealing Systems for Centrifugal and Rotary Pumps.

D. ASTM International (ASTM):
   1. A36 - Standard Specification for Carbon Structural Steel.
   2. A48 - Standard Specification for Gray Iron Castings.
   3. A125 - Standard Specification for Steel Springs, Helical, Heat-Treated.
   4. A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
   5. A194 - Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
   6. A320 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service.
   7. A536 - Standard Specification for Ductile Iron Castings.
   8. A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   9. B61 - Standard Specification for Steam or Valve Bronze Castings.
   10. B62 - Standard specification for Composition Bronze or Ounce Metal Castings.
   11. B505 - Standard Specification for Copper Alloy Continuous Castings.
   12. B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
   13. F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
   14. F594 - Standard Specification for Stainless Steel Nuts.

E. Hydraulic Institute (HI).

F. Occupational Safety and Health Administration (OSHA).

G. Unified Numbering System (UNS).

1.03 DEFINITIONS

A. Resonant frequency: That frequency at which a small driving force produces an ever-larger vibration if no dampening exists.

B. Rotational frequency: The revolutions per unit of time usually expressed as revolutions per minute.

C. Critical frequency: Same as resonant frequency for the rotating elements or the installed machine and base.

D. Peak vibration velocity: The root mean square average of the peak velocity of the vibrational movement times the square root of 2 in inches per second.

E. Rotational speed: Same as rotational frequency.

F. Maximum excitation frequency: The excitation frequency with the highest vibration velocity of several excitation frequencies that are a function of the design of a particular machine.

G. Critical speed: Same as critical frequency.

H. Free field noise level: Noise measured without any reflective surfaces (an idealized situation); sound pressure levels at 3 feet from the source unless specified otherwise.

I. Operating weight: The weight of unit plus weight of fluids or solids normally contained in unit during operation.

1.04 SUBMITTALS

A. As specified in Section 01600 - Product Requirements.

B. Product data:
   1. For each item of equipment:
      a. Design features.
      b. Load capacities.
      c. Efficiency ratings.
      d. Material designations by UNS alloy number or ASTM Specification and Grade.
      e. Data needed to verify compliance with the Specifications.
      f. Catalog data.
      g. Nameplate data.
      h. Clearly mark submittal information to show specific items, materials, and accessories or options being furnished.
   2. Gear reduction units:
      a. Engineering information in accordance with applicable AGMA standards.
      b. Gear mesh frequencies.

C. Shop drawings:
   1. Drawings for equipment:
      a. Drawings that include cut-away drawings, parts lists, material specification lists, and other information required to substantiate that proposed equipment complies with specified requirements.
   2. Outline drawings showing equipment, driver, driven equipment, pumps, seal, motor(s) or other specified drivers, variable frequency drive, shafting, U-joints, couplings, drive arrangement, gears, base plate or support dimensions, anchor bolt sizes and locations, bearings, and other furnished components.
   3. Installation instructions including leveling and alignment tolerances, grouting, lubrication requirements, and initial Installation Testing procedures.
   4. Wiring, control schematics, control logic diagrams and ladder logic or similar for computer-based controls.
   5. Recommended or normal operating parameters such as temperatures and pressures.
   6. Alarm and shutdown setpoints for all controls furnished.

D. Calculations:
   1. Structural:
      a. Substantiate equipment base plates, supports, bolts, anchor bolts, and other connections meet minimum design requirements specified and seismic design criteria as specified in Section 01612 - Seismic Design Criteria.
   2. Mechanical:
      a. ABMA 9 or ABMA 11 L10 life for bearings calculation methods for drivers, pumps, gears, shafts, motors, and other driveline components with bearings.
      b. Substantiate that operating rotational frequencies meet the requirements of this Section.
      c. Torsional analysis of power transmission systems: When torsional analysis specified in the equipment sections, provide:
         1) Sketch of system components identifying physical characteristics including mass, diameter, thickness, and stiffness.
         2) Results of analysis including first and second critical frequencies of system components and complete system.
      d. Calculations shall be signed and stamped by a licensed engineer.
   3. Drinking water:
      a. If applicable, conform to the requirements of Section 01600 - Product Requirements for materials in contact with drinking water.

E. Operation and maintenance manuals:
   1. As specified in Section 01782 - Operating and Maintenance Manuals.
   2. Equipment with bearings:
      a. Include manufacturer and model number of every bearing.
      b. Include calculated ball pass frequencies of the installed equipment for both the inner and outer raceways.

F. Commissioning submittals: As specified in Section 01756 - Commissioning.

G. Project closeout documents: As specified in Section 01770 - Closeout Procedures.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. General:
   1. Product requirements as specified in Section 01600 - Product Requirements.
   2. Project conditions as specified in Section 01610 - Project Design Criteria.
   3. Provisions specified under each technical equipment specification prevail over and supersede conflicting provisions specified in this Section.
   4. Equipment manufacturer's responsibility extends to selection and mounting of gear drive units, motors or other prime movers, accessories, and auxiliaries required for proper operation.
   5. Vibration considerations:
      a. Resonant frequency:
         1) For single-speed equipment, ensure there are no natural resonant frequencies within 25 percent above or below the operating rotational frequencies or multiples of the operating rotational frequencies that may be excited by the equipment design.
         2) For variable-speed equipment, ensure there are no natural resonant frequencies within 25 percent above or below the range of operating frequencies.
      b. Design, balance, and align equipment to meet the vibration criteria specified in Section 15958 - Mechanical Equipment Testing.
   6. Equipment units weighing 50 pounds or more: Provide with lifting lugs or eyes to allow removal with hoist or other lifting device.

B. Power transmission systems:
   1. V-belts, sheaves, shaft couplings, chains, sprockets, mechanical variable-speed drives, variable frequency drives, gear reducers, open and enclosed gearing, clutches, brakes, intermediate shafting, intermediate bearings, and U-joints are to be rated for 24 hour-a-day continuous service or frequent stops-and-starts intermittent service, whichever is most severe, and sized with a service factor of 1.5 or greater in accordance with manufacturer recommendations:
      a. Apply service factor to nameplate horsepower and torque of prime source of power and not to actual equipment loading.
      b. Apply service factors in accordance with AGMA 6001-E08, other applicable AGMA standards, or other applicable referenced standards.

C. Equipment mounting and anchoring:
   1. Mount equipment on cast-iron or welded-steel bases with structural steel support frames.
      a. Utilize continuous welds to seal seams and contact edges between steel members.
      b. Grind welds smooth.
   2. Provide bases and supports with machined support pads, dowels for alignment of mating of adjacent items, adequate openings to facilitate grouting, and openings for electrical conduits.
   3. Provide jacking screws in bases and supports for equipment weighing over 1,000 pounds.
   4. Design equipment anchorage, supports, and connections for dead load, running loads, loads during start-up, seismic load specified in Section 01612 -

Seismic Design Criteria, and other loads as required for proper operation of equipment.

a. For equipment with an operating weight of 400 pounds or greater and all equipment that is supported higher than 4 feet above the floor, provide calculations for:
    1) The operating weight and location of the centroid of mass for the equipment.
    2) Forces and overturning moments.
    3) Shear and tension forces in equipment anchorages, supports, and connections.
    4) The design of equipment anchorage, supports, and connections based on calculated shear and tension forces.

5. Anchorage of equipment to concrete or masonry:
    a. Perform calculations and determine number, size, type, strength, and location of anchor bolts or other connections.
    b. Unless otherwise indicated on the Drawings, select and provide anchors from the types specified in Section 05190 - Mechanical Anchoring and Fastening to Concrete and Masonry.
    c. Provide bolt sleeves around cast-in anchor bolts for 400 pounds or greater equipment.
        1) Adjust bolts to final location and secure the sleeve.
6. Anchorage of equipment to metal supports:
    a. Perform calculations and determine number, size, type, strength, and location of bolts used to connect equipment to metal supports.
7. Unless otherwise indicated on the Drawings, install equipment supported on concrete over non-shrink grout pads as specified in this Section.

2.02 MATERIALS

A. Materials as specified in Section 01600 - Product Requirements including special requirements for materials in contact with drinking water.

B. Ferrous materials:
1. Steel for members used in fabrication of assemblies: ASTM A36.
2. Iron castings: ASTM A48, tough, close-grained gray iron, free from blowholes, flaws, and other imperfections.
3. Ductile iron castings: ASTM A536, Grade 65-45-12, free from flaws and imperfections.
4. Galvanized steel sheet: ASTM A653, minimum 0.0635-inch (16-gauge).
5. Expanded metal: ASTM A36, 13-gauge, 1/2-inch flat pattern expanded metal.
6. Stainless steel:
    a. As specified in Section 05120 - Structural Steel.
    b. In contact or within 36 inches of water: Type 316 or 316L.
    c. In sea air environment: Type 316 or 316L.
    d. Other locations: Type 304 or 304L.
    e. Source cleaning and passivation as specified in Section 05120 - Structural Steel.

C. Non-ferrous materials:
1. Bronze in contact with wastewater: Composition of not more than 2 percent aluminum nor more than 6 percent zinc; UNS Alloy C83600, C92200, or

C93700 in accordance with ASTM B61, B62, B505, or B584, when not specified otherwise.
2. Aluminum: As specified in Section 05140 - Structural Aluminum.

D. Dielectric materials for separation of dissimilar metals:
1. Neoprene, bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other materials as specified.

E. Non-shrink grout and epoxy non-shrink grout: As specified in Section 03600 - Grouting.

2.03 ANCHORS AND FASTENERS

A. Mechanical anchoring to concrete and masonry:
1. As specified in Section 05190 - Mechanical Anchoring and Fastening to Concrete and Masonry:
a. Type 316 stainless steel.
2. Design as specified in Section 01612 - Seismic Design Criteria.

B. High-strength fasteners:
1. As specified in Section 05120 - Structural Steel.

C. Flange bolts:
1. As specified in Section 15052 - Common Work Results for General Piping.

D. Mechanical assembly fasteners:
1. Stainless steel:
a. High-temperature service or high-pressure service:
1) Bolts: ASTM A193, Grade B8 (Type 304) or Grade B8M (Type 316), Class 1, heavy hex.
2) Nuts: ASTM A194, Grade 8, heavy hex.
3) Washers: Alloy group matching bolts and nuts.
b. Low-temperature service:
1) Bolts: ASTM A320, Grade B8 (Type 304) or Grade B8M (Type 316), Class 1, heavy hex.
2) Nuts: ASTM A194, Grade 8 (Type 304) or Grade B8M (Type 316), heavy hex.
3) Washers: Alloy group matching bolts and nuts.
c. General service:
1) Bolts: ASTM F593, Alloy Group 1 (Type 304) or Alloy Group 2 (Type 316).
2) Nuts: ASTM F594, Alloy Group 1 (Type 304) or Alloy Group 2 (Type 316).
3) Washers: Alloy group matching bolts and nuts.

2.04 SHAFT COUPLINGS

A. General:
1. Type and ratings: Provide non-lubricated type, designed for not less than 50,000 hours of operating life.
2. Sizes: Provide as recommended by manufacturer for specific application, considering horsepower, speed of rotation, and type of service.

B. Shaft couplings for close-coupled electric-motor-driven equipment:
   1. Use for:
      a. Equipment 1/2 horsepower or larger.
      b. Reversing equipment.
      c. Equipment subject to sudden torque reversals or shock loading:
      d. Examples:
         1) Reciprocating pumps, blowers, and compressors.
         2) Conveyor belts.
   2. Manufacturers: One of the following or equal:
      a. Lovejoy.
      b. T.B. Woods.
   3. Provide flexible couplings designed to accommodate angular misalignment, parallel misalignment, and end float.
   4. Manufacture flexible component of coupling from synthetic rubber or urethane.
   5. Provide service factor of 2.5 for electric motor drives and 3.5 for engine drives.
   6. Do not allow metal-to-metal contact between driver and driven equipment.

C. Shaft couplings for direct-connected electric-motor-driven equipment:
   1. Use for 1/2 horsepower or larger and subject to normal torque, non-reversing applications.
   2. Manufacturers: One of the following or equal:
      a. Rexnord.
      b. T.B. Woods.
   3. Provide flexible couplings designed to accommodate shock loading, vibration, and shaft misalignment or offset.
   4. Provide flexible connecting element of rubber and reinforcement fibers.
   5. Provide service factor of 2.0.
   6. Connect stub shafts through collars or round flanges, firmly keyed to their shafts with neoprene cylinders held to individual flanges by through pins.

D. Spacer couplings: Where cartridge-type mechanical seals or non-split seals are specified, provide a spacer-type coupling of sufficient length to remove the seal without disturbing the driver or driven equipment unless noted otherwise in the individual equipment specifications.

E. Specialized couplings: Where requirements of equipment dictate specialized features, supply coupling recommended for service by manufacturer:
   1. Includes any engine-driven equipment.

2.05 STUFFING BOX, SEAL CHAMBER, AND SHAFT SEALS

A. General:
   1. Unless otherwise noted in the equipment section, provide cartridge-type, double mechanical shaft seals for pumps.
   2. Provide a stuffing box large enough for a double mechanical seal.
   3. Where packing is specified, provide stuffing box large enough to receive a double mechanical seal.
   4. Provide seal or packing flush connections, (3/4-inch size unless another size is indicated on the Drawings).
   5. Provide and route leakage drain line to nearest equipment floor drain indicated on the Drawings.

6. For pumps with packing, design packing gland to allow adjustment and repacking without dismantling pump except to open up packing box.
7. Seal or packing flush requirements shall be in accordance with API Standard 682 requirements. Unless otherwise indicated, specified or required by the equipment and seal manufacturers, the following API flushing Plan arrangements shall be utilized as appropriate for the application:
    a. Single seal, clean water applications: Plan 11 (Discharge bypass to seal).
    b. Single seal, vertical pump applications: Plan 13 (Seal bypass to suction).
    c. Single seal, clean hot water (greater than 180 degrees Fahrenheit) applications: Plan 23 (Seal cooler and pumping ring).
    d. Single seal, solids, or contaminants containing water applications: Plan 32 (External seal water).
    e. Double seal applications: Plan 54 (External seal water).

B. Packing: When specified in the equipment section of the specifications, provide the following type of packing:
1. Wastewater, water, and sludge applications:
    a. Asbestos free.
    b. PTFE (Teflon™) free.
    c. Braided graphite.
    d. Manufacturers: One of the following or equal:
        1) Chesterton, 1400.
        2) John Crane, equivalent product.
2. Drinking water service:
    a. Asbestos free.
    b. Material: Braided PTFE (Teflon™).
    c. Manufacturers: One of the following or equal:
        1) Chesterton, 1725.
        2) John Crane, equivalent product.

C. Mechanical seals: Provide seal types specified in the equipment sections and as specified.
1. Provide seal types meeting the following requirements:
    a. Balanced hydraulically.
    b. Spring: Stationary, out of pumping fluid, Hastelloy C; Type Elgiloy or 17-7 PH stainless steel for split seals.
    c. O-ring: Viton™ 747.
    d. Gland: Type 316L stainless steel.
    e. Set screws: Type 316L stainless steel.
    f. Faces: Reaction bonded, silicon carbide.
    g. Seal designed to withstand 300 pounds per square inch gauge minimum differential pressures in either direction; no requirement for seal buffer pressure to be maintained when pump is not operational even though process suction head may be present in pump.
2. Cartridge-type single mechanical:
    a. Manufacturers: One of the following or equal:
        1) Chesterton, S10.
        2) John Crane, 5610 Series.
3. Cartridge-type double mechanical: Manufacturers:
    a. One of the following or equal:
        1) Chesterton, S20.
        2) John Crane, 5620 Series.

4. Split-face single mechanical: Manufacturers:
    a. One of the following or equal:
        1) Chesterton, 442.
        2) John Crane, 3740.
5. Cartridge-type flushless mechanical:
    a. Manufacturers: One of the following or equal:
        1) Chesterton, 156.
        2) John Crane, 5870.

2.06 GEAR REDUCTION UNITS

A. Type: Helical or herringbone, unless otherwise specified.

B. Design:
1. Made of alloys treated for hardness and for severe service.
2. AGMA Class II service:
    a. Use more severe service condition when such is recommended by unit's manufacturer.
3. Cast-iron housing with gears running in oil.
4. Anti-friction bearings.
5. Thermal horsepower rating based on maximum horsepower rating of prime mover, not actual load.
6. Manufactured in accordance with applicable AGMA standards.

C. Planetary gear units are not to be used.

2.07 BELT DRIVES

A. Sheaves:
1. Separately mounted on bushings by means of at least 3 pull-up bolts or cap tightening screws.
2. When 2 sheave sizes are specified, provide separate belts sized for each set of sheaves.
3. Statically balanced for all; dynamically balanced for sheaves that operate at a peripheral speed of more than 5,500 feet per minute.
4. Key bushings to drive shaft.

B. Belts: Anti-static type when explosion-proof equipment or environment is specified.
1. When spare belts are specified, furnish 1 spare belt for every different type and size of belt-driven unit:
    a. Where 2 or more belts are involved, furnish matched sets.
    b. Identify as to equipment, design, horsepower, speed, length, sheave size, and use.
    c. Package in boxes labeled with identification of contents.

C. Manufacturers: One of the following or equal:
1. Dodge, Dyna-V belts with matching Dyna-V sheaves and Taper-Lock bushings.
2. T.B. Woods, Ultra-V belts with matching Sure-Grip sheaves and Sure-Grip bushings.

2.08 BEARINGS

A. Type: Oil or grease lubricated, ball or roller antifriction type, of standard manufacture.

B. Oil-lubricated bearings: Provide either pressure lubricating system or separate oil reservoir splash-type system:
   1. Size oil-lubrication systems to safely absorb heat energy generated in bearings when equipment is operating under normal conditions and with the temperature 15 degrees Fahrenheit above the maximum design temperature as specified in Section 01610 - Project Design Criteria.
   2. Provide an external oil cooler when required to satisfy the specified operating conditions:
      a. Provide air-cooled system if a water-cooling source is not indicated on the Drawings.
      b. Equip oil cooler with a filler pipe and external level gauge.

C. Grease lubricated bearings, except those specified to be factory sealed: Fit with easily accessible grease supply, flush, drain, and relief fittings.
   1. Lubrication lines and fittings:
      a. Lines: Minimum 1/4-inch diameter stainless steel tubing.
      b. Multiple fitting assemblies: Mount fittings together in easily accessible location.
      c. Use standard hydraulic-type grease supply fittings:
         1) Manufacturers: One of the following or equal:
            a) Alemite.
            b) Zerk.

D. Ratings: Rated in accordance with ABMA 9 or ABMA 11 L10 life for bearings rating life of not less than 50,000 hours.

2.09 MOTORS

A. As specified in Section 16222 - Low Voltage Motors Up to 500 Horsepower.

2.10 GEAR MOTORS

A. Motors as specified in Section 16222 - Low Voltage Motors Up to 500 Horsepower.

B. Helical gearing for parallel shaft drives and worm gearing for right-angle drives.

C. Manufactures: One of the following or equal:
   1. Baldor Electric Company.
   2. Bodine Electric Company.

2.11 VENDOR CONTROL PANELS

A. As specified in Section 17710 - Control Systems: Panels, Enclosures and Panel Components.

2.12 EQUIPMENT SUPPORT FRAMES

A. Bolt holes shall not exceed bolt diameter by more than 25 percent, up to a limiting maximum diameter oversize of 1/4-inch.

2.13 PIPING AND VALVES

A. Piping as specified in Section 15052 - Common Work Results for General Piping.

B. Valves as specified in Section 15110 - Common Work Results for Valves.

2.14 SAFETY EQUIPMENT

A. Safety guards:
   1. Provide guards that protect personnel from rotating shafts or components within 7.5 feet of floors or operating platforms.
   2. Requirements:
      a. Allow visual inspection of moving parts without removal.
      b. Allow access to lubrication fittings.
      c. Prevent entrance of rain or dripping water for outdoor locations.
      d. Size belt and sheave guards to allow for installation of sheaves 15 percent larger and addition of 1 belt.
   3. Materials:
      a. Sheet metal: Carbon steel, 12-gauge minimum thickness, hot-dip galvanized after fabrication.
      b. Fasteners: Type 304 stainless steel.

B. Insulation:
   1. Insulate all surfaces with normal operating temperatures above 120 degrees Fahrenheit when surface is within 7.5 feet height from any operating floor or level.
   2. Insulation thickness such that temperature is below 120 degrees Fahrenheit.
   3. Insulation Type 3 and cover Type 5 as specified in Section 15082 - Piping Insulation.

C. Warning signs:
   1. Provide warning signs in accordance with OSHA requirements for equipment that starts automatically or remotely.
   2. Material, sign size, and text: As specified in Section 10400 - Signage.
   3. Mount warning signs with stainless steel fasteners at equipment.

2.15 SPRING VIBRATION ISOLATORS

A. Design requirements:
   1. Telescopic top and bottom housing with vertical stabilizers to resist lateral and vertical forces.
   2. Use steel coil springs.
   3. Design vibration isolators in accordance with seismic design criteria as specified in Section 01612 - Seismic Design Criteria.

B. Performance requirements: Minimum spring deflection of **[1][ ]**-inch under static load and capable of limiting transmissibility to **[10][15][ ]** percent maximum at design operating load.

C. Manufacturers: One of the following or equal:
   1. California Dynamics Corporation, Type RJSD.
   2. Mason Industries, equivalent product.

D. Materials:
   1. Fabricate isolators using welded-steel or shatterproof ductile iron in accordance with ASTM A536 Grade CS-45-12.
   2. Spring steel: ASTM A125.

2.16 NAMEPLATES

A. Fastened to equipment at factory in an accessible and visible location.

B. Stainless steel sheet engraved or stamped with text, holes drilled or punched for fasteners.

C. Fasteners: Number 4 or larger oval head stainless steel screws or drive pins.

D. Text:
   1. Manufacturer's name, equipment model number and serial number, motor horsepower when appropriate, and identification tag number.
   2. Indicate the following additional information as applicable:
      a. Maximum and normal rotating speed.
      b. Service class per applicable standards.
   3. Include for pumps:
      a. Rated total dynamic head in feet of fluid.
      b. Rated flow in gallons per minute.
      c. Impeller, gear, screw, diaphragm, or piston size.
   4. Include for gear reduction units:
      a. AGMA class of service.
      b. Service factor.
      c. Input and output speeds.

2.17 SHOP FINISHES

A. Provide appropriate factory coatings as specified in Section 09960 - High-Performance Coatings.
   1. Motors and gear reducers: Shop finish paint with manufacturer's standard coating, unless otherwise specified in the individual equipment specification.

2.18 SPECIAL TOOLS

A. Supply 1 set of special tools as specified in Section 01600 - Product Requirements.

2.19 SOURCE TESTING

A. Testing requirements unless specified otherwise in the individual equipment specifications:
   1. Mechanical equipment: Level 1 General Equipment Performance Test as specified in Section 15958 - Mechanical Equipment Testing.

2. Motors: As specified in Section 16222 - Low Voltage Motors Up to 500 Horsepower.
3. Vendor control panels: As specified in Section 17950 - Commissioning for Instrumentation and Controls.

2.20 SHIPPING

A. As specified in Section 01600 - Product Requirements.

B. Prior to shipment of equipment:
   1. Bearings (and similar items):
      a. Pack separately or provide other protection during transport.
      b. Greased and lubricated.
   2. Gear boxes:
      a. Oil filled or sprayed with rust preventive protective coating.
   3. Fasteners:
      a. Inspect for proper torques and tightness.

PART 3 EXECUTION

3.01 DELIVERY, HANDLING, STORAGE, AND PROTECTION

A. As specified in Section 01600 - Product Requirements.

B. Inspect fasteners for proper torques and tightness.

C. Storage:
   1. Bearings:
      a. Rotate units at least once per month or more often as recommended by the manufacturer to protect rotating elements and bearings.
   2. Gear boxes:
      a. Inspect to verify integrity of protection from rust.

D. Protection:
   1. Equipment Log shall include description of rotation performed as part of maintenance activities.

3.02 INSTALLATION

A. Field measurements:
   1. Prior to shop drawings preparation, take measurements and verify dimensions indicated on the Drawings.
   2. Ensure equipment and ancillary appurtenances fit within available space.

B. Sequencing and scheduling:
   1. Equipment anchoring: Obtain anchoring material and templates or setting drawings from equipment manufacturers in adequate time for anchors to be cast-in-place.
   2. Coordinate details of equipment with other related parts of the Work, including verification that structures, piping, wiring, and equipment components are compatible.

C. Metal work embedded in concrete:
   1. Accurately place and hold in correct position while concrete is being placed.
   2. Clean surface of metal in contact with concrete immediately before concrete is placed.

D. Concrete surfaces designated to receive non-shrink grout:
   1. Heavy sandblast concrete surface in contact with non-shrink grout.
   2. Clean concrete surfaces of sandblasting sand, grease, oil, dirt, and other foreign material that may reduce bond to non-shrink grout.
   3. Saturate concrete with water. Concrete shall be saturated surface damp at time non-shrink grout is placed.

E. Install equipment in accordance with manufacturer's installation instructions and recommendations.

F. Lubrication lines and fittings:
   1. Support and protect lines from source to point of use.
   2. Fittings:
      a. Bring fittings to outside of equipment in manner such that they are readily accessible from outside without necessity of removing covers, plates, housings, or guards.
      b. Mount fittings together wherever possible using factory-mounted multiple fitting assemblies securely mounted, parallel with equipment lines, and protected from damage.
      c. Fittings for underwater bearings: Bring fittings above water surface and mount on edge of structure above.

G. Alignment of drivers and equipment:
   1. Where drive motors or other drivers are connected to driven equipment by flexible coupling, disconnect coupling halves and align driver and equipment after complete unit has been leveled on its foundation.
   2. Comply with procedures of appropriate HI, AGMA Standards, alignment tolerances of equipment manufacturers and the following requirements to bring components into angular and parallel alignment:
      a. Maximum total coupling offset (not the per-plane offset): Not to exceed 0.5 mils per inch of coupling length for spacer couplings based on coupling length (not dial separation).
      b. Utilize jacking screws, wedges, or shims as recommended by the equipment manufacturer and as specified in the equipment sections.
   3. Use reverse-indicator arrangement dial-type or laser-type alignment indicators: Mount indicators on the driver/coupling flange and equipment/coupling flange. Alignment instrumentation accuracy shall be sufficient to read angular and radial misalignment at 10 percent or less of the manufacturer's recommended acceptable misalignment.
   4. Alignment and calculations shall include measurement and allowance for thermal growth, spacer coupling length, indicator separation, and axial spacing tolerances of the coupling.
   5. When alignment satisfies most stringent tolerance of system components, grout between base and foundation.
      a. Allow minimum 48 hours for grout to harden.

b. After grout hardens, remove jacking screws, tighten anchor bolts and other connections, and recheck alignment.
c. Correct alignment as required.

6. After functional testing is complete, dowel motor or drivers and driven equipment:
   a. Comply with manufacturer's instructions.

H. Grouting under equipment bases, baseplates, soleplates, and skids:
1. Unless otherwise indicated on the Drawings, grout with non-shrink grout as specified in Section 03600 - Grouting.
   a. Non-shrink epoxy grout required only when indicated on the Drawings.
2. Comply with equipment manufacturer's installation instructions for grouting spaces, and tolerances for level and vertical and horizontal alignment.
3. Install grout only after:
   a. Equipment is leveled and in proper alignment.
   b. Piping connections are complete and in alignment with no strain transmitted to equipment.
4. Do not use leveling nuts on equipment anchors for supporting and leveling equipment bases, baseplates, soleplates, and skids for grouting.
5. Use jack screws for supporting and leveling equipment bases, baseplates, soleplates, and skids for grouting following the procedure defined below:
   a. Drill and tap equipment base plates, sole plates, and skids for jack screws.
   b. Use suitable number and size of jack screws.
   c. End of jack screws shall bear on circular steel plates epoxy bonded to equipment foundation.
   d. Jack screw threads that will be in contact with grout: Wrap with multiple layers of tape or other material, acceptable to Engineer, to prevent grout from bonding to threads.
   e. Place and cure grout as specified in Section 03600 - Grouting.
   f. After grout is cured, remove jack screws and material used to prevent bonding to grout.
      1) Provide jack screws to Owner for future use.
   g. Tighten equipment anchors in accordance with equipment manufacturer requirements.
   h. Fill holes where jack screws have been removed with grout.
   i. Cure as specified in Section 03600 - Grouting.
6. For equipment bases, baseplates, soleplates, and skids where it is not practical to use jack screws, use steel wedges and shims.
   a. Wrap wedges and shims that contact grout with multiple layers of tape or other material, acceptable to Engineer, to prevent grout from bonding.
   b. Place and cure grout as specified in Section 03600 - Grouting.
   c. Remove wedges or shims.
   d. Tighten equipment anchors to in accordance with equipment manufacturer requirements.
   e. Fill voids where wedges and shims have been removed with grout.
   f. Cure as specified in Section 03600 - Grouting.

7. Preparation of equipment bases, baseplates, soleplates, and skids for grouting:
    a. Metal in contact with grout: Grit blast to white metal finish.
    b. Clean surfaces of equipment bases, baseplates, soleplates, and skids in contact with grout of dirt, dust, oil, grease, paint, and other material that will reduce bond.
8. Preparation of concrete equipment foundation for grouting:
    a. Rough concrete surfaces in contact with grout.
    b. Concrete contact surface shall be free of dirt, dust, laitance, particles, loose concrete, or other material or coatings that will reduce bond.
    c. Saturate concrete contact surface area with water for minimum of 24 hours prior to grouting.
    d. Remove standing water just prior to grout placement, using clean rags or oil-free compressed air.

9. Forms and header boxes:
    a. Build forms for grouting of material with adequate strength to withstand placement of grouts.
    b. Use forms that are rigid and liquid tight. Caulk cracks and joints with an elastomeric sealant.
    c. Line forms with polyethylene film for easy grout release. Forms carefully waxed with 2 coats of heavy-duty paste wax will also be acceptable.
10. Grout placement requirements:
    a. Minimum ambient and substrate temperature: 45 degrees Fahrenheit and rising:
        1) Conform to grout manufacturer's temperature requirements.
    b. Pour grout using header box.
    c. Keep level of grout in header box above bottom of equipment bases, baseplates, soleplates, and skids at all times to prevent air entrapment.
    d. Grout shall flow continuously from header box to other side of forms without trapping air or forming voids.
    e. Vibrate, rod, or chain grout to facilitate grout flow, consolidate grout, and remove entrapped air.
    f. After grout sets, remove forms and trim grout at 45-degree angle from bottom edge of equipment bases, baseplates, soleplates, and skids.
    g. Cure as specified in Section 03600 - Grouting.

F. Field welding:
1. Use welding procedures, welders, and welding operators qualified and certified in accordance with AWS D1.1.
2. Shielded arc welding.

G. Field finishes:
1. Protect motors.
2. Clean equipment.
3. Apply primer and coating systems as specified in Section 09960 - High-Performance Coatings requirements.

H. Special techniques:
1. Use applicable special tools and equipment, including precision machinist levels, dial indicators, and gauges as required in equipment installations.

I. Tolerances:
   1. Completed equipment installations: Comply with requirements for intended use and specified vibration and noise tolerances.

J. Warning signs:
   1. Mount securely with stainless fasteners at equipment that can be started automatically or from remote locations.

1.01 COMMISSIONING

A. As specified in Section 01756 - Commissioning.

B. Functional testing requirements unless specified otherwise in the individual equipment specifications:
   1. Mechanical equipment: Level 1 tests as specified in Section 15958 - Mechanical Equipment Testing.
   2. Motors: As specified in Sections 16222 - Low Voltage Motors Up to 500 Horsepower and 16950 - Field Electrical Acceptance Tests.
   3. Vendor control panels: As specified in Section 17950 - Commissioning for Instrumentation and Controls.

END OF SECTION

SECTION 15084

DUCTWORK INSULATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Internal acoustical insulation and external thermal insulation for metal air ductwork systems.

1.02 REFERENCES

A. ASTM International (ASTM):
   1. E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   2. G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. Sheet Metal and Air Conditioning Contractor's National Association (SMACNA).

C. California Code of Regulations (CCR):
   1. Title 24 - Building Standard Code.

1.03 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data: As specified in Section 15052 - Common Work Results for General Piping.

C. Certification of compliance with CCR Title 24 energy and approval by the California Energy Commission.

1.04 QUALITY ASSURANCE

A. Comply with SMACNA ducting construction standards and the specified requirement, whichever is more stringent.

B. Compliance with CCR Title 24.

PART 2 PRODUCTS

2.01 INTERNAL DUCTWORK INSULATION

A. Manufacturers: One of the following or equal:
   1. Owens Corning, QuietR flexible duct liner or Fiberglass rigid duct liner.
   2. Johns Manville, Linacoustic RC flexible duct liner.

B. Type: Flexible or board type duct liner with 1 coated surface meeting the following:
   1. Thickness: As required to achieve the following R-values:
      a. For ducting exterior to weather protected spaces provide 2 inches minimum thickness to meet an installed value of R8; comply with minimum R-value requirements in accordance with CCR Title 24; provide additional weatherproof exterior barrier covering.
      b. For interior ducting in ceiling plenums, attics or other unconditioned spaces provide 2 inches minimum thickness to meet an installed value of R-8; comply with minimum R-value requirements in accordance with CCR Title 24.
   2. Temperature range: 40 to 250 degrees Fahrenheit.
   3. Density: 1.5 pounds per cubic foot.
   4. Thermal conductivity: 0.25 Btu-inch per hour per square foot per degree Fahrenheit at 75 degrees Fahrenheit.
   5. Fire hazard classification in accordance with ASTM E84:
      a. Flame spread: 25.
      b. Smoke developed: 50.
   6. Service conditions: Velocities to 2,500 feet per minute.
   7. Acoustical performance: NRC of 0.55 minimum.
   8. Bacterial growth: None in accordance with ASTM G21.

C. Edge treatment: Provide leading edges with galvanized metal nosing; seal other edges with manufacturer's recommended edge treatment.

PART 3 EXECUTION

3.01 INTERNAL DUCTWORK INSULATION

A. Provide rigid insulation on rectangular ducts carrying conditioned air that pass through outdoor or unconditioned spaces, or as indicated on the Drawings.

B. Install with coated surface facing inside of duct; attach with adhesive to duct and provide fasteners spaced at not to exceed 12 inches transverse (perpendicular) to flow and 18 inches parallel (longitudinal) to flow; provide fasteners within 3 inches of transverse edges and 4 inches of longitudinal edges.

C. Follow manufacturer's published installation instructions.

D. Install metal nosing on leading edges and seal other exposed edges with manufacturer's edge treatment.

END OF SECTION

SECTION 15111

BALL VALVES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Ball valves.

B. As specified in Section 15110 - Common Work Results for Valves.

1.02 REFERENCES

A. American Society of Mechanical Engineers (ASME):
   1. B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
   2. B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through 24.

B. American Water Works Association (AWWA):
   1. C507 - Standard for Ball Valves 6 Inch Through 48 Inch.

C. ASTM International (ASTM):
   1. A48 - Standard Specification for Gray Iron Castings.
   2. A216 - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.
   3. A351 - Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.

1.03 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data: As specified in Section 15110 - Common Work Results for Valves:
   1. Metal body ball valves: 6 inches and larger only: Submit affidavit of compliance in accordance with AWWA C507.
   2. Operation and maintenance manual.

C. Commissioning submittals:
   1. Provide Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 01756 - Commissioning.

1.04 WARRANTY

A. Provide warranty as specified in Section 01783 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. General: Unless otherwise indicated on the Drawings use:
   1. Metal body ball valves on metallic pipelines.
   2. Plastic body ball valves on plastic pipelines.

B. Do not use metal body ball valves in sodium hypochlorite or sodium bisulfite systems.

2.02 METAL BODY BALL VALVES, LESS THAN 6-INCH SIZE

A. Manufacturers: One of the following, or equal:
   1. Conbraco Industries, Inc., Apollo Valves.
   2. Flow-Tek, Inc.
   3. Metso Automation/Jamesbury.
   4. NIBCO, Inc.

B. General:
   1. Type: Non-lubricated, full port and capable of sealing in either direction.
   2. End connections:
      a. Threaded or solder ends for sizes 3-inch and smaller.
      b. Class 150 flanged for sizes larger than 3 inches.
         1) Flanges: In accordance with ASME B16.1 standards.
   3. Stem packing: Manually adjustable while valve is under pressure.
   4. Shafts:
      a. Rigidly connected to the ball by a positive means.
         1) Design connection to transmit torque equivalent to at least 75 percent of the torsional strength of the shaft.
   5. Handles: Stainless steel latch lock handle with vinyl grip and stainless steel nut designed to open and close the valve under operating conditions.
   6. Temperature limits: Suitable for operation between minus 20 and 350 degrees Fahrenheit.

C. Materials:
   1. Valves in copper lines: Bronze body.
   2. Valves in steel and ductile iron piping: Ductile iron or cast steel body.
   3. Valves in stainless steel piping: Stainless steel body, material type to match piping material as specified in Section 15052 - Common Work Results for General Piping.
   4. Ball: Type 304 or 316 stainless steel, Type 316 in digester gas applications.
   5. Seats: PTFE.
   6. Stem seals: PTFE or Viton™.
   7. Bearings: Self-lubricated, corrosion resistant material that will not contaminate potable water.
   8. Valves for combustible fluid applications (digester gas, natural gas, fuel oil, etc.) must be of fire safe design.

2.03 PLASTIC BODY BALL VALVES

A. Manufacturers: One of the following or equal:
   1. Asahi America.

2. Chemtrol Division, NIBCO, Inc.
3. Georg Fischer Piping Systems.
4. Hayward Flow Control.
5. Plast-O-Matic Valves, Inc.

B. General:
1. Type: Non-lubricated and capable of sealing in either flow direction.
2. End connections: True union; solvent or heat welded to piping.
3. Operator handle: Lever.

C. Materials:
1. Body: Polyvinyl chloride (CPVC).
2. Ball: Polyvinyl chloride (CPVC). Vented type for sodium hypochlorite service.
3. Seats: PTFE (Teflon™).
4. O-rings: FKM (Viton™).

PART 3 EXECUTION

3.01 INSTALLATION

A. General: Install each type of valve in accordance with manufacturers' printed instructions.

B. Special techniques:
1. PVC ball valves for hypochlorite service:
a. Provide valve with factory drilled 0.125-inch hole in the upstream side of the ball.
b. Provide an engraved plastic tag permanently attached to the valve stem stating "One side of ball drilled for hypochlorite service".
2. Metal ball valves for hydrogen peroxide service:
a. Provide valve with factory drilled 0.125-inch hole in the upstream side of the ball.
b. Provide an engraved Type 316 stainless steel tag permanently attached to the valve stem stating "One side of ball drilled for hydrogen peroxide service".

3.02 COMMISSIONING

A. As specified in Section 01756 - Commissioning and this Section.

B. Manufacturer services:
1. Provide certificates:
a. Manufacturer's Certificate of Installation and Functionality Compliance.

C. Source testing:
    1. Sludge cake ball valve:
        a. Shell test: With valve in the open position, conduct hydrostatic test of the valve body at 1.5 times the maximum rated pressure for 7 minutes.
        b. Seat test: With valve in the closed position, conduct hydrostatic test of the valve seat seals at 1.1 times the maximum rated pressure for 7 minutes. Test each seat independently.

D. Functional testing:
    1. Valves:
        a. Test witnessing: Witnessed.
        b. Conduct pressure and leak test, as specified in Section 15956 - Piping Systems Testing.

END OF SECTION

SECTION 15112

BUTTERFLY VALVES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Butterfly valves:
   1. As specified in Section 15110 - Common Work Results for Valves.

1.02 REFERENCES

A. American Society of Mechanical Engineers (ASME):
   1. B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Classes 25, 125 and 250.
   2. B16.5 - Pipe Flanges and Flanged Fittings, NPS 1/2 through NPS 24.

B. American Water Works Association (AWWA):
   1. C110 - Standard for Ductile-Iron and Gray-Iron Fittings.
   2. C504 - Rubber-Seated Butterfly Valves.
   3. C540 - Standard for Power-Actuating Devices for Valves and Sluice Gates.
   4. C550 - Protective Interior Coatings for Valves & Hydrants.
   5. C606 - Standard for Grooved and Shouldered Joints.

C. ASTM International (ASTM):
   1. A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
   2. A216 - Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for Higher-Temperature Service.
   3. A276 - Standard Specification for Stainless Steel Bars and Shapes.
   4. A351 - Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.
   5. A395 - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
   6. A479 - Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels.
   7. A515 - Standard Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate - and Higher-Temperature Service.
   8. A516 - Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate - and Lower-Temperature Service.
   9. A536 - Standard Specification for Ductile Iron Castings.
   10. A564 - Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes.
   11. B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
   12. D429 - Standard Test Methods for Rubber Property-Adhesion to Rigid Substrate.

D. Compressed Gas Association (CGA):
   1. Standard G-4.1 - Cleaning Equipment for Oxygen Service.

E. NSF International (NSF):
   1. Standard 61 - Drinking Water System Components - Health Effects.

F. United States Code of Federal Regulations (CFR):
   1. 21 - Food and Drugs.

1.03 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data: As specified in Section 15110 - Common Work Results for Valves
   1. For general purpose AWWA butterfly valves, include description of the method of attachment of the disc edge to the valve disc.
   2. Interior epoxy coatings: Affidavit of compliance attesting that epoxy coatings applied to interior surfaces of butterfly valves comply with all provisions in accordance with AWWA C550.
   3. Certification, for valves and coatings in contact with potable water, that the products used are suitable for contact with drinking water in accordance with NSF Standard 61.

C. Commissioning submittals:
   1. Provide Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 01756 - Commissioning.

1.04 WARRANTY

A. Provide warranty as specified in Section 01783 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Design requirements:
   1. General purpose AWWA butterfly valves:
      a. Design standard: Provide valves designed and manufactured in accordance with AWWA C504.
      b. Class:
         1) Provide butterfly valves in accordance with AWWA Class 150B, unless otherwise specified.
         2) Provide butterfly valves in accordance with AWWA Class 250B in piping systems with test pressure greater than 150 pounds per square inch and less than 250 pounds per square inch.
   2. High pressure butterfly valves:
      a. Piping systems designed for operating pressures greater than 250 pounds per square inch and less than 450 pounds per square inch: Provide ASME B16.5, Class 300 high pressure valves.

3. Industrial class butterfly valves:
    a. Industrial class butterfly valves capable of 150 pounds per square inch leak tight shut off.
4. Stainless steel butterfly valves:
    a. Stainless steel butterfly valves capable of a minimum of 100 pounds per square inch leak tight shut off and with special cleaning, packaging, and handling.

B. Usage:
1. Provide and install butterfly valve types as outlined in the Butterfly Valve Application Schedule at the end of this Section.

C. Design requirements for all butterfly valves with power actuating devices:
1. Design valves and actuators for maximum operating torque, in accordance with and using safety factors required in AWWA C540, using the following values:
    a. Maximum water velocity: 16 feet per second with valve fully open.
    b. Maximum pressure differential across the closed valve equal to the pressure class designation.
    c. Coefficient for seating and unseating torque, dynamic torque, and bearing friction in accordance with valve manufacturer's published recommendations.
2. Valve disc: Seat in an angular position of 90 degrees to the pipe axis and rotate an angle of 90 degrees between fully open and fully closed positions:
    a. Do not supply valves with stops or lugs cast with or mechanically secured to the body of the valve for limiting the disc travel.
3. Unacceptable thrust bearings: Do not provide valves with thrust bearings exposed to the fluid in the line and consisting of a metal bearing surface in rubbing contact with an opposing metal bearing surface.

D. Performance requirements:
1. Tight shutoff at the pressure rating of the valve with pressure applied in either direction.
2. Suitable for the following service conditions:
    a. Throttling.
    b. Frequent operation.
    c. Operation after long periods of inactivity.
    d. Installation in any position and flow in either direction.

2.02 GENERAL PURPOSE AWWA BUTTERFLY VALVES

A. Manufacturers: One of the following or equal:
1. DeZURIK/Sartell Model BAW.
2. Henry Pratt Co.

B. Valve body:
1. Material: Cast iron, ASTM A126, Grade B, or ductile iron, ASTM A536, Grade 65-45-12.

2. Body design:
    a. Flanged body valves:
        1) Usage: Comply with limitations specified in the Butterfly Valve Application Schedule.
        2) Flanges: In accordance with ASME B16.1 Class 125 flanges for Class 150B valves, in accordance with ASME B16.1 Class 250 flanges for Class 250B valves.

C. Disc:
1. Material: Cast iron or ductile iron with Type 316 stainless steel edge that matches seat in valve body.
2. Secure valve disc to shaft by means of smooth-sided, taper or dowel pins, Type 316 stainless steel, or Monel.
3. Extend pins through shaft and mechanically secure in place.

D. Shaft and bearings:
1. Shaft design:
    a. Valves 20-inches and less: 1-piece, through disc design.
    b. Valves greater than 20-inch size: 2-piece, stub shaft design.
2. Shaft seal: Vee type, chevron design.
3. Shaft material for Class 150B valves: Type 316 stainless steel, ASTM A276.
4. Shaft material for Class 250B valves: Type 17-4 pH stainless steel, ASTM A564.
5. Shaft bearings: Self-lubricating sleeve type:
    a. Valves 20 inches and less: Nylatron.
    b. Valves greater than 20-inch size: Teflon™ with stainless steel or fiberglass backing.

E. Seats:
1. Seat materials:
    a. In low-pressure air applications: EPDM.
    b. In all other applications: EPDM.
2. For valves 20 inches in nominal size and smaller, bond or vulcanize seat into the valve body.
3. For valves 24 inches in nominal size and larger, retain seats mechanically or by adhesive:
    a. Mechanical retainage: Retain seat by a clamping ring with segmented clamping ring locks with adjusting locking screws.
        1) Clamping ring, ring locks, and adjusting locking screws: Type 316 stainless steel.
        2) Provide means to prevent ring locks and screws used to retain seats from loosening due to vibration or cavitation.
    b. Adhesive retainage: Inset the seat within a groove in the valve body and retain in place with epoxy injected behind the seat so that the seat expands into the body.
    c. Do not provide valves with seats retained by snap rings or spring-loaded retainer rings.
4. Resilient seat: Withstand 75 pound per inch pull when tested in accordance with ASTM D429, Method B.

F. Valve packing:
   1. Valves 4 inches to 48 inches nominal size: Self-adjusting V-type packing or chevron-type packing. NBR or EPDM to match seat material.
   2. Valves 54 inches nominal size and larger: Adjustable V-type packing with bronze packing gland or self-adjusting V-type packing. NBR or EPDM to match seat material.

2.03 BUTTERFLY VALVE ACTUATORS

A. Motorized actuators are specified in Section 13447.

2.04 COATING

A. Shop coat interior and exterior metal surfaces of valves, except as follows:
   1. Interior machined surfaces.
   2. Surfaces of gaskets and elastomeric seats and stem seals.
   3. Bearing surfaces.
   4. Stainless steel surfaces and components.

B. Coating material for potable water applications:
   1. Formulate interior coating material from materials in accordance with CFR 21, AWWA C550, and NSF 61.
   2. Submit affidavit of compliance attesting that epoxy coatings applied to interior surfaces of butterfly valves in accordance with CFR 21, AWWA C550, and NSF 61.

C. Interior surfaces:
   1. Interior surfaces, except for valves used in low-pressure air service: High solids epoxy.
   2. Interior surfaces of valves used in low-pressure air service: High temperature coating for range of 150 to 350 degrees Fahrenheit.

D. Exterior surfaces:
   1. Exterior surfaces of valves, actuators, and accessories coating in accordance with Section 09960 - High-Performance Coatings with the following coating types:
      a. Submerged valves: High solids epoxy.
      b. Buried valves: Coal tar epoxy.
      c. Other valves: High solids epoxy with polyurethane topcoat.
   2. Polished and machined surfaces: Apply rust-preventive compound.
      a. Manufacturers: One of the following or equal:
         1) Houghton, Rust Veto 344.
         2) Rust-Oleum, R-9.

E. Coating materials:
   1. High solids epoxy and coal tar epoxy:
      a. Products: As specified in Section 09960 - High-Performance Coatings:
         1) Coating product in contact with potable water must be in accordance with AWWA C550 and NSF 61.

2. High temperature coating: As specified in Section 09960 - High-Performance Coatings and in accordance with AWWA C550.
3. Rust-preventive compound:
    a. Manufacturers: One of the following or equal:
        1) Houghton, Rust Veto 344.
        2) Rust-Oleum, R-9.

F. Field applied coatings of valve exterior:
1. Match color and be compatible with manufacturer's coating system and as specified in Section 09960 - High-Performance Coatings.
    a. When shop applied finish coating matches field applied coating on adjacent piping, touch up shop coating in damaged areas in accordance with instructions recommended by the paint manufacturer.
    b. When shop applied coating does not match field coating on adjacent piping, or when damage has occurred to the shop applied coating that requires more than touchup, blast clean valve surfaces or utilize other surface preparation recommended by the manufacturer of the coating material and apply the coating system used for coating adjacent piping.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install valves with valve shafts horizontal, unless a vertical shaft is required to suit a particular installation, and unless a vertical shaft is indicated on the Drawings.

B. Install pipe spools or valve spacers in locations where butterfly valve disc travel may be impaired by adjacent pipe lining, pipe fittings, valves, or other equipment.

3.02 BUTTERFLY VALVE APPLICATION SCHEDULE

A. Acceptable butterfly valve types and body styles are listed in the Butterfly Valve Application Schedule. Furnish and install butterfly valves in accordance with this Schedule.

BUTTERFLY VALVE APPLICATION SCHEDULE	
Valve Type and Style	**Acceptable Applications**
General Purpose AWWA Butterfly Valves - Flanged Body Design.	Aboveground or submerged in the following service applications only: - Acceptable in all service applications except oxygen and ozone service and high-pressure service. - May be used in buried applications when required by the specified piping system.

3.03 COMMISSIONING

A. As specified in Section 01756 - Commissioning and this Section.

B. Manufacturer services:
1. Provide certificates:
    a. Manufacturer's Certificate of Installation and Functionality Compliance.

C. Functional testing:
   1. Valves:
      a. Test witnessing: Witnessed.
      b. Conduct pressure and leak test, as specified in Section 15110 - Common Work Results for Valves.

B. Manufacturer services from each supplier for all motor operated butterfly valve assemblies supplied:
   1. As specified in Section 15110 - Common Work Results for Valves.
   2. On site services.

Manufacturer Rep Onsite					
Training Requirements		**Installation Testing**		**Functional Testing**	
Maintenance (hours per session)	**Operation (hours per session)**	**Trips**	**Days (each trip)**	**Trips**	**Days (each trip)**
0.5	0.5	1	1	1	1

END OF SECTION

SECTION 15211

DUCTILE IRON PIPE: AWWA C151

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Ductile iron pipe, joints, connections, fittings, and pipe linings and coatings.

B. As specified in Section 15052 - Common Work Results for General Piping.

1.02 REFERENCES

A. American Society of Mechanical Engineers (ASME):
   1. B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

B. American Water Works Association (AWWA):
   1. C104 – Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
   2. C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
   3. C110 - Standard for Ductile-Iron and Gray-Iron Fittings.
   4. C111 - Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   5. C115 - Flanged Ductile Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
   6. C150 - Standard for Thickness Design of Ductile-Iron Pipe.
   7. C151 - Standard for Ductile-Iron Pipe, Centrifugally Cast.
   8. C153 - Standard for Ductile-Iron Compact Fittings for Water Service.
   9. C600 - Installation of Ductile Iron Water Mains and Their Appurtenances.
   10. C606 - Standard for Grooved and Shouldered Joints.

C. American Welding Society (AWS):
   1. D11.2 - Guide for Welding Iron Castings.

D. ASTM International (ASTM):
   1. A536 - Standard Specifications for Ductile Iron Castings.
   2. C283 - Standard Test Methods for Resistance of Porcelain Enameled Utensils to Boiling Acid.
   3. D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.

E. Ductile Iron Pipe Research Association (DIPRA):
   1. Thrust Restraint Design Manual.

F. NACE International (NACE):
   1. SP0188 - Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates.

G. National Association of Pipe Fabricators, Inc. (NAPF):
   1. 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings in Exposed Locations Receiving Special External Coatings and/or Special Internal Linings.

H. NSF International (NSF):
   1. 61 – Drinking Water System Components - Health Effects.

I. Society for Protective Coatings (SSPC):
   1. PA-2 - Measurement of Dry Coating Thickness With Magnetic Gages.

1.03 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data.

C. Manufacturer's qualifications.
   1. Manufacturer qualifications and list of projects using the specified material: 5 years minimum.

D. Manufacturer's Quality Assurance Manual:
   1. Submit manufacturer's coating and lining application quality assurance manual to Engineer prior to beginning coating application.
      a. Strict conformance to the requirements of the manual will be required.
      b. Deviation from the requirements of the manual will be grounds for the Engineer to reject the applied coating.

E. Shop drawings:
   1. Detailed layout drawings showing alignment of pipes, location of valves, fittings, and appurtenances, types of joints, and connections to pipelines or structures.
   2. Thrust restraint systems.
   3. Photographs, drawings, and descriptions of fittings, gaskets, couplings, grooving of pipe and fittings.

F. Calculations:
   1. Calculations for thrust restraint system design.

G. Manufacturer's Certificate of Source Testing for ceramic epoxy and glass lined materials:
   1. Certify successful performance of holiday detection tests on 100 percent of lining in accordance with ASTM B1000.
   2. Identify each test piece by mark designation and show the actual test results during the final inspection by manufacturer prior to shipment.
   3. Include Coating Manufacturer’s Technical Representative’s reports.

1.04 QUALITY ASSURANCE

A. Pre-installation meeting:
   1. Arrange for Coating Manufacturer’s Technical Representative to attend preconstruction conferences, and to make periodic visits to factory or shop to inspect surface preparation of pipe, fittings, and accessories; and to inspect

application of linings to interior and coatings to exterior of pipe, fittings, and accessories.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Block piping and associated fittings for shipment to prevent damage to coatings and linings.

B. Carefully handle piping and associated fittings during loading, unloading, and installation:
   1. Do not drop piping material from cars or trucks.
   2. Lower piping by mechanical means.
   3. Do not drop or pound pipe to fit grade.

C. Handle pipe from the outside if lined with ceramic epoxy, or glass.
   1. No forks, chains, straps, hooks, or other lifting device shall be placed inside the pipe or fittings for lifting, positioning, or laying.

D. Protect gaskets and polyethylene encasement from long-term exposure to sunlight.

E. Store piping, fittings, and other accessories such that they do not accumulate and hold rainwater, dirt, and debris.

PART 2 PRODUCTS

2.01 MANUFACTURED UNITS

A. Ductile iron piping:
   1. Manufacturers: One of the following or equal:
      a. American Cast Iron Pipe Co.
      b. McWane Ductile.
      c. SIP Industries.
      d. U.S. Pipe.

2.02 THRUST RESTRAINT SYSTEM DESIGN

A. Determine the length of pipe that must be restrained on each side of the focus of a thrust load in accordance with the procedures and criteria established by the DIPRA Thrust Restraint Design Manual, City of Roseville standards, and the following additional criteria:
   1. Design pressure: Test pressure.
   2. Laying condition: Type 5 in accordance with AWWA C150.
   3. Soil type: Silt 1 as defined by DIPRA.
   4. Unit friction resistance for polyethylene encasement of pipe: DIPRA factor multiplied by a safety factor of 1.5.

2.03 CONCRETE THRUST BLOCK RESTRAINT

A. Joint thrust restraint system designed by Contractor.
   1. Concrete thrust blocks will not be permitted for DIP restraint.

2.04 DUCTILE IRON JOINTS AND CONNECTIONS

A. General:
   1. Pressure class or special thickness class as indicated on the Drawings.
   2. In accordance with AWWA C150 and AWWA C151.
   3. Joints:
      a. Flanged.
      b. Grooved.
      c. Mechanical.
      d. Push-on Rubber Gasket.
      e. Integrally Restrained Push-On.
   4. Fittings.

B. Joints:
   1. Flanged joints:
      a. Screw-on flanges:
         1) Comply with the diameter, thickness, drilling, and other characteristics in accordance with ASME B16.1.
         2) Ductile iron.
         3) Long hub, threaded, and specially designed for ductile iron pipe.
         4) After attaching to pipe, machine flange face to make pipe end and flange even and perpendicular to the axis of the pipe.
      b. Bolt holes on flanges: 2-holed and aligned at both ends of pipe.
      c. Cap screw or stud bolt holes: Tapped.
      d. Bolts and nuts:
         1) As specified in Section 15052 - Common Work Results for General Piping.
      e. Gaskets:
         1) Standard styrene butadiene copolymer (SBR) unless specified otherwise in Section 15052 - Common Work Results for General Piping.
   2. Grooved joints:
      a. In accordance with AWWA C606, as complemented and modified below, radius-cut type.
      b. Couplings:
         1) Rigid type, cast from ductile iron in accordance with ASTM A536, Grade 65-45-12.
      c. Bolts and nuts:
         1) In accordance with ASTM A 183, Grade 2.
      d. Gaskets:
         1) Capable of being applied on surface of piping with cavities to provide for an improved seal with the internal piping pressure. Material to be used for following services:
            a) For liquid service: NBR.
            b) For air service: Fluoroelastomer.
            c) For hot water service: EPDM.
      e. Fittings:
         1) In accordance with AWWA C606, rigid radius-cut groove.
         2) Center-to-center dimensions: In accordance with AWWA C110.
         3) Wall thickness and other characteristics: In accordance with AWWA C606.

f. Flanged unit connections:
    1) Flanged to grooved joint adapters or a long enough spool with one end flanged and the other end grooved to prevent interference with the operation of adjacent valves, pumps, or other items.

3. Mechanical joints:
    a. In accordance with AWWA C111.
    b. Gaskets:
        1) As specified in Section 15052 - Common Work Results for General Piping.
    c. Bolts and nuts, including T-bolts:
        1) As specified in Section 15052 - Common Work Results for General Piping.
4. Push-on rubber gasket joints:
    a. In accordance with AWWA C111.
    b. Gaskets:
        1) As specified in Section 15052 - Common Work Results for General Piping.
5. Integrally restrained push-on joints:
    a. Application:
        1) Where designation restrained push-on is specified in the Piping Schedule provided in the Drawings, supply a restrained push-on joint piping system, which includes restrained push-on joints where necessary based upon thrust calculations.
        2) Standard push-on rubber gasket joints as specified above can be used where thrust calculations demonstrate restraint is not required.
    b. Design:
        1) Restrained push-on joints of the configuration which utilizes a gripping or friction force for restraint will not be acceptable.
        2) Suitable for the following working pressures:
            a) For 4- through 24-inch pipe: 350 pounds per square inch gauge.
            b) For 30- through 54-inch pipe: 250 pounds per square inch gauge.
    c. Gaskets:
        1) As specified in Section 15052 - Common Work Results for General Piping.
    d. Manufacturers: One of the following or equal:
        1) U.S. Pipe, TR Flex.
        2) McWane Ductile, TR Flex.
        3) American Cast Iron Pipe Co., Flex Ring or Lok-Ring.
    e. Limit buried joints to half the manufacturer's published allowable angular joint deflection for purposes of pipeline alignment and elimination of fittings.

C. Connections:
    1. Tapping saddle as specified in Owner standard specification.
        a. If Owner does not have a standard specification, provide tapping saddles as specified in Section - Piping Specialties.
    2. Tapping sleeve as specified in Owner standard specification.
        a. If Owner does not have a standard specification, provide tapping sleeves as specified in Section - Piping Specialties.
    3. Welded outlet.

D. Fittings:
   1. Ductile iron in accordance with AWWA C110 or AWWA C153.
   2. Joint type:
      a. Same as that of the associated piping as specified in Section 15052 - Common Work Results for General Piping.
   3. Plain end-to-flanged joint connectors using setscrews are not acceptable.

2.05 ASPHALT VARNISH

A. Coating:
   1. Factory apply.

B. Primer:
   1. Factory applied for field coating.

C. Compatible with materials as specified in Section 09960 - High-Performance Coatings.

2.06 CEMENT MORTAR

A. Line pipe with cement mortar in accordance with AWWA C104 and as specified in this Section.

B. Cement:
   1. Cement: In accordance with ASTM C150, Type II.

C. Water:
   1. In accordance with AWWA C104 and as specified in this Section.

D. Sand and aggregate:
   1. In accordance with AWWA C104.
   2. Provide silica sand or other aggregate that is not subject to leaching in accordance with ASTM C33.

E. Lining:
   1. Minimum lining thickness: Standard in accordance with AWWA C104.
   2. Apply cement mortar on clean bare metal surfaces.
   3. Extend to faces of flanges, ends of spigots, and shoulders of hubs.
   4. Line special pieces or fittings by mechanical, pneumatic, or hand placement.
      a. Extend to faces of flanges and ends of spigots.
      b. Less than 12 inches in width: Coat with epoxy bonding agent prior to applying cement mortar.
      c. Larger than 12 inches in width: Reinforced with 2-inch by 4-inch No. 13 gauge welded steel wire mesh prior to applying cement mortar.
   5. Provide plastic end caps of sufficient thickness and strength to resist shipping, handling, and storage stresses.

6. Repair damage to the cement mortar lining, including disbondment, or cracking caused by improper curing, shipping, handling, or installation in accordance with AWWA C104 and approved by the Engineer.
    a. Reinforce coating with 2 layers spirally-wound steel wire positioned approximately in center of mortar coating positioned approximately at the third points of mortar coating:
        1) No. 12 gage spaced at maximum 1-inch centers.
        2) No. 14 gage steel wire at maximum 1/2-inch centers.

2.07 CERAMIC EPOXY

A. Line pipe with ceramic epoxy.

B. Manufacturers: One of the following or equal:
    1. PROTECTO 401.
    2. SP-2000W.

C. Material:
    1. Amine cured Novolac epoxy containing at least 20 percent by volume of ceramic quartz pigment.

D. Application:
    1. The lining shall only be applied by a manufacturer-authorized representative with no less than 5 years of experience in applying the specified material.
    2. The application of the lining shall be performed in accordance with manufacturer's published specifications.
    3. Pipe and fittings shall be delivered to application facility with no interior lining.
    4. Interior of pipe shall be abrasive blasted in accordance with manufacturer instructions.
    5. Apply lining in accordance with manufacturer instructions.
    6. Minimum dry film thickness (DFT): 40 mills.

E. Coverage:
    1. Gasket and spigot ends on joints:
        a. Minimum coverage using joint compound: 6 mils.
        b. Maximum coverage using joint compound: 10 mils.
    2. Mechanical joints:
        a. Extend lining from spigot end to edge of gauging ring.
    3. Number of coats:
        a. In accordance with manufacturer instructions.

F. Source quality control:
    1. Test pipe and fitting lining with a magnetic film thickness gauge in accordance with SSPC PA-2 Film Thickness Rating.
    2. Test lining integrity of pipes in accordance with coating manufacturer instructions using a holiday detection testing instrument set at the specified voltage.
    3. Discard pipe or reline pipe when pinholes or discontinuities are found.
    4. Repair holidays with joint compound in accordance with coating manufacturer instructions and re-test.

2.08 GLASS LINING

A. Manufacturers: One of the following or equal, having a minimum of 5 years of experience supplying this product to the wastewater and water industry:
   1. Water Works Manufacturing, Ferrock MEH-32 Lining.
   2. Vitco Corp., SG-14 Lining.

B. Material:
   1. Special glasses and inorganic materials suited for lining of sewage, sludge, and scum piping.
   2. Thickness: 0.008 to 0.012 inch.
   3. Hardness: 5 to 6 on the Mohs Scale.
   4. Density: 2.5 to 3.0 grams per cubic centimeter, measured in accordance with ASTM D792.
   5. Thermal shock resistance: Capable of withstanding 350 degrees Fahrenheit change from 430 degrees Fahrenheit to 80 degrees Fahrenheit without crazing, blistering, or spalling.
   6. Gloss retention: Capable of retaining gloss after immersion in an 8 percent sulfuric acid solution at 148 degrees Fahrenheit for 10 minutes.
   7. Weight loss: Maximum 3 milligrams per square inch when tested in accordance with ASTM C283.

C. Fabrication:
   1. Use piping that is suitable for glass lining with minimum Class 53 wall thickness after application of glass lining.
   2. Machine interior of pipe.
      a. Bore or grit blast in accordance with NAPF 500-03 prior to application of glass lining.
   3. Screw factory assembled flanges on pipe, align boltholes, and flange faces, unless otherwise specified.
   4. Apply lining to surfaces free of chemicals.
   5. Place piping in furnaces specially designed for heating piping until glass melts and fuses with an integral molecular bond to the base metal.
   6. Test 100 percent of the product in the factory in accordance with ASTM B1000.

2.09 POLYETHYLENE ENCASEMENT

A. General:
   1. Polyethylene encasement shall be supplied by the pipe manufacturer.

B. Materials: Supply one of the following polyethylene encasements:
   1. 2 layers of linear low-density polyethylene (LLDPE) film, minimum thickness of 8 mils in accordance with AWWA C105.
   2. Single layer of high-density, cross-laminated polyethylene (HDCLPE) film, minimum thickness of 4 mils in accordance with AWWA C105.

2.10 SEAL COAT

A. Asphaltic seal coat:
   1. Apply over cement mortar linings and to outside surface of pipes that will not receive another coating.
   2. Apply in accordance with AWWA C151.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:
   1. Install ductile iron piping in accordance with AWWA C600, or as modified in Section 15052 - Common Work Results for General Piping.
   2. For underground piping, the trenching, backfill, and compaction:
      a. Inspect coating prior to backfill.
      b. As specified in Section 02318 - Trenching.

B. Polyethylene encasement:
   1. Wrap all buried ductile iron pipe and fittings in 2 layers of loose low-density polyethylene wrap or a single layer of high-density polyethylene wrap in accordance with AWWA C105.
   2. Polyethylene encasement shall be continuous and terminated neatly at connections to below grade equipment or structures.
   3. At wall penetrations, extend encasement to the wall and neatly terminate.
   4. At slab penetrations, extend encasement to 2 inches below the top of slab and neatly terminate.
   5. When rising vertically in unimproved areas, extend encasement 6 inches above existing grade and neatly terminate.
   6. Repair tears and make joints with 2 layers of plastic tape.
   7. All work shall be inspected prior to backfilling of pipe and associated items.

C. Joints:
   1. Install types of joints as specified in the Piping Schedule provided in the Drawings.
   2. Mechanical joints are not acceptable in above ground applications.
   3. Field closure for restrained push-on pipe:
      a. Locate field closures in areas where thrust calculations demonstrate restraint is not required.
   4. Grooved joints:
      a. Install piping with grooved joints where specified in the Piping Schedule, or as otherwise indicated on the Drawings.
      b. Assemble grooved joints in accordance with manufacturer's published instructions.
      c. Support grooved-end pipe in accordance with manufacturer's published instructions.
         1) Install at least 1 support between consecutive couplings.

D. Connection:
   1. Tapping ductile iron pipe:
      a. Direct tapping of ductile iron pipe may be performed but is limited to the following conditions:
         1) Maximum allowable tap diameter by pipe diameter and pressure class:

Pipe Size (inches)	Pressure Class				
	150	200	250	300	350
	Maximum Allowable Direct Tap Size (inches)				
3	-	-	-	-	3/4
4	-	-	-	-	3/4
6	-	-	-	-	1
8	-	-	-	-	1
10	-	-	-	-	1
12	-	-	-	-	1-1/4
14	-	-	1-1/4	1-1/2	1-1/2
16	-	-	1-1/2	2	2
18	-	-	2	2	2
20	-	-	2	2	2
24	-	2	2	2	2

b. The maximum allowable tap diameter for pipelines greater than 24 inches is 2 inches.
c. 2 layers of 3-mil thread sealant are required to minimize the torque required to effect a watertight connection.

2. Direct tapping of glass lined ductile iron pipe may be performed only when approved in writing by the Engineer. Direct tapping of glass lined pipe shall be performed in accordance with the above conditions for tapping ductile iron pipe in addition to the following conditions:
   a. Drilling and tapping shall be performed using a hole saw.
      1) Use of a large drill bit is not acceptable.
   b. As the hole saw approaches the glass lining, lessen the inward pressure to avoid excess chipping or cracking of the lining.
   c. Minor chipping or spalling of the glass lining shall be repaired using an epoxy resin “glass repair kit” provided by the fabricator.
      1) Manufacturers: One of the following or equal:
         a) Devoe - Devran 224 HS.
         b) Sherwin-Williams Co. - Sher-Tile High Solids Epoxy.
      2) Repair kit use is only allowed for areas of damage less than 1/2 inch in diameter.
         a) Larger areas of damage will require replacement.
      3) Surface shall be prepared and repair kit shall be applied in accordance with manufacturer and/or fabricator’s instructions.

3.02 DEFECTS IN COATINGS EXCEPT TAPE WRAP AND CEMENT MORTAR COATING

A. Engineer will identify defective coating to be field repaired in accordance with the applicable AWWA standard.
   1. Pipe joints exceeding the following defect maximum will be rejected.
      a. Minor defects:
         1) No more than 1.5 per 100 square feet of surface area.

2) 2 or more minor repairs within an 8-inches diameter circle will be considered a single repair.
3) Repairs for adhesion testing will not be included in the total number of repairs.
4) Repair in accordance with manufacturer's requirements.

b. Major defects:
1) No more than 3 major repairs on each pipe joint.
2) No more than 30 percent repairs on the pipe surface area with defects.

2. Minor repairs:
a. Repairs less than 8-inches in the greatest dimension.
b. Repair in accordance with manufacturer's requirements.

3. Major repairs:
a. Repairs that exceed 8-inches in the greatest dimension.
b. Repair in accordance with manufacturer's requirements.

3.03 CORROSION MONITORING FACILITIES

A. Bond pipe joints and associated fittings to provide electrical continuity.

B. Install dielectric insulating fittings and corrosion monitoring facilities as indicated on the Drawings and specified in Section 09922 - Pipeline Corrosion Protection.

3.04 FIELD QUALITY CONTROL

A. Testing ductile iron piping:
1. Test as specified in Section 15052 - Common Work Results for General Piping and Section 15956 - Piping Systems Testing.

B. Repair damaged cement mortar lining to match quality, thickness, and bonding of original lining in accordance with AWWA C104.
1. When lining cannot be repaired or repairs are defective, replace defective piping with undamaged piping.

C. Verify that interior surfaces of ceramic epoxy and glass lined pipe and fittings have continuous coverage:
1. Test random samples, as directed by Engineer, in accordance with ASTM B1000.
2. Discard lined piping and fittings found to have pinholes, crazing, or fish scales, which expose the metal substrate.

END OF SECTION

SECTION 15230

PLASTIC PIPING AND TUBING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Plastic pipe, tubing, and fittings for systems that are not plumbing systems.

1.02 REFERENCES

A. American Society of Mechanical Engineers (ASME):
   1. B16.12 - Cast Iron Threaded Drainage Fittings.

B. ASTM International (ASTM):
   1. D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable.
   2. D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
   3. D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120.
   4. D1869 - Standard Specification for Rubber Rings for Asbestos-Cement Pipe.
   5. D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated (SDR Series).
   6. D2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
   7. D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
   8. D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
   9. D2513 - Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing and Fittings.
   10. D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
   11. D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
   12. D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.
   13. D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
   14. D3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
   15. D3261 - Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
   16. D3350 - Standard Specification for Polyethylene Plastic Pipes and Fittings Materials.
   17. D4101 - Standard Specification for Polypropylene Injection and Extrusion Materials.

18. F438 - Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40.
19. F439 - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
20. F441 - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
21. F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
22. F493 - Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
23. F645 - Standard Guide for Selection, Design and Installation of Thermoplastic Water-Pressure Piping Systems.
24. F679 - Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
25. F714 - Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

C. American Water Works Association (AWWA):
   1. C900 - Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 Inches to 12 Inches, for Water Transmission Distribution.

D. NSF International (NSF).

E. Plastics Pipe Institute (PPI):
   1. TR 31 - Underground Installation of Polyolefin Piping.

1.03 ABBREVIATIONS

A. ABS: Acrylonitrile-butadiene-styrene.

B. CPVC: Chlorinated polyvinyl chloride.

C. DR: Dimension ratio.

D. DWV: Drain, waste, and vent.

E. HDPE: High-density polyethylene.

F. ID: Inside diameter of piping or tubing.

G. NPS: Nominal pipe size followed by the size designation.

H. NS: Nominal size of piping or tubing.

I. PE: Polyethylene.

J. PP: Polypropylene.

K. PVC: Polyvinyl chloride.

L. SDR: Standard dimension ratio; the outside diameter divided by the pipe wall thickness.

1.04 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data: As specified in Section 15052 - Common Work Results for General Piping.

C. Shop Drawings:
   1. Describe materials, pipe, fittings, gaskets, and solvent cement.
   2. Installation instructions.

1.05 QUALITY ASSURANCE

A. Plastic pipe in potable water applications: Provide pipe and tubing bearing NSF seal.

B. Mark plastic pipe with nominal size, type, class, schedule, or pressure rating, manufacturer and all markings required in accordance with ASTM and AWWA standards.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect piping materials from sunlight, scoring, and distortion.

B. Do not allow surface temperatures on pipe and fittings to exceed 120 degrees Fahrenheit.

C. Store and handle pipe and fittings as recommended by manufacturer in published instructions.

PART 2 PRODUCTS

2.01 MATERIALS

A. Extruding and molding material: Virgin material containing no scrap, regrind, or rework material except where permitted in the referenced standards.

B. Fittings: Same material as the pipe and of equal or greater pressure rating, except the fittings used in drain, waste, and vent piping systems need not be pressure rated.

C. Unions 2-1/2 inches and smaller: Socket end screwed unions. Make unions 3 inches and larger of socket flanges with 1/8-inch full-face soft Viton™ gasket.

2.02 PVC PIPING, SCHEDULE TYPE

A. The requirements for PVC piping used in plumbing systems are found in Section 22_42_01 - Plumbing Systems.

B. Materials:
   1. PVC Pipe: Designation PVC 1120 in accordance with ASTM D1785 and appendices:
      a. Pipe and fittings: Extruded from Type I, Grade 1, Class 12454 material in accordance with ASTM D1784.
      b. PVC Pipe: Schedule 80 unless otherwise indicated on the Drawings.
   2. Fittings:
      a. Supplied by pipe manufacturer.
      b. Pressure fittings: In accordance with ASTM D2466 or ASTM D2467.
      c. DWV fittings: In accordance with ASTM D2665.
   3. Solvent cement: In accordance with ASTM D2564:
      a. Chemical service: For CPVC or PVC pipe in chemical service, provide the following primer and cement, or equal:
         1) Primer: IPS Corp., Type P70.
         2) Cement: IPS Corp., Type 724 cement or another cement certified by the manufacturer for chemical service.

2.03 PVC GRAVITY SEWER PIPING

A. The requirements for PVC piping used in plumbing systems are found in Section 22_42_01 - Plumbing Systems.

B. Materials:
   1. Polyvinyl chloride (PVC) gravity sewer pipe and fittings: In accordance with ASTM D3034 for piping NPS 15 and smaller diameter, and to ASTM F679 for piping NPS 18 and larger diameter:
      a. Referenced standards apply as complemented and modified in this Section.
      b. Fittings: Supplied by the pipe manufacturer.
   2. PVC compounds: Class Number 12454, in accordance with ASTM D1784:
      a. Stabilizers, antioxidants, lubricants, colorants, and other additives and fillers: Not to exceed 10 parts by weight per 100 of PVC resin in the compound.
   3. Pipe NPS 15 and smaller diameter: Wall thickness SDR 26:
      a. Joints: Push-on joints in accordance with ASTM D3212.
   4. Pipe NPS 18 and larger diameter:
      a. PVC compound: Cell classification 12454 in accordance with ASTM D1784.
      b. Minimum wall thickness: Thickness T-1 in accordance with Table 1 in ASTM F679.
      c. Joints: Integral bell gasketed joints in accordance with ASTM F679.
      d. Bell: Fabricated from pipe sections, thickness of the wall of the bell equivalent to the pipe wall thickness.
      e. Gasket ring: Locked into the bell.
      f. Spigot end of the pipe: Marked by the manufacturer to identify the final in-place position of the spigot in the bell.
   5. Fittings, including wyes, tees, elbow caps, plug adapters, and manhole waterstops: Same wall thickness as the pipe:
      a. Fittings: Factory molded with joints and gaskets equal to those of the pipe.

6. Gasket: EPDM in accordance with ASTM D3212 or ASTM F477:
    a. Keep rubber gasket in place during pipe joining.
7. Gasket for connection to manhole: Stainless steel clamp with gasket or similar device to seal the penetration.

2.04 CPVC PIPING

A. Materials:
1. CPVC pipe: Schedule 80, as specified, in accordance with ASTM F441 and Appendix, CPVC 4120:
    a. Pipe: Extruded from Type IV, Grade 1, Class 23447 material in accordance with ASTM D1784.
    b. Manufacturers: One of the following or equal:
        1) Charlotte Pipe and Foundry Co.
        2) Eslon Thermoplastics, Inc.
        3) GF Harvel.
2. Fittings: In accordance with ASTM F438 or ASTM F439 for pressure fittings, as appropriate to the service and pressure requirement:
    a. Fittings: Supplied by the pipe manufacturer.
    b. Manufacturers: One of the following or equal:
        1) Colonial Engineering.
        2) Eslon Thermoplastics, Inc.
        3) Chemtrol.
        4) Spears Manufacturing Co.
3. Solvent cement: In accordance with ASTM F493:
    a. For CPVC pipe in chemical service, utilize IPS Corp., Type 724 cement or another cement certified by the manufacturer for high strength hypochlorite service.

2.05 PFA TUBING AND FITTINGS

A. Materials:
1. Small bore PFA tubing: ASTM D 3307 Type II, Natural color, OD copper tubing size.
    a. Plastic tubing ID as follows:
        1) For NS 1/4 inch, ID of 0.125 inch.
        2) For NS 5/16 inch, ID of 0.1875 inch.
        3) For NS 3/8 inch, ID of 0.25 inch.
        4) For NS 1/2 inch, ID of 0.375 inch.
        5) For NS 3/4 inch, ID of 0.625 inch.
        6) For NS 1 inch, ID of 0.875 inch.
        7) For NS 1-1/8 inch, ID of 1 inch.
    b. Fittings: Compression fittings.
    c. Supplied in 1000 foot coiled lengths.
    d. Manufacturers: One of the following or equal:
        1) Altaflo, Altraflour 400.
        2) Parker Hannifin Corp., 104 Series Heavy Wall.

2.06 SOURCE QUALITY CONTROL

A. The requirements for PVC piping used in plumbing systems are found in Section 15400 - Plumbing Systems.

B. PVC piping, Schedule Type:
   1. Mark pipe and fittings in accordance with ASTM D1785.

C. PVC gravity sewer piping:
   1. Mark pipe and fittings in accordance with ASTM D3034. Also mark the production control code on pipe and fittings.

D. CPVC piping:
   1. Mark pipe and fittings in accordance with ASTM F441.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:
   1. Where not otherwise specified, install piping in accordance with ASTM F645, or manufacturer's published instructions for installation of piping, as applicable to the particular type of piping.
   2. Provide molded transition fittings for transitions from plastic to metal or IPS pipe. Do not thread plastic pipe.
   3. Locate unions where indicated on the Drawings, and elsewhere where required for adequate access and assembly of the piping system.
   4. Provide serrated nipples for transition from plastic pipe to rubber hose.

B. Installation of PVC piping, Schedule Type:
   1. The requirements for PVC piping used in plumbing systems are found in Section 15400 - Plumbing Systems.
   2. Solvent weld joints in accordance with ASTM D2855:
      a. For PVC pipe in chemical service use IPS Corp., Type 724 cement in accordance with manufacturer's instructions.
   3. Install piping in accordance with manufacturer's published instructions.

C. Installation of PVC piping, Class Type:
   1. Install piping in accordance with the Appendix of AWWA C900 complemented with manufacturer's published instructions.

D. Installation of PVC gravity sewer piping:
   1. The requirements for PP piping used in plumbing systems are found in Section 15400 - Plumbing Systems.
   2. Install piping in accordance with manufacturer's published instructions, as modified and complemented in this Section.
   3. Install pipe and fittings not later than 4 months after their manufacture.
   4. Provide for contraction and expansion at joints with a gasket ring.
   5. Provide plugs or caps for stubs and branch pipes left unconnected to laterals.
   6. Lubricate and assemble joints in accordance with the pipe manufacturer's published instructions.
   7. Make connections to manholes with a manhole gasket that prevents infiltration and exfiltration through the penetrations:
      a. Provide opening for connection large enough to allow subsequent grouting around the manhole gasket.
      b. Grout around the manhole gasket and seal the opening.

E. Installation of CPVC piping:
   1. Clean dirt and moisture from pipe and fittings.
   2. Bevel pipe ends in accordance with manufacturer's instructions with chamfering tool or file. Remove burrs.
   3. Use solvent cement and primer formulated for CPVC:
      a. For CPVC pipe in chemical service use IPS Corp., Type 724 cement in accordance with manufacturer's instructions.
   4. Use primer on pressure and non-pressure joints.
   5. Do not solvent weld joints when ambient temperatures are below 40 degrees Fahrenheit or above 90 degrees Fahrenheit unless solvent cements specially formulated for these conditions are utilized.

3.02 FIELD QUALITY CONTROL

A. Leakage test for PVC piping, Class Type:
   1. The requirements for PVC piping used in plumbing systems are found in Section 15400 - Plumbing Systems.
   2. Polyvinyl chloride (PVC) piping, Class Type: Subject to visible leaks test and to pressure test with maximum leakage allowance, as specified in Section 15956 - Piping Systems Testing.
   3. Pressure test with maximum leakage allowance: Perform test after backfilling:
      a. Pressure: 125 pounds per square inch, gauge.
      b. Maximum leakage allowance as follows, wherein the value for leakage is in gallons per 100 joints per hour:

NPS, Inches	1-1/2	2	2-1/2	3	4	6	8	10	12
Leakage	0.41	0.52	0.63	0.76	0.98	1.45	1.88	2.35	2.80

B. Mandrel tests for PVC gravity sewer piping:
   1. The requirements for PVC piping used in plumbing systems are found in Section 15400 - Plumbing Systems.
   2. Perform initial mandrel test:
      a. After cleaning and completion of other tests.
      b. After placement and compaction of backfill.
      c. Before construction of pavement or surfacing.
      d. Not sooner than 30 days after pipe installation.
      e. Not later than 60 days after installation.
   3. Perform final verification mandrel test:
      a. Not sooner than 30 days before the end of the warranty period.
      b. Not later than 10 days before the end of the warranty period.
      c. Consider the final verification mandrel test a warranty service, and include the costs related to final verification mandrel test in the Contract Price.
   4. Utilize a 9 rod mandrel with minimum length equal to NPS and diameter as follows:

Nominal Pipe Size (NPS)	Mandrel Diameter, inches
6	5.50
8	7.37
10	9.21
12	10.96
15	13.56

5. Test procedure: Pull the mandrel through the line under test by 1 person, by hand, with reasonable effort, without the aid of mechanical equipment.
6. Failing test: Where the mandrel test is not successful, remove and replace the section of piping with the obstruction; test the piping again, including visible leaks test, pressure test with maximum leakage allowance, mandrel tests, and other specified tests:
    a. Correction of excessive deflection or obstructions by methods other than removal of the affected piping and replacement of the removed piping with new piping will not be accepted.

END OF SECTION

SECTION 15400

PLUMBING SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Requirements for materials and installation of plumbing systems.

1.02 REFERENCES

A. American Concrete Institute (ACI).

B. American Gas Association (AGA).

C. American National Standards Institute (ANSI):
   1. Z21.15 - Manually operated gas valves for appliances, appliance connector valves and hose end valves.

D. American Society of Mechanical Engineers (ASME).
   1. B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300.
   2. B16.12 - Cast Iron Threaded Drainage Fittings.

E. American Society of Sanitary Engineering (ASSE):
   1. 1070 - Performance Requirements for Water Temperature Limiting Devices

F. American Water Works Association (AWWA):
   1. C700 - Standard for Cold-Water Meters -- Displacement Type, Bronze Main Case.
   2. C702 - Standard for Cold-Water Meters -- Compound Type.

G. Americans with Disabilities Act (ADA).

H. ASTM International (ASTM):
   1. A48 - Standard Specification for Gray Iron Castings.
   2. A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   3. A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
   4. A518 - Standard Specification for Corrosion-Resistant High-Silicon Iron Castings.
   5. A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
   6. A861 - Standard Specification for High-Silicon Iron Pipe and Fittings.
   7. A888 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
   8. B32 - Standard Specification for Solder Metal.
   9. B88 - Standard Specification for Seamless Copper Water Tube.
   10. B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube.

11. B823 - Standard Specification for Materials for Copper Base Powder Metallurgy (PM) Structural Parts.
12. C552 - Standard Specification for Cellular Glass Thermal Insulation.
13. C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
14. D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
15. D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride (CPVC) Compounds.
16. D1785 - Standard Specification for Poly(Vinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.
17. D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
18. D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
19. D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
20. D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
21. D2843 - Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics.
22. D2863 - Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).
23. D4101 - Standard Classification System and Basis for Specification for Polypropylene Injection and Extrusion Materials.
24. F1412 - Standard Specification for Polyolefin Pipe and Fittings for Corrosive Waste Drainage Systems.

I. California Code of Regulations (CCR):
   1. Title 24 - Building Standard Code.

J. International Association of Plumbing and Mechanical Officials (IAPMO):
   1. IS 03 - Copper plumbing Tube Pipe and Fittings.

K. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1000 V Maximum).

L. Outside diameter (O.D.)

M. Plumbing and Drainage Institute (PDI):
   1. WH 201 - Water Hammer Arresters Standard.

N. Underwriters Laboratories, Inc. (UL):
   1. 94 - Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.

O. United States Environment Protection Agency (EPA): Water Sense.

1.03 DEFINITIONS

A. NEMA: Type 4X enclosure in accordance with NEMA 250.

1.04 REQUIREMENTS

A. Include in plumbing system:
   1. Fixtures.
   2. Drain, vent, and water piping.
   3. Connections and cleanouts.
   4. Fittings and accessories.
   5. Parts and pieces necessary to provide a complete system.
   6. Testing for complete and functional system.

B. Except in typical details, piping is indicated on the Drawings in diagrammatic form. Sizes and locations are indicated on the Drawings; however, not every offset and fitting, nor every structural difficulty that will be encountered in the Work has been indicated.

C. Modify piping alignment indicated on the Drawings as necessary to avoid structural or mechanical obstructions and to clear the work of other trades.

1.05 ADMINSTRATIVE REQUIREMENTS

A. Coordination.
   1. Roof:
      a. Provide plumbing equipment roof penetrations information required in the preparation of roofing drawings including, but not limited to:
         1) Location.
         2) Diameter.
         3) Configuration of penetration and the surround.
      b. Provide roof mounted plumbing equipment information required in the preparation of roofing drawings including, but not limited to:
         1) Location.
         2) Size.
         3) Weight.
         4) Anchoring and support details.

1.06 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Shop drawings, as applicable:
   1. System layout, mechanical, electrical power, and control diagrams.
   2. Nameplate information.
   3. Materials.
   4. Coatings and linings.
   5. Rough-in drawings.
   6. Supports, vibration isolators, and seismic bracing calculations and details.
   7. Primary and ancillary equipment.
   8. Proposed cutting and patching.
   9. Maximum recommended equipment vibration levels and field-testing method.
   10. Copy of factory test results.

C. Operation and maintenance data as specified in Section 01782 - Operation and Maintenance Manuals.

D. Field testing documentation.

E. Warranties.

1.07 QUALITY ASSURANCE

A. Work to be in accordance with the plumbing code specified in Section 01410 - Regulatory Requirements, and in accordance with applicable laws and regulations, including requirements for accessibility, energy, water conservation, and health related requirements for water fountains and coolers.
   1. Where provisions specified in these Specifications or indicated on the Drawings are in conflict with the plumbing code specified in Section 01410 - Regulatory Requirements or laws or regulations, the Code and the laws or regulations take precedence over the specified provisions and design.

B. All devices and fixtures shall be in accordance with CCR Title 24.

PART 2 PRODUCTS

2.01 GENERAL

A. As specified in Section 01600 - Product Requirements.

2.02 FIXTURES

A. General:
   1. Fixture fittings and piping which are exposed shall be heavy-duty chrome.
   2. Stops:
      a. Fixtures, except showers, shall have stops at the fixtures' service.
      b. Stops for laboratory equipment, and for other equipment or fixtures for which stops have not been otherwise specified in this Section, shall be chrome-plated straight pattern compression stops or chrome-plated angle pattern compression stops.

B. Wall-mounted service sink:
   1. 22 inches by 18 inches cast-iron with acid-resisting porcelain enamel interior.
   2. 9-inch high drilled back with concealed hanger.
   3. Stainless steel rim guard.
   4. Rough chromium plated utility sink faucet with rigid hose end spout with pail hook:
      a. Deliver not more than 15 gpm at 60 psig inlet.
      b. 1/2-inch female union inlets with adjustable flanges.
      c. Integral stops.
   5. Backflow preventer.
   6. Indexed lever handles.
   7. Cast-iron adjustable "P" trap standard with metal strainer, gaskets, and cleanout plug.
   8. Manufacturers: One of the following or equal:
      a. Wall-mounted service sink:
         1) American Standard, Inc.
         2) Crane Co.

3) Eljer Ind.
4) Kohler Co.

b. Model appropriate carrier:
1) Josam Co.
2) Jay R. Smith Manufacturing Co.
3) Zurn Ind., Inc.

C. Floor-mounted service sink:
1. 27 inches by 24 inches Type 304 stainless steel sink; 14 inch deep compartment; 8 inch high backsplash with 45 degree sloped top; 1-1/2 inch wide sloping top channel rims; integral drain board with sink pitched to drain; exposed surfaces polished to a satin finish.
2. Support on 4, 1-5/8 inch outside diameter tubular legs (LK251 stainless steel); 16 gauge wall thickness; adjustable bullet shaped feet.
3. Provide single lever faucet that deliver not more than 15 gpm at 60 psig inlet.
4. Manufacturers: One of the following or equal:
a. American Standard, Inc.
b. Crane Co.
c. Elkay.
d. Kohler Co.

D. Toilets, urinals, lavatories, and showers:
1. Provide as indicated on the Drawings.
2. Meet ADA accessibility standards.
3. EPA WaterSense labeled.
4. Flush valve water closets:
a. Wall mounted vitreous china elongated bowl.
b. Water-saver type, siphon jet action; 1-1/2-inch top spud; chrome-plated flush valve with vacuum breaker; non-hold-open type handle with flush volume adjustability at 1.28 gallons per flush; 1-inch screwdriver angle stop and flush connection.
c. White solid plastic seat with open front, stainless steel hinge and check.
d. Concealed carrier:
1) Mounting height as required.
e. Manufacturers: One of the following or equal:
1) Flush valve water closets:
a) American Standard, Inc.
b) Crane Co.
c) Eljer Ind.
d) Kohler Co.
2) Flush valves:
a) Delany.
b) Sloan Valve Co.
3) Carrier:
a) Josam Co.
b) Jay R. Smith Manufacturing Co.
c) Zurn Ind., Inc.

5. Lavatories:
a. Wall mounted 20-inch by 18-inch vitreous china bowl with backsplash and front overflow.
b. Concealed arms and concealed wall hanger.

c. 1-inch diameter drilling for soap dispenser and soap depression.
d. 4-inch center inlets; faucet, 4-inch centers; automatic flow control; 1/2-inch male IP connectors; chrome finish, 3/8-inch supply assemblies, 3/8-inch angle valve, loose key handles; escutcheon drain with integral perforated grid, 1-1/4-inch diameter by 4-inch tail piece; adjustable cast brass "P" trap with 1-1/4-inch inlet, 1-1/4-inch outlet, escutcheon and chrome finish.
e. Faucet that delivers not more than 0.5 gpm at 60 psig inlet.
f. Manufacturers: One of the following or equal:
    1) Lavatory:
        a) American Standard, Inc.
        b) Crane Co.
        c) Eljer Ind.
        d) Kohler Co.
    2) Carrier:
        a) Josam Co.
        b) Jay R. Smith Manufacturing Co.
        c) Zurn Ind., Inc.

2.03 PLUMBING AND DRAINAGE PRODUCTS

A. Water hammer arresters:
1. Stainless steel shell.
2. Hydro-pneumatic cushion of argon gas.
3. Elastomer bellows, stainless steel adapter, and female threaded plug.
4. Size arresters for each fixture supply branch:
    a. Determined in accordance with the PDI Standard PD1-WH201.
5. Manufacturers: One of the following or equal:
    a. Jay R. Smith Manufacturing Co., Series 5000.
    b. Josam Co. 75000.
    c. Zurn Ind., Inc., Series Z-1700.

B. Trap primers:
1. Mechanical type:
    a. Automatic trap primer valve with distribution unit and air gap.
    b. Manufacturer: One of the following or equal:
        1) Precision Plumbing Products (PPP) Prime Rite.
        2) J.R. Smith Model 2699.
2. Electronic trap primers:
    a. Provide electronic trap primer and distribution unit where indicated on the Drawings.
    b. Trap primer shall supply a minimum of 2 ounces of water at 20 pounds per square inch gauge at setting of 10 seconds every 24 hours.
    c. Trap primer shall be pre-assembled in a steel cabinet to be surface mounted:
    d. Trap primer inlet shall be 3/4 inch NPT female. Trap primer outlet shall be 1/2 inch compression fitting.
    e. Manifold shall be 3/4 inch Type "L" copper tubing complying with ASTM B88.
    f. Trap primer shall be provided with backflow prevention.

g. Trap primer shall be 120 volts.
h. Manufacturers: One of the following or equal:
1) Precision Plumbing Products PTS-12.
2) Sioux Chief 695-ES10.

3. Trap seals:
a. Provide trap seal on floor drains.
b. Manufacturer: The following or equal:
1) Zurn, Z1072 ZSheild.

C. Cleanouts:
1. Wall-mounted cleanouts for concealed piping:
a. Cast-iron tapped tee.
b. Round smooth stainless steel access cover and securing screw.
1) Manufacturers: One of the following or equal:
a) Josam Co., 58910-19 (Tee & Plug) and 58600 (Access Cover).
b) Zurn Ind., Z1445-BP.

2. Floor cleanouts:
a. Cast-iron ferrule, countersunk plug, gastight and watertight seal.
b. Adjustable cleanout head extension.
c. Scoriated nickel-bronze top and securing screw.
1) Heavy-duty top suitable for heavy traffic conditions in unfinished floor areas.
d. Manufacturers: One of the following or equal:
1) Josam Co., 56670 for finished floors, 55000 for unfinished floors.
2) Zurn Ind., Inc., ZN-1400 for finished floors, ZN-1400-HD for unfinished floors.

3. Yard cleanouts in asphalt or ground areas:
a. As specified for floor cleanouts in unfinished floor areas.

D. Equipment and floor drains:
1. Adjustable strainer head, floor level grate.
2. 4-inch diameter funnel extension.
3. No-hub outlet and nickel bronze top.
4. Manufacturers: One of the following or equal:
a. Floor drain:
1) Josam Co., 30000-A, combination drip drain, less clamping collar.
2) Zurn Ind., Inc., ZN-415 strainer.
b. Funnel extension:
1) Josam Co., E-2.
2) Zurn Ind., Inc., ZN-328.

E. Other floor drains:
1. No-hub outlet.
2. Nickel bronze Type B strainer:
a. Josam Co., 30000-A universal floor drain with adjustable strainer, less clamping collar.
b. Zurn Ind., Inc., ZN-415.
c. Strainer sizing:
1) 3-inch drain strainers: 6-inch diameter.
2) 4-inch drain strainers: 8-inch diameter.

F. Heavy-duty floor drains with sedimentation bucket:
   1. 12 inches square with coated cast-iron body, grate, and slotted sediment bucket.
   2. Manufacturers: One of the following or equal:
      a. Josam Co., 37810.
      b. Zurn Ind., Inc., Z-610.

G. Trench drains:
   1. Modular, 6 inches wide, 12 inches long extensions.
   2. Bottom outlet, with secondary dome strainer.
   3. Length as indicated on the Drawings.
   4. Manufacturers: One of the following or equal:
      a. Josam Co., 76000.
      b. Zurn Ind., Inc., Z-664.

H. Fixed air gaps:
   1. Threaded outlets:
   2. Manufacturers: One of the following or equal:
      a. Josam Co., 1800.
      b. Zurn Ind., Inc. Z-1025.

I. Hose bib stations:
   1. A 1-inch hose bib shall be a 1 inch single supply wall mounted hose bib station complete as described below and as indicated on the Drawings.
   2. Refer to detail for requirements for hose rack.
   3. The hose shall be 50 feet of 1 inch commercial/industrial grade rubber hose.
   4. The hose nozzle shall be a 7-pattern select-a-spray with vinyl grip. Unit shall include a hold-open clip for continuous spraying, a rust resistant stainless steel spring, and a lifetime leak proof seal.
   5. Manufacturers: The follow or equal:
      a. Flexon Pro Series.
      b. Gilmore Group.

2.04 EQUIPMENT

A. General:
   1. As specified when applicable in Section 15050 - Common Work Results for Mechanical Equipment.

B. Water heaters:
   1. Size and requirements as indicated on the Drawings.
   2. Provide with temperature limiting device meeting ASSE 1070.
   3. Water heaters shall meet the requirements in accordance with CCR Title 24.
   4. Electric water heaters:
      a. UL listed.
      b. Glass lined storage tank.
      c. 2 inches minimum fiberglass insulation.
      d. Exterior steel casing with factory standard enamel finish.
      e. High efficiency immersion heating elements.
      f. Automatic temperature control.
      g. Externally adjustable setting.
      h. ASME rated temperature and pressure relief valve.

i. Magnesium anode, tank cleanout.
j. Manufacturers: One of the following or equal:
1) A. O. Smith Corp.
2) State Ind., Inc.
k. Warranty:
1) Special warranty:
a) Duration: Provide 3-year warranty.

5. Tankless electric water heaters:
a. High temperature limit switch with automatic reset.
b. Compression fittings.
c. Maximum operating pressure of 150 psig.
d. Single lavatory:
1) Flow switch activated:
a) Ni Chrome heating coils activate at 0.3 gpm.
2) Manufacturers: One of the following or equal:
a) Eemax, single point series, Model SP48.
b) Keltech, HL Series.
e. Emergency shower/eye wash and multiple fixtures:
1) Flow switch activated:
a) Ni Chrome heating coils activate at 2.5 gpm.
2) Manufacturers: One of the following or equal:
a) Haws, Model 9327.
b) Eemax, similar model.
c) Keltech, similar model.

C. Water softeners:
1. Designed for 125 psig, and in accordance with ASME code.
2. Rust-resistant and corrosion-resistant.
3. Mineral tank: Steel and lined with 0.006-inch to 0.008 inch high quality phenolic epoxy.
4. Brine tank with platform: Fiberglass or rigid polyethylene.
5. Valves and other parts which come into contact with water made of copper, with plastic, EPDM or Monel internal parts.
6. Permanent type, high capacity mineral resin bed, and high capacity resin.
7. Down flow of water during softening.
8. Automatic cycling:
a. Controlled by a pair of sensors detecting the need for regeneration.
b. Upflow of water on regenerating cycle.
c. Automatic bypass to provide full supply of water at outlets during regenerating cycle.
9. Design with the following characteristics:
a. Maximum exchange capacity of 150 kilo grains.
b. Efficiency exchange capacity of 150 kilo grains per regeneration using 75 pounds of salt per cubic foot.
c. Ability to handle water up to 12 grains per gallon hardness and up to 1 milligram per liter iron.
d. Remove hardness up to 0.3 grain per gallon of hardness, as determined by the ASTM standard soap test method when operated at 120 gallon(s) per minute, and in accordance with the operating instructions.
e. Provide 8 gph of continuous softened water up to a peak flow rate of 12 gph.
10. Electrical controls: 120 volt, 60 hertz electrical service.

11. Manufacturers: One of the following or equal:
    a. Kinetico.
    b. Culligan
12. Warranty:
    a. Special warranty:
        1) Duration: Provide 5-year warranty.

2.05 DRAIN, WASTE, AND VENT PIPING

A. Cast iron soil pipe:
    1. Bell-and-spigot service weight in accordance with ASTM A74.
        a. "No Hub" optional for above ground.
    2. Joints underground: positive double seal compression type gaskets in accordance with ASTM C564.
    3. Joints aboveground:
        a. American standard taper screw threads cut clean and made up with Teflon™ tape or an acceptable paste thread compound applied to the male threads only.
        b. Slip joints permitted only in trap seals or on the inlet side of the traps.
            1) Do not use long screws or bushings.
    4. Cast iron drainage pattern fittings.
    5. Couplings for "No Hub": Stainless steel corrugated shield and clamp assembly over a molded 1-piece neoprene sealing sleeve, in accordance with ASTM A888.
    6. Line pipe and fittings inside and coat outside with bituminous coating except as follows:
        a. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute.

2.06 POTABLE COLD AND HOT WATER PIPING

A. Seamless copper water tube:
    1. Type: ASTM B88:
        a. Exposed copper piping or tubing: Type L hard-drawn, rigid.
        b. Copper tubing buried in the ground or in plastic conduit: Type K soft annealed.
    2. Fittings: Solder type forged or wrought copper.
        a. Manufacturers: One of the following or equal:
            1) Crawford Fitting Co., Swagelok.
            2) Hoke, Gyrolok.
            3) Parker.
    3. Solder: ASTM B32, Alloy Grade Sb5.
    4. Flux: ASTM B813.
    5. Dielectric insulating unions or fittings:
        a. Manufacturers: One of the following or equal:
            1) Mueller Co.
            2) Watts Series 3001A.
    6. Special thread to tube adapters:
        a. Manufacturers: One of the following or equal:
            1) Crawford Fitting Co., Swagelok.
            2) Hoke, Gyrolok.
            3) Parker.

2.07 LINK TYPE SEALS

A. Characteristics:
   1. Modular mechanical type, consisting of interlocking neoprene or synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening.
   2. Links to form a continuous rubber belt around the pipe.
   3. Provide a nylon polymer pressure plate with Type 316 stainless steel hardware. Isolate pressure plate from contact with wall sleeve.
   4. Hardware to be Type 316 stainless steel.
      a. Provide anti-galling lubricant for threads.

B. One of the following or equal:
   1. Link-Seal.
   2. Pipe Linx.

2.08 PIPE INSULATION

A. General:
   1. As specified in Section 01600 - Product Requirements.
   2. Insulation thicknesses: Provide insulation thickness in inches in accordance with the following table. Insulation thickness shown is nominal. Manufacturing tolerance of 15 percent variation is permissible.

Table 1 - Required Insulation Thicknesses (inches)

Service Temperature Range as Designated in Insulation Schedule at End of this Section	Nominal Pipe Diameters				
	1 inch and Less	1.25 to 2 inches	2.5 to 4 inches	5 to 10 inches	Over 10 inches
Above 200 degrees Fahrenheit	2.0	2.5	3.0	3.5	3.5
100 to 200 degrees Fahrenheit	1.5	1.5	1.5	2.0	2.5
40 to 100 degrees Fahrenheit	0.5	1.0	1.0	1.5	2.0
Below 40 degrees Fahrenheit	1.0	1.0	1.5	2.0	2.0
Heat Traced Pipes	1.0	1.0	1.0	1.5	2.0

B. Insulation, Type 1:
   1. Insulation material: Closed cell elastomeric insulation.
   2. Minimum temperature range: Minus 40 degrees Fahrenheit to plus 220 degrees Fahrenheit.
   3. K factor at 75 degrees Fahrenheit: Not more than 0.27 BTU-inch/hour-square feet-degrees Fahrenheit.
   4. Fire ratings:
      a. Flame spread: 25 or less.
      b. Smoke density: 50 or less for insulation thicknesses up to 1.5 inches.
   5. Joints: Seal with manufacturer's recommended contact adhesive to form continuous water barrier.
   6. Manufacturers: One of the following or equal:
      a. Aeroflex USA Inc., Aerocel® AC.
      b. Armacell®, AP Armaflex.

C. Insulation, Type 2:
   1. Insulation material: Preformed mineral fiberglass insulation made from glass fibers bonded with a thermosetting resin.
      a. In accordance with ASTM C547, Class 1.
      b. Provide with factory installed vapor barrier.
         1) Material: White Kraft paper bound to aluminum foil in accordance with ASTM C1136, Type I.
         2) Longitudinal lap seals: Pressure-sensitive, self-sealing longitudinal lap strip with factory applied adhesive.
         3) Circumferential butt seals: 4-inch wide tape or similar properties or 4 inch wide overlap with adhesive seal.
         4) Vapor barrier permeability: 0.02 perms or lower.
         5) Vapor barrier flame spread rating: 25 or less.
   2. Minimum temperature range: Minus 0 degrees Fahrenheit to plus 850 degrees Fahrenheit.
   3. K factor at 75 degrees Fahrenheit: Not more than 0.23 BTU-inch/hour-square feet degrees Fahrenheit.
   4. Maximum moisture absorption, volume percent: 5.
   5. Manufacturers: One of the following or equal:
      a. Owens-Corning , Fiberglas™ FLEXWRAP® ASJ.
      b. Johns Manville, Micro-Lok® HP.
      c. Knauf Insulation, Earthwool® Redi-Klad® 1000° Pipe Insulation.

D. Insulation, Type 3:
   1. Insulation material: Rigid cellular glass in accordance with ASTM C552, Type II.
   2. Temperature range: Minus 450 degrees Fahrenheit to plus 900 degrees Fahrenheit.
   3. K factor at 75 degrees Fahrenheit: Not more than 0.32 BTU-inch/hour-square feet-degrees Fahrenheit.
   4. Minimum average density: 7.5 pounds per cubic foot.
   5. Maximum moisture absorption, volume percent: 5.
   6. Minimum compressive strength: 87 pounds per square inch.
   7. Moisture permeability: 0.00 perm-inch.
   8. Manufacturers: One of the following or equal:
      a. Owens-Corning, Foamglas® One™.

E. Insulation jackets:
   1. Type 1:
      a. Material: Ultraviolet-resistant polyvinyl chloride jacketing, 20 mil minimum thickness.
      b. Fire rating: 25 maximum flame spread, smoke developed 50 or less.
      c. Color: White.
      d. Overlap: 1-inch minimum at joints and fittings.
      e. Joint seal: PVC solvent welded or adhesive as recommended by the manufacturer.
      f. Fittings: Factory made with full thickness insulation.
      g. Manufacturers: One of the following or equal:
         1) Johns Manville, Zeston® 2000 PVC.
         2) Proto Corp., LoSMOKE PVC.
         3) Speedline® Corp., Smoke-Safe™ PVC.

2. Type 2:
    a. Material: Aluminum, Alloy 5005; 0.016-inch (26-gauge) minimum thickness.
    b. Overlap: Overlap circumferential joints 4 inches minimum; overlap longitudinal joints 1-inch minimum; longitudinal joints oriented to minimize water entry.
    c. Bands: 0.5-inch wide, 0.0508-inch (16-gauge) thick aluminum, same alloy as jacket or 0.0179-inch thick Type 304 stainless steel; install on 18-inch centers, uniformly spaced and at all fitting joints.
    d. Joint seal: Apply waterproof adhesive at joints and overlaps.
    e. Fittings: Custom fit of same materials.
    f. Manufacturers: One of the following or equal:
        1) Childers Products.
        2) Premetco International.

F. Vapor barriers:
1. Vapor barrier, Type 1:
    a. Material: White Kraft paper bound to aluminum foil in accordance with ASTM C1136, Type 1.
    b. Permeability: 0.02 perms or lower.
    c. Maximum flame spread rating: 25.
    d. Edge seal: Pressure-sensitive tape lap seal.
    e. Circumferential joints: 4-inch wide tape or 4-inch overlap with adhesive seal.
2. Vapor barrier, Type 2:
    a. Material: Mastic.
    b. Manufacturers: One of the following or equal:
        1) Benjamin Foster, No. 30-76.
        2) Childers Products CP10/11 Vi-Acryl.
        3) Foster Products, 36-10/46-10 Weatherite.
        4) Insul-Coustic, No. I.C.-580.

G. Insulation schedule:

Table 2 - Insulation Schedule

Service Designation(1)	Location(2)	Insulation Type(3)	Jacket Type(3)	Service Temp. °F(4)	Vapor Barrier
Hot Water	Interior or Exterior	1 or 2	Type 1 on Exterior installations, none required on Interior installations	100-200	Install on Type 2 insulation
Hot Water Supply and Return	Interior or Exterior	2 or 3	1 or 2	100-200	Required
Steam Condensate	Interior or Exterior	3	2	Above 200	Required
HVAC Refrigerant	Interior or Exterior	1	1	Below 40	Required
Chilled Water	Interior or Exterior	1	1	Below 40	Required

Table 2 - Insulation Schedule					
Service Designation[1]	**Location[2]**	**Insulation Type[3]**	**Jacket Type[3]**	**Service Temp. °F[4]**	**Vapor Barrier**
Heat Traced Pipes[5]	Exterior	1 or 2	2	N/A	Install on Type 2 insulation

Notes:
1. Refer to Piping Schedule in Section 15052 - Common Work Results for General Piping for service designations.
2. Insulation jackets are not required for interior installations that are concealed. See definitions for description of concealed locations.
3. Contractor may select from options listed.
4. Unless noted otherwise, use service temperature range provided in this table to establish insulation thickness as required by Table 1.
5. Insulate all piping systems that are heat traced as indicated on the Drawings.

PART 3 EXECUTION

3.01 GENERAL

A. As specified in Section 01600 - Product Requirements.

B. As specified in Section 15082 - Piping Insulation.

C. Conceal plumbing piping unless otherwise indicated on the Drawings or specified in the specifications.

D. Furnish and install vents required in drainage piping as part of the plumbing system, in accordance with Laws and Regulations.

E. Use Link Type Seals as indicated on the Drawings.

3.02 INSTALLATION

A. Fixtures:
   1. Rough-in fixtures and accessories in accordance with the dimensions supplied by the manufacturers of the fixtures.
   2. Mount fixtures and accessories without cutting of finish surface.

B. Plumbing and drainage products:
   1. Provide cleanouts of the same size as the size of the waste and drain piping on which cleanouts are installed, up to 4 inches in diameter. Provide cleanouts 4 inches in diameter on waste and drain piping larger than 4 inches diameter.
   2. Provide traps at all fixture and equipment connections to the sanitary drainage system. Install traps as near to the fixtures as possible.
   3. Sizes of equipment drains and of floor drains shall be as indicated on the Drawings.
   4. When indicated on the Drawings, cut holes in heavy-duty floor drain grate for a drainpipe from equipment or other source.

C. Equipment:
   1. As specified when applicable in Section 15050 - Common Work Results for Mechanical Equipment.
   2. Provide piping for drain and overflow connections to drains.

D. Drain, waste, and vent piping:
   1. As specified when applicable in Section 15052 - Common Work Results for General Piping.
   2. Where not specified otherwise, install horizontal piping with a grade of 1/4 inch per foot.
   3. Provide vents, roof drains, and pipes flashed and made watertight at the roof with lead sheet flashings.
      a. Minimum 4-pound lead sheet.
   4. Extend flashing not less than 6 inches up the pipes, and counterflash with standard cast iron or malleable iron recessed roof couplings.
   5. Extend flashing for vents up to the top of the vent and turn down into the pipe.
   6. Extend flashing shields not less than 8 inches from vent and pipe in all directions.

E. Potable cold and hot water piping:
   1. Install copper tubing in accordance with ASTM B828 and IAPMO IS 03.
   2. Install copper tubing in straight runs, supported at intervals close enough to avoid sagging.
   3. Make cuts square with a tubing cutter or with a 32-tooth hacksaw.
      a. Provide a sizing tool to correct distortions.
   4. Ream the inside of the tubing and remove burrs from the outside, holding the end of the tubing downward and preventing chips and fillings from entering the tubing.
   5. Perform flaring with a flare block and yoke type screw feed flaring tool:
      a. After removing the tubing from the flare block, inspect both surfaces of the flare for splits, cracks, or other imperfections.
      b. Where there are imperfections, cut off the imperfect flare, and prepare a new flare.
   6. Insulate piping as specified.

3.03 FIELD QUALITY CONTROL

A. Testing:
   1. Test soil, waste, drain, and vent lines as specified and in accordance with plumbing code as specified in Section 01410 - Regulatory Requirements.
   2. Test water piping with water under a pressure of 100 psig.
      a. As required per code.
   3. Repair and correct defective work disclosed by testing. Repeat testing until defective work is corrected.

3.04 CLEANING AND DISINFECTION

A. Upon completion of installation, clean piping interior of foreign matter and debris.

B. Flush and disinfect potable water piping as specified in Section 01757 - Disinfection.

3.05 SCHEDULES

A. As indicated on the Drawings.

END OF SECTION

SECTION 15430

EMERGENCY EYE/FACE WASH AND SHOWER EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Emergency shower and eyewash.

1.02 REFERENCES

A. American National Standards Institute (ANSI):
   1. Z358.1 - Emergency Eyewash and Shower Equipment.

B. American Society of Mechanical Engineers (ASME).

C. California Department of Occupational Safety and Health Administration (Cal-OSHA).

D. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1000 V Maximum).

E. National Fire Protection Association (NFPA).

F. Occupational Safety and Health Administration (OSHA).

G. Underwriters Laboratories, Inc. (UL).

1.03 DEFINITIONS

A. NEMA:
   1. Type 4 enclosure in accordance with NEMA 250.

1.04 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data: As specified in Section 15050 - Common Work Results for Mechanical Equipment.

C. Shop drawings: As specified in Section 15050 - Common Work Results for Mechanical Equipment.

D. Provide warranty as specified in Section 01783 - Warranties and Bonds.

1.05 QUALITY ASSURANCE

A. Regulatory requirements:
   1. As applicable, equipment of this Section shall comply with requirements of public agencies of the state where the project is located including ASME Cal-OSHA NFPA OSHA UL.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Packing and shipping: Deliver to the job site in manufacturer's original containers.

B. Delivery: After wet operations in building are completed.

C. Storage and protection:
   1. Store materials in original, unopened containers in compliance with manufacturer's printed instructions.
   2. Keep materials dry until ready for use.
   3. Keep packages of material off the ground, under cover, and away from sweating walls and other damp surfaces.
   4. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with a protective covering.

PART 2 PRODUCTS

2.02 EMERGENCY SHOWERS AND EYE/FACE WASHES

A. General design requirements:
   1. Combination unit emergency shower with eye/face wash:
      a. Floor mounted fixture consisting of pipe standard, showerhead assembly, and eyewash assembly.
      b. Provide stanchion and floor flange, with interconnecting piping.
   2. Showerhead flow: 20.0 gallons per minute flow, minimum.
   3. Eye/face wash flow: 3.0 gallons per minute flow, minimum.
   4. Meet or exceed all requirements of ANSI Z358.1.
   5. Provide ANSI compliant identification sign and markings.

B. Combination unit emergency shower and eye/face wash:
   1. Manufacturers: One of the following or equal:
      a. Haws, Model No. 8309.
      b. Guardian Equipment, Model No. G1950HFC.
      c. Bradley, Model No. S19314AC.
   2. Pipe standard:
      a. 1-1/4-inch hot-dip galvanized steel pipe, and fittings with interconnecting piping, stanchion, and 9-inch diameter floor flange.
      b. Corrosion protection:
         1) Manufacturers: One of the following or equal:
            a) Bradley Galvanized steel with BradTect® safety yellow coating.
            b) Guardian Equipment “-GC” epoxy protective coating in corrosive environments.
            c) Haws “-CRP”.

3. Shower head:
    a. Material and size: ABS plastic, 10-inch diameter with 20 gallons per minute flow control.
    b. Valve and actuator: Stay open chrome plated brass ball valve equipped with stainless steel ball and stem operated by a rigid stainless steel pull rod.
4. Eye/face wash receptor:
    a. Valve and actuator: Stay open chrome plated brass ball valve with stainless steel ball and stem operated by a stainless steel or epoxy coated aluminum push handle and foot treadle.
    b. Spray head(s): ABS plastic or polypropylene eye/face wash type heads, with integral flip top protective dust covers releasing with water pressure.
    c. Receptor bowl: Stainless steel; 11 inches diameter.
5. Supply: 1-1/4-inch Industrial Piping Systems (IPS).
6. Waste: 1-1/4-inch IPS.

C. Safety shower and eye/face wash tepid water mixing valves:
1. Manufacturers: One of the following or equal:
    a. Bradley, Model No. S19-2250.
    b. Guardian Equipment, Model No. G3800 Series.
    c. Haws, Model No. 9201 Series.
2. General requirements:
    a. Provide 1 mixing valve for each safety unit or group of safety units mounted within 100 feet of each other.
3. Tepid water system to provide a minimum of 20 gallons per minute for shower and 3 gallons per minute for eye/face wash of water for a period of at least 15 minutes at a delivery temperature of 80 to 85 degrees Fahrenheit.

D. Safety shower tester:
1. Manufacturers: One of the following or equal:
    a. Bradley, Model No. S19-330ST.
    b. Guardian Equipment, Model No. AP250-005.
    c. Haws, Model No. 9010 with No. 9009.
2. Kit includes:
    a. Minimum 5 gallon plastic bucket.
    b. 7 foot long watertight 12-gallon translucent vinyl plastic bag for attaching over drench showerhead.
        1) Bag shall have drawstring at top and be hemmed at bottom.
    c. Testing record card.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturers' recommendations.

B. Install products in accordance with code requirements and ANSI Z358.1.

C. Plumbing and mechanical work as specified in Section 15050 - Common Work Results for Mechanical Equipment.

D. Electrical connections and distribution as specified in Section 16050 - Common Work Results for Electrical.

3.02 COMMISSIONING

A. As specified in Section 01756 - Commissioning and this Section.

B. Functional testing:
   1. Shower/eyewash unit with integral controls:
      a. Test witnessing: Witnessed.
      b. Electrical Instrumentation and Controls:
         1) Test witnessing: Witnessed.
         2) Conduct testing as specified in Section 17950 - Commissioning for Instrumentation and Controls.

END OF SECTION

SECTION 15732

AIR CONDITIONING UNITS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Air conditioning units (ACU).

1.02 REFERENCES

A. Air-Conditioning, Heating, and Refrigeration Institute (AHRI):
   1. 210-240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment.
   2. 270 - Sound Rating of Outdoor Unitary Equipment.
   3. 340/360 - Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment.

B. Air Movement and Control Association International, Inc. (AMCA):
   1. 210 - Laboratory Methods for Testing Fans for Certified Aerodynamic Performance Rating.

C. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE):
   1. Standard 15 - Safety Standard for Refrigeration System.
   2. Standard 52.2 - Methods of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
   3. Standard 62.1 - Ventilation for Acceptable Indoor Air Quality.

D. American National Standards Institute (ANSI):
   1. Z21.47 - Gas Fired Central Furnaces (except Direct Vent Central Furnaces) with Addenda.

E. California Code of Regulations (CCR):
   1. Title 24 - Building Standards Code.

F. Federal Specification (FS):
   1. Standard 141 - Paint, Varnish, Lacquer and Related Materials: Methods of Inspection, Sampling and Testing.

G. National Electrical Code (NEC).

H. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1000 V Maximum).

I. National Fire Protection Association (NFPA):
   1. 54 - National Fuel Gas Code.
   2. 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

J. National Roofing Contractors Association (NRCA).

K. Underwriters' Laboratories, Inc. (UL):
   1. 900 – Standard for Air Filter Units.

1.03 DEFINITIONS

A. NEMA: Type 3R enclosure in accordance with NEMA 250.

1.04 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Shop drawings:
   1. System layout, mechanical, electrical power, and control diagrams.
   2. Nameplate information.
   3. Materials.
   4. Supports, vibration isolators, and seismic bracing calculations and details.
   5. Primary and ancillary equipment.
   6. Proposed cutting and patching, when required.
   7. Maximum recommended equipment vibration levels and field-testing method.
   8. Sound power level in each of 8 octave bands and overall Sones.
   9. Bearing life.
   10. Fan performance curves showing specified operating condition.
   11. Copy of factory test results.
   12. For projects located in California, provide certification of compliance with CCR Title 24 energy efficiency standards and approval by the California Energy Commission.

C. Operation and maintenance data as specified in Section 01782 – Operation and Maintenance Manuals.

D. Warranties.

E. Provide required commissioning submittals as specified in Section 01756 – Commissioning.

1.05 QUALITY ASSURANCE

A. Assemble panels, enclosures, and rack systems along with all internal and external devices, wiring, equipment, and materials in a facility that is recognized by UL to assemble and certify UL-labeled control panels.

B. Regulatory requirements:
   1. For projects located in California, in accordance with CCR Title 24 energy efficiency regulations.

C. Qualification of manufacturer: Manufacturer with experienced personnel, physical facilities, and management capacity sufficient to produce products of quality specified with a minimum 5 years satisfactory performance record.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver units in 1 piece (or modular, if required), factory assembled, piped, internally wired, and factory tested.

B. Protect equipment from dust and atmospheric exposure as recommended by the unit manufacturer.
   1. Provide temporary closures for equipment openings designed for airflow.

1.07 WARRANTY

A. Provide warranty as specified in Section 01783 - Warranties and Bonds.

B. Special warranties:
   1. Refrigerant compressors and closed or sealed refrigerant systems warranty duration: Provide 5-year warranty.
   2. Evaporator and condensing coils warranty duration: Provide 10-year warranty.

1.08 MAINTENANCE

A. Extra materials: Provide 2 extra (3 total) sets of filters per unit installed.

B. Provide 1 set of sheaves and belts for change-out, if required, for final balance per unit installed.

C. After final balance, provide one extra set of belts for each unit installed.

D. Special tools: Deliver 1 set of special tools needed to assemble and disassemble the components of the unit requiring regular maintenance.

PART 2 PRODUCTS

2.01 GENERAL

A. As specified in Section 01600 - Product Requirements and 15050 - Common Work Results for Mechanical Equipment.

B. Inclusion of a specific manufacturer's name in the Specifications does not mean that the specific manufacturer's standard product will be acceptable. Specified manufacturer's or other manufacturer's standard product shall be modified as required to meet the Specifications.

C. All supplied components of the unit shall be furnished and fully integrated by the unit system supplier, having unit responsibility:
   1. Furnish and install all piping, valves, dampers, sensors and wiring within the unit package.
   2. Provide a unit mounted control panel prewired on the unit to all dampers and sensors within the unit.

D. Motors:
   1. Totally enclosed.

2. Voltage and number of phases as scheduled.
3. Compressor motors:
   a. Cooled by refrigerant gas passing through windings.
   b. Provided with line break thermal and current overload protection.
4. Fan and blower motors:
   a. Permanently lubricated ball bearings.
   b. Integral automatic reset thermal overload protection.
5. Other requirements as specified.

E. Electrical:
   1. Provide a single conduit connection in the unit for both power and control wiring.

2.02 DESIGN AND PERFORMANCE CRITERIA

A. Design requirements:
   1. Provide fans that have sharply rising pressure characteristics which extend throughout the operating range and continue to rise beyond the efficiency peak.
   2. Provide fans that peak as close as possible to the maximum efficiency and whose operating range is within the normal fan selection range.
   3. When scheduled, provide guided vibration isolator for fans, so that not more than 10 percent of the vibration amplitude of the fan and motor is transmitted to the supporting structure.
   4. Design fan inner scroll and air stream surfaces to maintain smoothness for entire fan service life.
   5. Seismic supports: Design support to meet criteria as specified in Section 01612 - Seismic Design Criteria.
   6. Wind supports: For exterior units, design support that meet the criteria as specified in Section 01614 - Wind Design Criteria.
   7. Electrical components: UL listed and met the design and installation requirements of the NEC.
   8. Roof curbs: Designed in accordance with NRCA Standards.
   9. Gas, water piping, drains, and venting: In accordance with building code, mechanical code, and plumbing code a specified in Section 01410 - Regulatory Requirements and in accordance with applicable codes.
   10. Fans: Rated in accordance with AMCA 210.
   11. Unit air conditioners: Rated in accordance with AHRI Standards 210-240 or 340/360 and AHRI 270. Conform to the latest version of ASHRAE 15.
   12. Unit air conditioners with heating options: Certified in accordance with ANSI Z21.47.
   13. Insulation and adhesives: In accordance with NFPA 90A requirements for flame spread and smoke generation.
   14. Refrigerant: HFC R-410A.
   15. Finishes: When not specified with fan type, coat ferrous metals as specified in Section 09960 - High-Performance Coatings.
   16. For projects located in California, comply with energy efficiency requirements of CCR Title 24.

B. Performance requirements:
   1. Performance requirements are included in the Air Conditioning Unit Schedule indicated on the Drawings.
   2. Outdoor noise levels: Outdoor noise levels in the 8 octave band range as measured in accordance with AHRI Standard 270 for unit air conditioners and split system condensers shall not exceed the following:

Unit Nominal Capacity (Tons)	OCTAVE BANDS, hertz							
	63	125	250	500	1,000	2,000	4,000	8,000
3 to 5	64	70	71	74	74	71	67	61
6	79	85	78	74	71	73	66	59
7-1/2 to 10	64	70	73	79	82	78	74	67
12-1/2 and larger	84	88	84	83	84	78	72	68

   3. Units shall be capable of starting and running at 125 degrees Fahrenheit ambient outdoor air temperature and exceeding the maximum load criteria of AHRI Standard 210-240 or 340/360.
   4. Cooling capacities and energy efficiency ratios: Provide units with the following cooling capacities and energy efficiency ratios (EER) as rated in accordance with AHRI 210-240 or 340/360 and 270, unless scheduled otherwise.

Equipment Type	Net Cooling Cap (Btuh)	EER(1)
Air Cooled	>65,000 and <135,000	11.2
Air Cooled	>135,000 and < 240,000	11.0
Air Cooled	>240,000 and < 760,000	10.0
Air Cooled	> 760,000	9.7
Water Cooled	>65,000 and <135,000	12.1
Water Cooled	>135,000 and < 240,000	12.5
Water Cooled	>240,000 and < 760,000	12.4
Water Cooled	> 760,000	12.2
(1) Deduct 0.2 from the required EERs for units with a heating section other than electric resistance heat.		

   5. Units with heating capabilities: Meet or exceed the following efficiencies:
      a. Annual fuel utilization efficiency: 80 percent.
      b. Steady state efficiency: 80 percent.
      c. California seasonal efficiency: 76.9 percent.
   6. Unit air flows for cooling: A minimum of 300 cubic feet per minute per ton but not exceeding 500 cubic feet per minute per ton of cooling unless scheduled otherwise.
   7. Filter:
      a. Media: UL 900 listed, Class I or Class II, approved by local authorities.

b. Efficiency: 45 to 50 percent dust spot efficiency when rated in accordance with ASHRAE Test Standard 52.2.
c. Face velocity: Per manufacturer recommendation.

2.03 PACKAGED AIR CONDITIONING UNITS

A. Manufacturers: One of the following or equal:
1. Trane, Series THC.
2. Carrier, similar series.
3. Johnson Controls, similar series.

B. Compressors:
1. Fully hermetically sealed, high efficiency, reciprocating, or scroll type, with internal and external vibration isolation.
2. Equipped with high-pressure relief.

C. Fans:
1. Evaporator fan:
a. Direct or belt driven, forward curved, double inlet, centrifugal type, steel with corrosion resistant finish, statically and dynamically balanced.
b. Permanently sealed ball bearings and permanently lubricated.
c. Adjustable pitch motor pulley.
d. Where the condenser fan exceeds 7.49 horsepower, provide variable speed or 2-speed fan with low speed at 2/3 of the high speed.
2. Condenser fan:
a. Propeller type, direct drive, aluminum blades, dynamically balanced, and vertical discharge.
b. Permanently sealed ball bearings and permanently lubricated.
3. Induced draft blower:
a. Direct or belt drive, single inlet, forward curved centrifugal type, statically and dynamically balanced.
b. Made from steel with corrosion resistant finish.

D. Coils:
1. Evaporator and condenser coils, seamless copper tubes with mechanically bonded aluminum plate fins.
2. Evaporator and condenser coils, internal piping, and appurtenances: Factory applied phenol-formaldehyde thermosetting resinous coating.

E. Refrigerant components: Refrigerant circuit including:
1. Accumulator.
2. Filter drier.
3. Expansion device.
4. Gauge ports.
5. Flow control valves.
6. Circuit feed system.
7. Service gauge connections on suction, discharge, and liquid lines to charge, evacuate and contain refrigerant.

F. Controls and equipment safety features:
   1. Provide system controls for a complete and properly functioning system that operates as described. Provide, as a minimum, the following:
      a. Condenser fan controls.
      b. Evaporator fan controls.
      c. All motor contactors.
      d. 24-volt control circuit and transformer, if 24-volt control is specified in the Air Conditioning Unit Schedule.
      e. Manual reset circuit breakers.
      f. Power disconnect switch.
      g. Electronic thermostat.
      h. 5-minute compressor cycle delay.
      i. Differential enthalpy economizer control.
      j. Check filter switch suitable for field connection remote alarm.
      k. 2 stage heating and cooling.
      l. Flame proving controls.
      m. Provide with a low ambient cooling option.
   2. Equipment safety features, include:
      a. High-pressure switches.
      b. Compressor over-temperature and overcurrent.
      c. Loss of charge/low pressure switch.
      d. Freeze stat on evaporator.
      e. Lock out protection.
      f. Heating high temperature limit switch.
      g. Heating induced draft motor pressure switch.
      h. Heating flame roll out switch.
   3. Provide dry-contacts for the following status and alarms:
      a. Failed.
      b. Running.
      c. Dirty Filter.
   4. Provide an input connection for a smoke alarm shutdown.
   5. Interface to building HVAC controls:
      a. Provide contacts and signals to operate unit with the HVAC control system as specified in Section 15936 - Instrumentation and Control Devices for HVAC.

G. Electrical:
   1. Provide 15-amp, 120-volt, single-phase, ground fault interrupter convenience outlet at condenser unit; provide factory installed transformer, and independent fuse or breaker protection for outlet.
   2. Provide power disconnect switch at each piece of unit; mount disconnect in NEMA Type 3R enclosure if exterior to unit.

H. Unit casing:
   1. Manufactured of minimum 22-gauge galvanized steel, bonderized, corrosion protected, and exterior coated with a baked enamel finish interior primer coated. Coating shall withstand FS Test Method Standard 141 (Method 6061) 500-hour salt spray test.
   2. Weatherproof design, reinforced, and braced for maximum rigidity.
   3. Indoor air section compartment: Insulated with minimum 1/2 inch thick, permanent, fireproof, odorless glass fiber material, and coated on the air

side. Aluminum foil face fiberglass insulation shall be used in the furnace compartment.
4. Provide gasketed, removable panels or access doors to service equipment components and connections.
5. Provide with:
   a. Filter rack for 2-inch filters accessible through hinged access door.
   b. Non-corrosive drain pan in accordance with ASHRAE Standard 62.1.
   c. Minimum 3/4-inch horizontal drain connection.
   d. Knockouts for utility and control connections.
   e. Minimum 16-gauge steel roll formed base rail with lifting holes.

I. Filter section:
1. Provide filter with at least a MERV 13 rating.
2. Low velocity 2-inch thick pleated filters of commercially available sizes.
3. Filter face velocity: Per manufacturer's recommendations.
4. Filters for any 1 unit shall be the same size.
5. Manufacturer: The following or equal:
   a. American Air Filter.

2.04 ACCESSORIES

A. Curb assemblies:
1. Provide where called for on the Air Conditioning and/or as indicated on the Drawings.
2. Factory fabricated of aluminum with wood nailer strip and gaskets.
3. Capable of supporting entire unit weight.
4. Suitable for installing and connecting ductwork to curb.
5. In accordance with NRCA Standards.
6. Height:
   a. Shall extend a minimum of 12 inches above top of built up roofing, but shall be no more than 15 inches high for Packaged Air Conditioning Units.
   b. Shall extend a minimum of 8 inches above top of built up roofing, but shall be no less than 14 inches high for Split System Air Conditioning Units outdoor condensing unit.
7. Flashing shall comply with NRCA Standards.

B. Economizer, when scheduled provide:
1. Integrated type capable of compressor operation while modulating to utilize up to 100 percent outdoor air for cooling when outdoor air and humidity are at set acceptable levels.
2. Including:
   a. Differential bulb enthalpy control.
   b. Damper drive motor.
   c. Gravity relief damper.
   d. Low leakage dampers, not to exceed 3 percent leakage at 1-inch static pressure.
3. Differential enthalpy sensor for economizer control.

C. Sensors: As specified in 15936 - Instrumentation and Control Devices for HVAC.

D. Provide flue hood protector assembly to protect from the hot sides of the gas flue hood.

E. Provide hail guard to protect against damage from hail and other flying debris.

F. Provide NO_x reduction kit to reduce NO_x emission levels to no more than 40 nanograms per joule.

G. Provide dirty filter switch with contacts for field installed remote light or alarm.

H. Provide coil guard grill to protect condenser coil from penetration by large objects.

I. Provide condensate drain per mechanical code as specified in Section 01410 - Regulatory Requirements.

J. Flexible duct connectors: As specified in Section 15820 - Ductwork Accessories.

PART 3 EXECUTION

3.01 GENERAL

A. Inspect all components for shipping damage, conformance to specifications, and proper torques and tightness of fasteners, as specified in Section 15050 - Common Work Results for Mechanical Equipment.

B. Prior to installation, protect equipment from dust and atmospheric exposure as recommended by the unit manufacturer.
   1. Provide temporary closures for equipment openings designed for airflow.

C. During installation and until equipment is operated, protect equipment and ducts from dust and debris by covering openings with tape or plastic.

D. Examine and verify details and sections indicated on the Drawings, ascertain adequacy, and determine conflicts in dimensions and clearances.
   1. Take measurements and verify dimensions to ascertain fit of installation.
   2. Ascertain structural sufficiency to support installation.
   3. Ascertain that supports and openings are correctly located; otherwise cut new openings where required.
   4. Confirm specified thermostat or other controls are compatible with specified equipment.

3.02 INSTALLATION

A. As specified in Section 15050 - Common Work Results for Mechanical Equipment:
   1. Before installation, remove dust and debris from equipment and ducts.

B. Anchoring and support:
   1. Provide anchoring and support designed in accordance with current engineering practice for equipment and appurtenances by attaching or connecting to supporting members or by providing other supports.

C. Adjust alignment of ducts where necessary to resolve conflicts with architectural features or to resolve conflicts with the work of other trades.

D. Install and wire unit air conditioners, controls, and thermostats in accordance with manufacturer's recommendations.
   1. Provide local disconnect switches.

E. Provide flexible duct and flexible piping connections at connections to unit air conditioners.

F. Install roof curb and unit as recommended by unit manufacturer.

G. Install NRCA approved flashing and counterflashing.

H. Provide venting in accordance with building code, mechanical code, and plumbing code as specified in Section 01410 - Regulatory Requirements and in accordance with NFPA 54.

I. Upon completion of installation, clean duct, and debris from ductwork, and equipment.

3.03 COMMISSIONING

A. As specified in Section 01756 - Commissioning and this Section.

B. Manufacturer services:
   1. Provide certificates:
      a. Manufacturer’s Certificate of Source Testing.
      b. Manufacturer’s Certificate of Installation and Functionality Compliance.

C. Source testing:
   1. Test as specified in Section 15958 - Mechanical Equipment Testing.
   2. Equipment:
      a. Test witnessing: Not witnessed.
      b. Conduct Level 1 General Equipment Performance Test.
      c. Conduct Level 1 Vibration Test.
      d. Conduct Level 1 Noise Test.
   3. Equipment:
      a. Test witnessing: Not witnessed.
      b. Conduct Level 1 General Equipment Performance Test.
      c. Conduct Level 1 Vibration Test.
      d. Conduct Level 1 Noise Test.

D. Functional testing:
   1. Equipment:
      a. Test witnessing: Witnessed.
      b. Conduct Level 2 General Equipment Performance Test.

c. Conduct Level 2 Vibration Test.
d. Conduct Level 2 Noise Test.
e. Test for outdoor sound power at levels.

3.04 SCHEDULES

A. As indicated on the Drawings.

END OF SECTION

SECTION 15762

HEATING UNITS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Electric unit heaters (EUH).
   2. Thermostats for unit heater.

1.02 REFERENCES

A. Air Movement and Control Association International, Inc. (AMCA):
   1. 302 - Application of Sone Ratings for Non-Ducted Air Moving Devices.

B. American Gas Association (AGA).

C. California Code of Regulations (CCR):
   1. Title 24 - Building Standards Code.

D. National Electrical Code (NEC).

E. National Fire Protection Association (NFPA):
   1. 54 - National Fuel Gas Code.
   2. 70 - National Electrical Code (NEC).

F. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (100 V Maximum).

G. Underwriters' Laboratories, Inc. (UL).

1.03 DEFINITIONS

A. NEMA Type 3R enclosure in accordance with NEMA 250.

1.04 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures and Section 15050 - Common Work Results for Mechanical Equipment.

B. Product data:
   1. Samples: Manufacturer's standard color chips for cabinets finish.
   2. Certificates: Successful testing of burners used in gas unit heaters.
   3. Provide heating units and controls that are listed by UL.

C. Shop drawings:
   1. System layout, mechanical, electrical power, and control diagrams.
   2. Materials.
   3. Supports and seismic bracing calculations and details.

4. Cut sheets on primary and ancillary equipment.
5. Sound ratings of fans in Sones in accordance with AMCA Publication 302.
6. For projects located in California, certification of compliance with CCR Title 24 efficiency standards.

D. Commissioning submittals:
   1. Provide Manufacturer's Certificate of Source Testing as specified in Section 01756 - Commissioning.
   2. Provide Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 01756 - Commissioning.

E. Project closeout documents:
   1. Provide vendor operation and maintenance manual as specified in Section 01782 - Operation and Maintenance Manuals.

F. Warranties.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect equipment from dust and atmospheric exposure as recommended by the unit manufacturer.
   1. Provide temporary closures for equipment openings designed for airflow.

1.06 SITE CONDITIONS

A. As specified in Section 01610 - Project Design Criteria.

1.07 WARRANTY

A. As specified in Section 01783 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Design requirements:
   1. Provide supports meeting the seismic design criteria as specified in Section 01610 - Project Design Criteria and wind design criteria for exterior units as specified in Section 01610 - Project Design Criteria.
   2. Electrical components: UL listed and meeting the design and installation requirements of the NEC.
   3. Hot water piping, gas piping, drains, venting, and other appurtenances of unit heaters: Install in accordance with building code, mechanical code, and plumbing code as specified in Section 01410 - Regulatory Requirements, and the NFPA.
   4. Noise levels for unit heaters installed in offices, hallways, or entry areas: Not to exceed 10 Sones as measured in accordance with AMCA Publication 302.
   5. Motors supplied with heating units: As specified in Section 16222 - Low Voltage Motors up to 500 Horsepower.
   6. Heaters: For projects located in California, comply with efficiency requirements of CCR Title 24.

B. Performance requirements are included in the Heating Unit Schedules at the end of this Section.

C. Design and supply necessary electrical power and control systems, components, and wiring to make a complete functioning system.
   1. Comply with referenced electrical Sections and design to perform system heating functions as specified in Section 15936 - Instrumentation and Control Devices for HVAC.

2.02 ELECTRIC UNIT HEATER (EUH)

A. Manufacturers: One of the following or equal:
   1. Indeeco, Type TRIAD.
   2. Trane, similar models.
   3. Markel, similar models.
   4. Chromalox, similar models.

B. Fan type: Aluminum axial flow:
   1. Provide fan guards.
   2. Dynamically balance.
   3. Fan designed for quiet operation.
   4. Permanently lubricated ball bearings.
   5. Automatic reset thermal overload protection.

C. Heating element characteristics:
   1. Rated capacity at entering air temperature of 65 degrees Fahrenheit.
   2. Fin type, Type 316 stainless steel plated heater elements, with elements brazed to common fins, designed for maximum strength and maximum heat transfer.
   3. 3-phase designed for balanced phases.
   4. Over temperature cutout with automatic reset.

D. Features:
   1. Built-in magnetic contactors.
   2. Control transformer for 24 or 120-volt control as indicated in the Heating Unit Schedules.
   3. Required mounting brackets.
   4. Individually adjustable outlet louvers.
   5. Heavy 16 gauge stainless steel louvered outlet grille and plated rear grille.
   6. Cabinet formed of minimum thickness 18-gauge steel with steel stiffeners. Listed for corrosive areas and NEMA 4X hose down requirements.
   7. Controls:
      a. Provide thermostat as specified in this Section.
      b. Provide control transformer suitable for 24-volt or 120-volt control as indicated in the Heating Unit Schedules.

E. Finishes:
   1. Casing finish backed enamel in manufacturer's standard color.

2.03 THERMOSTATS FOR UNIT HEATERS

A. Type: Wall mounted, heat only with fan AUTO-ON selector switch when fan part of unit and separate system ON-OFF selector switch.

B. Dial or lever temperature setpoint adjustment with 45 to 90 degrees Fahrenheit setpoint range.

C. Setpoint and temperature indication.

D. Control voltage as indicated in the attached Heating Unit Schedules.

E. The use of mercury within the thermostat is not acceptable.

F. Bi-metallic contacts suitable for 1- or 2-stage unit heater control as specified for the heater size or as scheduled.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine and verify that Work is in condition to receive installation specified in this Section.
   1. Take measurements and verify dimensions to ascertain fit of installation.
   2. Verify structural sufficiency to support installation.
   3. Verify that chassis, shafts, and openings are correctly located.
      a. Otherwise cut new openings where required.
   4. Confirm specified thermostat and other controls are compatible with specified equipment.

B. Examine and verify structural details and sections indicated on the Drawings, ascertain adequacy, and determine possible conflicts in dimensions and clearances.

3.02 PREPARATION

A. Before installation, remove dust and debris from equipment and ducts.

B. During installation and until equipment is operated, protect equipment and ducts from dust and debris by covering openings with tape or plastic.

3.03 INSTALLATION

A. Anchoring and support: Install anchoring for seismic and wind forces to meet the design criteria specified in Section 01610 - Project Design Criteria.

B. Alignment: Adjust ductwork alignment when necessary to resolve conflicts with architectural and structural features or to resolve conflicts with work of other trades.

C. Install and wire unit heaters and thermostats in accordance with manufacturer's recommendations.

D. Adjust heater units with louvers for optimum air circulation.

E. Provide gas unit heater venting in accordance with mechanical code and plumbing code as specified in Section 01410 - Regulatory Requirements and in accordance with NFPA 54.

3.04 COMMISSIONING

A. As specified in Section 01756 - Commissioning and this Section.

B. Manufacturer services:
   1. Provide certificates:
      a. Manufacturer's Certificate of Source Testing.
      b. Manufacturer's Certificate of Installation and Functionality Compliance.

C. Source testing:
   1. Test as specified in Section 15958 - Mechanical Equipment Testing.
   2. Equipment:
      a. Test witnessing: Not witnessed.
      b. Conduct Level 1 General Equipment Performance Test.
      c. Conduct Level 1 Vibration Test.
      d. Conduct Level 1 Noise Test.
   3. Equipment:
      a. Test witnessing: Not witnessed.
      b. Conduct Level 1 General Equipment Performance Test.
      c. Conduct Level 1 Vibration Test.
      d. Conduct Level 1 Noise Test.
   4. Electrical Instrumentation and Controls:
      a. Test witnessing: Not witnessed.
      b. Conduct testing as specified in Section 17950 - Commissioning for Instrumentation and Controls.

D. Functional testing:
   1. Equipment:
      a. Test witnessing: Witnessed.
      b. Test equipment performance and balance equipment as specified in Section 15954 - Testing, Adjusting, and Balancing for HVAC.
      c. Conduct Level 2 General Equipment Performance Test.
      d. Conduct Level 2 Vibration Test.
      e. Conduct Level 2 Noise Test.
   2. Electrical Instrumentation and Controls:
      a. Test witnessing: Witnessed.
      b. Conduct testing as specified in Section 17950 - Commissioning for Instrumentation and Controls.
   3. System:
      a. Test witnessing: Witnessed.
      b. Conduct Level 2 General Equipment Performance Test.
      c. Conduct Level 2 Vibration Test.
      d. Conduct Level 2 Noise Test.
      e. Process test.

3.05 FIELD QUALITY CONTROL

A. Test equipment and installation to verify operation is within manufacturer's standards and that noise levels do not exceed levels specified.

B. Test equipment performance and balance equipment as specified in Section 15954 - Testing, Adjusting, and Balancing for HVAC.

3.06 HEATING UNIT SCHEDULES

A. Electric Heating Unit Schedule: as indicated on Drawings.

END OF SECTION

SECTION 15812

METAL DUCTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Aluminum ductwork.

1.02 REFERENCES

A. ASTM International (ASTM):
   1. B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):
   1. HVAC Systems-Duct Design.
   2. Seismic Restraint Manual Guidelines for Mechanical Systems.

C. Underwriters Laboratories, Inc. (UL):
   1. 181A - Closure Systems for Use with Rigid Air Ducts.

1.03 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data:
   1. Duct and component material and details of construction.
   2. System layout including floor and wall penetrations.
   3. Supports and anchoring details.
   4. Components used in the duct system including turning vanes, dampers, flexible connections, and access doors.

C. Design data: Seismic design calculations:
   1. Design calculations for duct construction as specified in Section 01612 - Seismic Design Criteria and in accordance with SMACNA.

D. Provide Manufacturer’s Certificate of Source Testing as specified in Section 01756 - Commissioning.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Custom design and fabricate metal ductwork for the applications indicated on the Drawings and for the conditions specified.

B. In accordance with SMACNA Manual for gauge of sheet metal, joint types, reinforcement, bracing, hangers and supports, fabrication, and installation.
   1. Sheet metal thicknesses: The greater of that thickness required to in accordance with SMACNA for the design pressure specified and the following minimum thicknesses:

Diameter or Largest Dimension of Rectangular Duct (Inches)	Minimum Sheet Thickness, Inches (B&S Gauge)
Up to 12	0.025 (22)
13 to 30	0.032 (20)
Larger than 31	0.040 (18)

   2. Spacing of hangers and supports:
      a. Provide supports as indicated on the Drawings.
      b. When supports are not shown, provide supports as required in accordance with SMACNA but no greater than the spacing indicated on the Drawings or the following requirements, whichever is less:
         1) Ducts 18 inches and smaller in largest dimension: 8 feet on center.
         2) Ducts over 18 inches in largest dimension: 4 feet on center.
   3. Support connections:
      a. Provide as indicated on the Drawings.
      b. When not indicated on the Drawings, provide in accordance with SMACNA.
      c. As a minimum, all support connections to metal or wood roofs shall be located at roof framing members only.
      d. No penetrations through roof deck, roof membrane, or connections to roof membrane are acceptable.

C. Design pressure: 2 inches water column unless otherwise indicated on the Drawings or specified.

D. Seismic design criteria: As specified in Section 01612 - Seismic Design Criteria and in accordance with SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.

E. Hanger reinforcement:
   1. Ducts 18 inches and smaller in largest dimension: None.
   2. Ducts over 18 inches and under 30 inches in largest dimension: 1-1/2 inches by 1-1/2 inches by 1/8-inch angles, 8 feet on center.
   3. Ducts 30 inches and larger in largest dimension: 1-1/2 inches by 1-1/2 inches by 1/8-inch angles, 4 feet on center.

F. When ducts are specified with insulation on interior walls, size duct to provide clear inside dimensions indicated on the Drawings.

G. Miscellaneous design details:
   1. Changes in duct size:
      a. Use uniformly tapering sections.
      b. Taper not more than 1 inch in 5 inches of run unless otherwise indicated on the Drawings.

2. Bends: With the exception of miter bends, design bends with inside radii equal to duct width or diameter.
    a. Install turning vanes at all 90 degree beds.
3. Duct sleeves: Install duct sleeve when ducts pass through concrete or masonry walls, slabs, or ceilings.
4. Access openings: Install in locations that allow access to dampers, fusible links, controllers, and similar devices.
5. Flexible connections: Install at connections to air handling equipment and at locations indicated on the Drawings.

2.02 MATERIALS

A. Ducts: Aluminum alloy 3003 H14 in accordance with ASTM B209.

B. Flexible connectors: As specified in Section 15820 - Ductwork Accessories.

C. Turning vanes: Match duct material.

D. Reinforcing: Formed or extruded aluminum angles.

E. Ductwork insulation: As specified in Section 15084 - Ductwork Insulation.

2.03 COMPONENTS

A. Duct sleeves:
1. Sleeve flanges: 4 inches wide.
2. Size: 2 inches larger than the duct or duct with external insulation.

B. Access openings:
1. Size: 2 inches less than duct size.
2. Doors:
    a. Gauge not less than duct sheet.
    b. Provide continuous hinge and latch on outside.
3. Gasket: Along door periphery.
4. Visual panel: 1/8-inch thick, clear plexiglass.

C. Turning vanes:
1. Material: Same as ductwork.
2. Type:
    a. Single-blade vanes for duct widths less than 36 inches.
    b. Airfoil type vanes for duct widths of 36 inches and greater:
        1) No trailing edge.
3. Mounted in side rails.
4. Provide turning vanes for square-turn elbows, smooth radius elbows, and splitters.
5. Size: 2-inch blades for ducts up to 18 inches, 4-1/2 inch blades for larger ducts.

D. Splitter dampers: Provide at branch take-offs where necessary for balancing system.

E. Extractors:
   1. Components:
      a. Synchronized steel curved blades.
      b. Heavy side rails.
      c. Screw operator.
   2. Provide extractors at take-off from main supply duct adjacent to diffusers, registers, or grilles where splitter is not used.

2.04 FABRICATION

A. Fabricate ductwork to the configuration and dimensions indicated on the Drawings.

B. Dimensions indicate net free area. Increase duct dimensions by thickness of insulation when internal insulation is specified.

C. Do not utilize S clips, duct tape, or externally applied mastic on medium pressure duct systems.

D. Do not use snap lock seams.

E. Provide flexible duct connectors at all connections to fans and other air movement equipment.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine and verify that Work is in condition to receive metallic ductwork as specified in this Section.
   1. Take measurements and verify dimensions on shop drawings to verify fit of installation.
   2. Verify that supports and openings are correctly located.

B. Examine and verify structural details and determine conflicts in dimensions and clearances.

3.02 INSTALLATION

A. Cover ductwork openings with tape, plastic, or sheet metal to reduce the amount of dust or debris which may collect in the system at each of the following times:
   1. At the time of rough installation.
   2. During storage on the construction site.
   3. Until final start-up of the heating and cooling equipment.

B. Before installation remove dust and debris from ducts.

C. Adjust duct alignment where necessary to resolve conflicts with architectural features or to resolve conflicts with the work of other trades.

D. Install ductwork to provide a system free of buckling, warping, or vibration.

E. Hangers:
   1. Install hangers as indicated on the Drawings.
   2. When hangers are not detailed, conform to SMACNA HVAC System Duct Design and Seismic Restraint Manual standards and the following requirements:
      a. Rectangular ducts concealed in ceiling spaces:
         1) Use metal strap hangers.
         2) Fasten to sides of duct with 2 screws.
         3) Fasten to bottom of duct with 1 screw.
      b. Rectangular ducts in exposed areas:
         1) Install shelf angle trapeze hangers or Unistrut type hangers.
         2) Install sway bracing as required by seismic calculations, minimum 1 brace at right angle to each duct run.
      c. Round ducts in exposed areas:
         1) Install 2 half-round bands with rods bolted to panels.
         2) Install sway bracing as required by seismic calculations, minimum 1 brace at right angle to each duct run.
   3. Flexible connections: As specified in Section 15084 - Ductwork Insulation.

F. Provide closed-cell neoprene gaskets at flanged joints.

G. Tapes and mastics used to seal ductwork shall be listed and labeled in accordance with UL 181A and shall be marked.

3.03 FIELD QUALITY CONTROL

A. Inspect ductwork under operating conditions.
   1. Correct audible leaks and leaks that can be felt with the hand.

B. Test and balance ducting systems as specified in Section 15954 - Testing, Adjusting, and Balancing for HVAC.

END OF SECTION

SECTION 15820

DUCTWORK ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Dampers and damper operators.
   2. Diffusers, grilles, and registers.
   3. Screens.
   4. Flexible duct connectors.
   5. Other ductwork accessories.

1.02 REFERENCES

A. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1000 V Maximum).

B. National Fire Protection Association (NFPA):
   1. 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.
   2. 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

C. Uniform Building Code (UBC).

D. Underwriters Laboratories, Inc. (UL):
   1. 555 - Fire Dampers.
   2. 555S - Smoke Dampers.

1.03 DEFINITIONS

A. Dampers, diffusers, grilles, and registers specified are indicated on the Drawings by the abbreviations listed below. Each abbreviation is followed by a hyphen and a number to designate the required style of unit:
   1. BD: Balancing Damper.
   2. BDD: Backdraft Damper.
   3. DG: Door Grille.
   4. FD: Fire Damper.
   5. FL: Flexible Duct Connector.
   6. RR: Return Register or Grille.
   7. SR: Supply Register, Grille, or Diffuser.

B. NEMA Type 1 enclosure in accordance with NEMA 250.

C. Return registers:
   1. RR designation includes wall, ceiling, and duct mounted air exhaust or return devices including diffusers and grilles with or without control dampers.
   2. When no return register style is indicated on the Drawings, provide Style RR-4; provide 4 inch flanged drop frame when duct mounting indicated.

D. Supply registers:
   1. SR designation includes wall, ceiling, and duct mounted air supply devices including diffusers and grilles with or without control dampers.
   2. When no supply register style is indicated on the Drawings, provide Style SR-4; provide 4 inch flanged drop frame when duct mounting indicated.

1.04 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data: As specified in Section 15050 - Common Work Results for Mechanical Equipment.

PART 2 PRODUCTS

2.01 DAMPERS

A. Manufacturers:
   1. Provide dampers manufactured by the same manufacturer.
   2. Dampers:
      a. Manufacturers: One of the following or equal:
         1) One manufacturer's model is listed with each style, similar models from other listed vendors are acceptable:
            a) Ruskin Manufacturing.
            b) American Warming and Ventilating.
            c) Swartwout.

B. Materials:
   1. Metallic ductwork: Aluminum for aluminum duct work; aluminum or galvanized steel for galvanized steel ductwork unless specified otherwise with styles.
   2. Fiberglass reinforced plastic ductwork: Fiberglass reinforced plastic where not otherwise specified.

C. Components: Include specified damper type with frame actuators, clips, connectors, and other accessories necessary for mounting; provide locking quadrant manual actuator or electric actuator as indicated on the Drawings.

D. Volume control and balancing dampers (BD):
   1. BD-9, Style 9 Balancing Damper, Aluminum Rectangular Damper:
      a. Service: Wet and corrosive air systems up to 13 inches water column; up to 6,000 feet per minute velocity and up to 74 by 48 inches size.
      b. Size and installation: Size as indicated on the Drawings suitable for mounting in rectangular ducting.
      c. Frame: Aluminum construction.
      d. Blade: Symmetrical blades of aluminum construction as required to fill the damper opening; horizontal blade orientation.

e. Blade axle: 1/2-inch diameter stainless steel.
f. Finish: Mill aluminum.
g. Manufacturers: One of the following or equal:
1) Ruskin, Model CD403.
2) Greenheck, Model VCD.

E. Damper operators:
1. General: Provide manual or electric damper operator for each damper furnished; type as indicated on the Drawings.
2. Manual operators:
a. Gears or mechanical, to operate damper manually with a force not exceeding 20 pounds.
b. Provide manual operators with locking quadrant.
c. Provide 3/8 inch, or larger, square double-ended drive shaft adequate for required damper torque.
d. Provide sufficient number of operators for torque required to operate damper.
3. Electric damper operators:
a. Manufacturers: One of the following or equal:
1) Honeywell, Model M445A.
2) Johnson Controls, Model M100.
b. 2-position spring return.
c. 1 internal single pole double throw auxiliary switch rated 5 ampere, 120 volt, single phase, and 60 hertz.
d. Housed in die-cast aluminum case with mounting flange.
e. Motor and gear train components immersed in oil.
f. When required, provide auxiliary transformers factory wired to damper operator and installed in NEMA Type 1 enclosure fastened to motor housing.

2.02 DIFFUSERS, GRILLES, AND REGISTERS

A. Manufacturers:
1. Provide diffusers, grilles, and registers manufactured by the same manufacturer.
2. Diffusers, grilles, and registers: One of the following or equal. One manufacturer's model is listed with each style, similar models from other listed vendors are acceptable:
a. Titus Manufacturing Corp.
b. Tuttle and Bailey.
c. Kees, Inc.
d. Metal Industries, Inc., (MetalAire).
e. Krueger.

B. Materials:
1. For metallic ductwork: Aluminum for aluminum duct work; aluminum or galvanized steel for galvanized steel ductwork unless specified otherwise with styles.
2. For fiberglass reinforced plastic ductwork: Fiberglass reinforced plastic where not otherwise specified.

C. Components: Include specified style with frame, clips, connectors, and other accessories necessary for mounting.

D. Appearance: Similar for units in same room or space.

E. Finishes:
   1. In chlorine, hypochlorite, or sodium bisulfite storage or pumping rooms and building exhaust systems for these areas: Coat with two 1-1/2 mils thick coats of synthetic vinyl plastic coating suitable for use in gas contaminated exhaust system including chlorine, sulfur dioxide, ozone, or a combination thereof of such gases:
      a. Manufacturers: One of the following or equal:
         1) Bisonite M, Amercoat® Number 23 and 55.
         2) Plasite, 2441.
   2. In laboratory room exhaust systems: Coat with 2 finish coats of synthetic resin over prime applied on clean surface suitable for use in a laboratory exhaust system:
      a. Manufacturers: The following or equal:
         1) Carboline Eisen-Heiss.
   3. In other locations, specified factory standard with the style requirements of a color selected by Engineer from standard manufacturer's colors.

F. Supply diffuser, grille, and register styles:
   1. SR-3, Supply Register Style 3:
      a. Size and installation: Rectangular grille size as indicated on the Drawings framed for surface mounting on gypsum or directly mounted on exposed ducting; provide 4 inch flanged drop frame when duct mounted.
      b. Faceplate: Removable grille with double deflection blades spaced at 3/4 inch; front blades parallel to long dimension; provide gasket at frame for sealing.
      c. Core: Adjustable vanes with rectangular or round neck to match ducting.
      d. Damper: Provide opposed blade volume control damper suitable for use with ducting type; damper to be adjustable through the face of the unit.
      e. Materials: Aluminum frame, core, damper, and faceplate.
      f. Manufacturers: One of the following or equal:
         1) Titus, Model 272FL.
         2) Krueger, Model 5880H.

G. Return diffuser, grille, and register styles:
   1. RR-3, Return Register Style 3:
      a. Size and installation: Rectangular grille with size as indicated on the Drawings framed for surface mounting on gypsum or directly mounted on exposed ducting; provide 4 inch flanged drop frame when duct mounted.
      b. Faceplate: Removable grille with fixed blades spaced at 3/4 inch; front blades parallel to long dimension with 35 degree deflection; provide gasket at frame for sealing.
      c. Core: When connected to ducting, provide suitable rectangular or round neck to match ducting; when filter indicated on the Drawings, provide 1-inch deep filter frame and hinged face with 1/4-turn fasteners.
      d. Damper: When connected to ducting, provide opposed blade volume control damper suitable for use with ducting type; damper to be adjustable through the face of the unit.

e. Materials: Aluminum frame, core, damper, and faceplate.
f. Manufacturers: The following or equal:
1) Titus, Model 350FL or Model 350FF1.

2.03 SCREENS

A. Characteristics and features:
1. Bird screen: 1/2-inch mesh by 14 gauges.
2. Insect screens: 18 by 14 mesh.
3. Screens and frames, same material as ductwork, hood, louver, fan, or equipment connected to screen.
4. Screens secured in frames.

2.04 FLEXIBLE CONNECTIONS

A. Provide flexible duct connectors at all connections to fans and other air movement equipment as indicated on the Drawings.

B. FL-2, Duct to Duct Flexible Connection, Corrosive Environment:
1. Fabric for flexible connections exposed to chemicals shall be glass fabric coated with Teflon™ and suitable for a temperature range of -10 degrees Fahrenheit to 500 degrees Fahrenheit and shall have a weight of at least 14 ounces per square yard and a thickness of 0.014-inch.
2. Manufacturers: The following or equal:
a. Ventfabrics, “Ventel”.

PART 3 EXECUTION

3.01 PREPARATION

A. Before installation, remove dust and debris from ducts and accessories.

3.02 INSTALLATION

A. Install items in accordance with manufacturer’s instructions.

B. FL-2, Flexible Connections:
1. Install at building expansion joints and as indicated on the Drawings.
2. Install with collar and metal band to form airtight joints.
3. Install with minimum 4 inches of slack in fabric.
4. Exterior locations: Install sheet metal weather cover over fabric.
5. Duct alignment shall be a maximum of 1/2-inch offset.
6. The minimum/maximum gap shall be 2-inches and 6-inches.
7. Lap longitudinal joints and glue per manufacturer’s recommendations.

3.03 FIELD QUALITY CONTROL

A. Set grilles, dampers, and diffusers to achieve flows and flow patterns indicated on the Drawings and test finished system as specified in Section 15954 - Testing, Adjusting, and Balancing for HVAC.

B. Mark final balance positions on all manual damper actuators with paint pen in a distinctive color.

END OF SECTION

SECTION 15830

FANS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Fans, including:
   1. Type 4 - Sidewall propeller fans.
   2. Type 5 - Centrifugal ceiling exhaust fans.

1.02 REFERENCES

A. American Bearing Manufacturers Association (ABMA):
   1. 9, Load Ratings and Fatigue Life for Ball Bearings.
   2. 11, Load Ratings and Fatigue Life for Roller Bearings.

B. Air Movement and Control Association International, Inc. (AMCA):
   1. 210, Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating.
   2. 211, Certified Rating Program- Product Rating Manual for Fan Air Performance.
   3. 300, Reverberant Room Method for Sound Testing of Fan.
   4. 301, Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

C. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE):
   1. 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
   2. 68 - Laboratory Methods of Testing to Determine Sound Power in a Duct.

D. ASTM International (ASTM):
   1. A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
   2. D4167 - Standard Specification for Fiber Reinforced Plastic Fans and Blowers.
   3. E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

E. National Electrical Code (NEC).

F. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1000 V Maximum).

G. National Fire Protection Association (NFPA):
   1. 90A - Standard for Installation of Air Conditioning and Ventilating Systems.
   2. 820 - Standard for Fire Protection in Wastewater Treatment and Collection Facilities.

H. National Roofing Contractors Association (NRCA).

I. Occupational Safety and Health Administration (OSHA).

J. Underwriters' Laboratories, Inc. (UL).

1.03 DEFINITIONS

A. As used in this Section and on the drawings, abbreviations and Fan Schedule headings have the following meaning:
   1. SF or SPF: Supply Fan.
   2. EF or EXF: Exhaust Fan.
   3. Type: Fan type as specified in this Section.
   4. SP or ESP: Fan External Static Pressure in inches water column.
   5. Size: Nominal fan blade or wheel diameter in inches.
   6. Hp: Fan motor horsepower.
   7. V/Ph: Fan motor voltage and power phases.

B. NEMA:
   1. Type 1 enclosure in accordance with NEMA 250.
   2. Type 3R enclosure in accordance with NEMA 250.

1.04 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data:
   1. Materials.
   2. Primary and ancillary equipment.
   3. Sound Power Level in each of 8 octave bands and overall Sones.
   4. Fan system layout, mechanical, electrical power, and control diagrams.
   5. Supports, vibration isolators, and seismic bracing calculations and details.
   6. Calculated fan vibration levels and field-testing method.
   7. Bearing life.
   8. Fan performance curves showing specified operating condition.

C. Provide vendor operation and maintenance manual as specified in Section 01782 - Operation and Maintenance Manuals.
   1. Furnish bound sets of installation, operation, and maintenance instructions for each type fan.

D. Provide Manufacturer's Certificate of Source Testing as specified in Section 01756 - Commissioning.

1.05 QUALITY ASSURANCE

A. Provide fans:
   1. Listed by UL.
   2. Rated in accordance with AMCA.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver units in 1 piece, factory assembled, internally wired, and lubricated.

B. Protect equipment from dust and atmospheric exposure as recommended by the unit manufacturer.
   1. As a minimum provide temporary closures for equipment openings designed for airflow.

1.07 EXTRA MATERIALS

A. Provide 2 extra sets (3 sets total) of filters per installed fan for fans specified with filters.

B. Provide 1 extra set of belts per installed fan for fans specified with belt drives.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. Design requirements:
   1. Provide fans that have sharply rising pressure characteristics which extend throughout the operating range and continue to rise beyond the efficiency peak.
   2. Provide fans that peak as close as possible to the maximum efficiency and whose operating range is within the normal fan selection range.
   3. When scheduled, provide guided vibration isolator for fans, so that not more than 10 percent of the vibration amplitude of the fan and motor is transmitted to the supporting structure.
   4. Design fan inner scroll and air stream surfaces to maintain smoothness for entire fan service life.
   5. Seismic supports: Seismic design criteria as specified in Section 01612 - Seismic Design Criteria.
   6. Wind supports for exterior units: Wind design criteria as specified in Section 01614 - Wind Design Criteria.
   7. Electrical components: UL listed and meeting the design and installation requirements of the NEC.
   8. Applicable portions as specified in Section 15050 - Common Work Results for Mechanical Equipment.
   9. Motors supplied with fans: Roof curbs: Designed in accordance with NRCA standards.
   10. Insulation and adhesives: Meet NFPA 90A requirements for flame spread and smoke generation.
   11. Belt drive systems: Adjustable for minimum within 5 percent speed change, rated for 1.5 times maximum horsepower motor available for the scheduled fan size or model.
   12. Screens: Provide bird or insect screen as specified with the fan type or as listed on the Fan Schedule:
       a. Bird screen: Stainless steel; 0.5-inch mesh 18-gauge.
       b. Insect screen: Stainless steel mesh and frame.
   13. Finishes: When not specified with fan type, coat ferrous metals as specified in Section 09960 - High-Performance Coatings.

14. Accessories: Provide accessories specified and those scheduled.
15. Provide fans with fire/smoke control system as specified under paragraph Fire/Smoke Control System Design Requirements.

B. Performance requirements:
   1. Performance requirements are included in the Fan Schedule located at the end of this Section.
   2. Fan performance: Rated and licensed to bear the AMCA label in accordance with AMCA 210 and AMCA 211.
   3. Total sound power levels in the 8 octave band range as measured in accordance with ASHRAE 68, AMCA 301, or AMCA 300 as appropriate for each fan: Not to exceed the lesser of the following or the Sones levels on the Fan Schedule.

Sound Power Level, decibel levels referenced to 10-12 watts								
Frequency, Hz	63	125	250	500	1,000	2,000	4,000	8,000
General	100	98	94	88	84	84	78	75

   4. Air filters supplied with fans: 25 to 30 percent dust spot efficiency when rated per ASHRAE Testing Standard 52.2.
   5. Bearings: Rated per ABMA 9 or 11 for a L10 life rating of not less than 50,000 hours; provide greater life when specified with each fan type.

C. Electrical and control system design:
   1. Design and supply necessary electrical power and control systems, components, and wiring to make a complete functioning system. Design to perform the system ventilating functions with the control systems as specified in Section 15936 - Instrumentation and Control Devices for HVAC or as indicated on the Drawings and as specified in the following Sections:
      a. Section 16050 - Common Work Results for Electrical.
      b. Section 16060 - Grounding and Bonding.
      c. Section 16075 - Identification for Electrical Systems.
      d. Section 16123 - 600-Volt or Less Wires and Cables.
      e. Section 16130 - Conduits.
      f. Section 16134 - Boxes.
      g. Section 16140 - Wiring Devices.
      h. Section 16222 - Low Voltage Motors up to 500 Horsepower.
      i. Section 16411 - Disconnect Switches.

D. Fire control system design requirements:
   1. Provide all supply, exhaust, and odor control fans greater than or equal to 2,000 cubic feet per minute with smoke control system including the following minimum components.
      a. Duct or fan mounted smoke detector as specified in Section 15936 - Instrumentation and Control Devices for HVAC.
      b. Fan interlock to shut down fan upon smoke detection.
      c. Signals for fans and smoke detectors to and from local fire alarm control panel if a fire alarm control panel is part of project design.
      d. Provide all wire, conduit, end of line resistors, and other electrical equipment for complete functioning smoke control system. Provide in conformance with the electrical, mechanical, and instrumentation Drawings. When no electrical design for smoke control system is

indicated, Contractor shall provide design and installation of the smoke control system.

2.02 TYPE 4, SIDEWALL PROPELLER FANS

A. Manufacturers: One of the following or equal:
   1. Greenheck, Model AER.
   2. Loren Cook, similar model.
   3. Penn Ventilator, similar model.

B. Type: Wall-mounted, low noise propeller type, packaged unit.
   1. Fan: Statically and dynamically balanced propeller with aluminum blades, unless noted otherwise.
   2. Motor: Permanently lubricated; selected to avoid running in the service factor.

C. Accessories:
   1. Motor and fan side OSHA guards.
   2. Wall mount collar when necessary for installation as indicated on the Drawings.
   3. Dampers with damper guards when damper scheduled.
   4. Weather hood when scheduled.
   5. Bird screen: Provide bird screen if no screen is listed on the Fan Schedule.
   6. Finish: Coat fan, housing, and accessories with polyester finish.
   7. Diffusers and louvers when scheduled.
   8. Mounting hardware.

2.03 TYPE 5, CENTRIFUGAL CEILING EXHAUST FANS

A. Manufacturers: One of the following or equal:
   1. Greenheck, Model SP, CSP.
   2. Cook, Gemini series.
   3. Penn, Zephyr.

B. Characteristics:
   1. Type: Cabinet type centrifugal fan.
   2. Fan: Steel, forward-curved, squirrel-cage type wheel.
   3. Housing: Heavy gauge carbon steel housing.
   4. Access: Removable access panel.

C. Accessories:
   1. Exhaust grille, egg-crate pattern, aluminum, or PVC construction.
   2. Factory installed backdraft damper on discharge of fan.
   3. Finish: Galvanized fan, housing, and damper.

2.04 SOURCE QUALITY CONTROL

A. Factory test fans listed on the Fan Schedule for proper operation, performance, and electrical controls.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine and verify that Work is in condition to receive installation specified in this Section.

B. Take measurements and verify dimensions to ascertain fit of installation.

C. Ascertain support and openings are correctly located.

3.02 PREPARATION

A. Before installation, remove dust and debris from equipment and ducts.

B. During installation and until equipment is operated, protect equipment and ducts from dust and debris by covering openings with tape or plastic.

3.03 INSTALLATION

A. Observe applicable installation requirements as specified in Section 15050 - Common Work Results for Mechanical Equipment.

B. Anchoring and support:
   1. Provide anchoring and support for fans and appurtenances.
   2. Provide anchoring to sustain seismic and wind forces as specified in Sections 01612 - Seismic Design Criteria and 01614 - Wind Design Criteria.

C. Adjust alignment of ducts where necessary to resolve conflicts with architectural features or to resolve conflicts with the work of other trades.

D. Install and wire unit fans and controls in accordance with manufacturer's recommendations.

E. Install flexible connections to fans.

F. Install roof curb and fan as recommended by fan manufacturer.

G. For fan housings with threaded water trap drain, provide drain piped from fan housing to the nearest drain channel, floor drain, or sump.

3.04 FIELD QUALITY CONTROL

A. Test equipment and installation to verify tightness, operation, and unit vibration is within manufacturer's submitted maximum.

B. Test equipment performance and balance equipment as specified in Section 15954 - Testing, Adjusting, and Balancing for HVAC.

3.05 COMMISSIONING

A. As specified in Section 01756 - Commissioning, 15958 - Mechanical Equipment Testing, and this Section.

B. Manufacturer services:
   1. Provide certificates:
      a. Manufacturer's Certificate of Source Testing.
      b. Manufacturer's Certificate of Installation and Functionality Compliance.

C. Source testing:
   2. Test as specified in Section 15958 - Mechanical Equipment Testing).
   3. Equipment:
      a. Test witnessing: Not witnessed.
      b. Conduct Level 1 General Equipment Performance Test.
      c. Conduct Level 1 Vibration Test.
      d. Conduct Level 1 Noise Test.
      e. Each unit shall be factory tested including control functions and economizer operation prior to shipment.
   4. Electrical Instrumentation and Controls:
      a. Test witnessing: Not witnessed.
      b. Conduct testing as specified in Section 17950 - Commissioning for Instrumentation and Controls.

D. Functional testing:
   5. Equipment:
      a. Test witnessing: Witnessed.
      b. Conduct Level 2 General Equipment Performance Test.
      c. Conduct Level 2 Vibration Test.
      d. Conduct Level 2 Noise Test.
      e. Test equipment and installation to verify tightness, operation, and unit vibration is within manufacturer's submitted maximum.
      f. Test equipment performance and balance equipment as specified in Section 15954 - Testing, Adjusting, and Balancing for HVAC.
   6. Electrical Instrumentation and Controls:
      a. Test witnessing: Witnessed.
      b. Conduct testing as specified in Section 17950 - Commissioning for Instrumentation and Controls.

3.06 SCHEDULES

A. Fan Schedule: as indicated on Drawings.

END OF SECTION

SECTION 15936

INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Controls for Heating, Ventilating, and Air Conditioning (HVAC) Systems.

1.02 REFERENCES

A. CSA International (CSA).

B. National Electrical Code (NEC).

C. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1,000 Volts Maximum).

D. National Fire Protection Association (NFPA):
   1. 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.

E. Underwriters' Laboratories, Inc. (UL):
   1. 268A - Standard for Smoke Detectors for Duct Application.
   2. 508 - Standard for Industrial Control Equipment.
   3. 1479 - Fire Tests of Through-Penetration Firestops.

F. California Code of Regulations (CCR):
   1. Title 24 - Building Standard Code.

1.03 DEFINITIONS

A. NEMA:
   1. Type 1 enclosure in accordance with NEMA 250.
   2. Type 3 enclosure in accordance with NEMA 250.
   3. Type 3R enclosure in accordance with NEMA 250.
   4. Type 4 enclosure in accordance with NEMA 250.
   5. Type4X enclosure in accordance with NEMA 250.

1.04 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Product data: As specified in Section 15050 - Common Work Results for Mechanical Equipment.

C. Shop drawings:
   1. Manufacturer's information including:
      a. Catalog information clearly marked to show specific products, models, and sizes being furnished.
      b. Component cut sheets.
   2. Provide certification that components and systems meet CCR Title 24 and are approved by the California Energy Commission.

1.05 QUALITY ASSURANCE

A. The control system shall be designed in accordance with UL and CSA standards.

B. Regulatory requirements: In accordance with CCR Title 24.

1.06 DELIVERY, STORAGE, AND HANDLING

A. The system control products shall be stored and handled per manufacturer's recommendations.

1.07 SITE CONDITIONS

A. Elevation and ambient conditions as specified in Section 01610 - Project Design Criteria.

1.08 WARRANTY

A. Special warranties: Warranty period begins at date of Project Acceptance or first date of Beneficial Use by the Owner:
   1. 1 year: Parts and on-site labor for components, systems, and programming.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

A. General requirements:
   1. All electrical components shall be UL-listed and meet the design and installation requirements of the NEC.
   2. Complete, functional system: Provide all necessary electrical power and control systems, components, and wiring to make a complete functioning system.
   3. Comply with electrical Sections for electrical power and control systems.
   4. System control functions to perform as described in Products.
   5. Materials: New, free from defects, and of the quality specified.
   6. Common manufacturer: Provide components, component accessories, and devices, as much as possible, by the same manufacturer throughout the work.
   7. Mounting: Mount control components and devices in accessible locations for maintenance and as recommended by the manufacturer; provide necessary

manufacturer-approved mounting and configuration hardware for mounting and operation of control components and devices.

8. Components and systems must in accordance with CCR Title 24 energy conservation regulations and be listed with the California Energy Commission as approved for sale in California.

B. Fire detection system design requirements:
   1. Provide all supply and exhaust fans greater than 2,000 cubic feet per minute with a smoke control system including the following minimum components.
      a. Fan and air handling unit interlocks interlock to shut down upon smoke detection signal from fire alarm control panel.
      b. Field wiring terminal blocks for connection of shut down signals from local fire alarm control panel.

2.02 DIFFERENTIAL PRESSURE SWITCHES

A. Differential pressure switches suitable for monitoring pressure drop in non-hazardous spaces:
   1. Manufacturers: One of the following or equal:
      a. Dwyer, Model EDPS series.
      b. Omega.
   2. Characteristics and features:
      a. Service:
         1) Air and other non-combustible, non-aggressive gases.
      b. Materials:
         1) Diaphragm: Silicone
         2) Housing: Acetal plastic.
         3) Switch body: PA 6.6.
         4) Cover: Polystyrene.
      c. Temperature limits: -4 degrees Fahrenheit to 185 degrees Fahrenheit.
      d. Pressure limits: Maximum 40 inches w.c.
      e. Switch type: Single-pole double-throw.
      f. Electrical rating: 1.5 A, 120 V.
      g. Enclosure: NEMA 3.
      h. Approvals: ETL approved to UL 508.

2.03 DUCT MOUNTED SMOKE DETECTORS

A. General:
   1. Provide duct mounted smoke detectors in air ducting with flows greater than 2,000 cubic feet per minute as indicated on the Drawings.
   2. Capable of mounting to rectangular or round ducts.
   3. Integral filter to reduce dust.
   4. Comply in accordance with UL 268A for air handling systems.
   5. Airflow velocity: 100 to 4,000 feet per minute.
   6. Connect the smoke detector to:
      a. Building fire alarm system.
      b. Fan control circuit to shut down respective fan upon detection of smoke.
      c. Damper control circuits to close respective air dampers to prevent spread of smoke.

B. Non-Classified Areas (SD-1):
   1. Manufacturers: The following or equal:
      a. System Sensor InnovairFlex Series D4120.
   2. Characteristics:
      a. Photoelectric type.
      b. UL 268A listed.
      c. Enclosure: NEMA Type 4.
      d. Operating temperature range of -4 to 158 degrees Fahrenheit.
      e. Power supply voltage: 120 VAC.
      f. Contacts:
         1) Alarm contact: SPST rated for 2 A at 30 VDC.
      g. Auxiliary contacts: DPDT, rated for 10 A at 30 VDC/10 A at 250 VAC.

C. Accessories:
   1. Provide metal sampling tube and end cap to match duct width. Sampling tube shall be able to be installed without use of tools.
   2. Provide mounting base and hardware.
   3. Provide duct access door as specified in Section 15812 - Metal Ducts. Provide similar for non-metallic ducting.
   4. Provide remote annunciator with alarm and power LEDs and all required wiring and conduit per installation instructions for complete working operation.
   5. Provide remote test station and all required wiring and conduit per installation instructions for complete working operation.

2.04 HVAC CONTROL DESCRIPTIONS

A. General: Provide control systems that will maintain room or area comfort under changing ambient conditions and varying use; descriptions in this Section are general in nature and do not cover every mode of operation.

B. Chemical Room Control Sequences:
   1. Exhaust Fan WD37-FANx-28302/WD37-FANx-35302 will run continuously to provide 6 ACH to the space.
      a. WD37-FANx-28302/WD37-FANx-35302 will be hardwired to a break-glass emergency shutdown switch. Upon switch activation, the supply fan will de-energize.
      b. WD37-FANx-28302/WD37-FANx-35302 will send a “General HVAC Fault” alarm to the SCADA system upon unit de-energizing.
   2. Electric Unit Heater WD37-HEAT-28203/WD37-HEAT-35203 will be controlled by a thermostat with an adjustable set-point. The heating set-point will be 55 degrees Fahrenheit. When the temperature falls 3 degrees below the set-point, the unit will energize. When the temperature rises 3 degrees above the set-point, the unit will de-energize.

C. Pump Room Control Sequences:
   1. Exhaust Fan WD37-FANx-28301/Exhaust Fan WD37-FANx-35301 will be controlled by a thermostat with an adjustable set-point. The cooling set-point will be 80 degrees Fahrenheit. When the temperature rises 3 degrees above the set-point, the unit will energize. When the temperature falls 3 degrees below the set-point, the unit will de-energize.
   2. Electric Unit Heaters WD37-HEAT-28201/WD37-HEAT-35201 and WD37-HEAT-28202/WD37-HEAT-35202 will be controlled by thermostats with

an adjustable set-point. The heating set-point will be 55 degrees Fahrenheit. When the temperature falls 3 degrees below the set-point, the unit will energize. When the temperature rises 3 degrees above the set-point, the unit will de-energize.

D. Electrical Room Control Sequences:
   1. Air Conditioning Unit WD37-HVAC-28101/WD37-HVAC-35101 will be controlled by a thermostat with an adjustable set-point. The cooling set-point will be 90 degrees Fahrenheit. When the temperature rises 3 degrees above the set-point, the unit will energize. When the temperature falls 3 degrees below the set-point, the unit will de-energize.
      a. WD37-HVAC-28101/WD37-HVAC-35101 will send a "Dirty Filter" alarm to the SCADA system upon high pressure indication from a differential pressure switch across the filter.
      b. WD37-HVAC-28101/WD37-HVAC-35101 will have a duct mounted smoke detector. When the detector senses smoke, the unit will send a "smoke" alarm to the SCADA system. All units in this area will de-energize upon detection of smoke.
      c. WD37-HVAC-28101/WD37-HVAC-35101 will send a "General HVAC Fault" alarm to the SCADA system upon failure to energize.
   2. Electric Unit Heater WD37-HEAT-28204/WD37-HEAT-35204 will be controlled by a thermostat with an adjustable set-point. The heating set-point will be 55 degrees Fahrenheit. When the temperature falls 3 degrees below the set-point, the unit will energize. When the temperature rises 3 degrees above the set-point, the unit will de-energize.

E. Restroom Control Sequences:
   1. Restroom Exhaust Fan WD05-FANx-28303/WD05-FANx-35303 will be interlocked with the lights of restroom. When the lights are turned on, the fan will energize. When the lights are turned off, the fan will de-energize.

2.05 HVAC CONTROL PANELS

A. Supply NEMA 4X single source power/control panel. The single panel enclosure shall contain on/off switches, auto/manual switches, interlocks, and other accessories per the P&IDs and the control strategies above.

Tag Number	Equipment Name
YY-LCP-XX1	Operations Area HVAC unit Control Panel

B. The control panel shall meet all the requirements as specified in Section 17710 - Control Systems: Panels, Enclosures, and Panel Components.

C. Supply motor starters for each supply and exhaust fan as specified in Section 16422 - Motor Starters.

D. Unit power and control wiring shall enter the control panel at 1 location.

E. The panel shall be UL labeled.

F. Panel shall have hinged cover.

G. Provide terminal strips for power and control as specified in Section 16150 - Low Voltage Wire Connections.

H. Provide control transformer for all 120-volt circuits within the panel.

I. Provide service light per the following:
   1. Provide a marine-type, vapor proof, service light.
   2. Light shall be suitable for 100-watt service and shall be wired to an individual switch.

J. Internal wiring shall be enclosed inside a weatherproof flexible UL-listed conduit.

K. Provide the following additional accessories:
   1. An external, unit-mounted disconnect in a NEMA 3R enclosure.
   2. 15-amp convenience outlet with a ground fault interrupter.
   3. Independent fuse protection.

PART 3 EXECUTION

3.01 PREPARATION

A. Before installation remove dust and debris from equipment and accessories.

B. During installation and until equipment is operated, protect equipment and accessories from dust and debris.

3.02 INSTALLATION

A. Install as indicated on the Drawings, in accordance with NFPA 90A, and per the manufacturer's written instructions.

B. Coordinate installation of HVAC control systems with other trades.
   1. Prior to installation, coordinate wiring and conduit requirements with electrical subcontractor.

C. Mount remote annunciator and test station on wall near smoke detector.
   1. Devices shall be easily accessible from floor level.
   2. Label annunciator and test station.

D. Provide all electrical work to support smoke detector.
   1. Coordinate with electrical subcontractor.

E. Sensor and control station mounting:
   1. Where not otherwise indicated, mount 5 feet above floor or walking level.
   2. Provide insulating back plates when mounting is on an exterior wall or a wall adjoining an unconditioned space.
   3. Shield outside thermostats or sensors from the sun; provide thermostats with remote bulb and compensated capillary.
   4. Install locking covers where indicated on the Drawings.

3.03 COMMISSIONING

A. As specified in Section 01756 - Commissioning and this Section.

B. Functional testing:
   1. HVAC Instrumentation and Controls:
      a. Test witnessing: Witnessed.
      b. Test each control component and system as part of HVAC system testing, adjusting, and balancing as specified in Section 15954 - Testing, Adjusting, and Balancing for HVAC.

END OF SECTION

SECTION 15954

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Heating, ventilation, and air conditioning systems testing, adjusting, and balancing.

1.02 REFERENCES

A. Associated Air Balance Council (AABC):
   1. National Standards for Field Measurements and Instrumentation, Total System Balance, Air Distribution Systems.

B. National Environmental Balancing Bureau (NEBB):
   1. Procedural Standards for Testing, Adjusting, and Balancing Environmental Systems.

C. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):
   1. Heating, Ventilating, and Air Conditioning Systems - Testing, Adjusting, and Balancing.

D. Testing, Adjusting, and Balancing Bureau (TABB):
   1. International Standards for Environmental Systems Balance.

1.03 TESTING, ADJUSTING, AND BALANCING WORK REQUIREMENTS

A. Procure the services of an independent air balance and testing agency belonging to and in good standing with the AABC, NEBB, or the TABB to perform air balancing, testing, and adjustment of building and process air conditioning, heating, and ventilating air systems.

B. The Work includes: Balancing new air systems installed as part of this contract and existing air systems affected by the installation of new equipment.

C. Perform testing of heating, ventilating, and air conditioning equipment, balancing of distribution systems, and adjusting of air terminal units and ductwork accessories to ensure compliance with Specifications and Drawings. Perform tests for following:
   1. Air conditioning units.
   2. Heat pump units.
   3. Central station air handlers.
   4. Evaporative coolers.
   5. Heating units.
   6. Fans.
   7. Odor scrubber fans.
   8. Condensers.
   9. Air terminal units.

10. Ductwork accessories.
11. Ducting.
12. HVAC controls.
13. Other specified HVAC equipment.

D. Test each mode of operation of thermostats, electronic controllers, and pneumatic, electric or electronic heating, ventilating, and air conditioning instruments to ensure operation as specified.

E. Test and adjust room distribution patterns at air outlets.

F. Provide instruments required for testing, adjusting, and balancing operations; retain possession of instruments; remove instruments from site at completion of services.

G. Make instruments available to the Engineer to facilitate spot checks during testing.

H. Provide test holes for pressure and pitot flow measurements; provide plugs for all test holes after testing.

1.04 QUALITY ASSURANCE

A. Test, balance, and adjust environmental systems in accordance with either:
1. AABC: National Standards for Field Measurements and Instrumentation, Total Systems Balance, Air Distribution-Hydronic System.
2. NEBB: Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.
3. TABB: International Standards for Environmental Systems Balance.

B. Perform services under direction of AABC, NEBB, or TABB certified supervisor.

C. Calibrate and maintain instruments in accordance with requirements of standards. Make calibration histories of instruments available for examination.

D. Make measurements in accordance with accuracy requirements of standards.

E. Testing, adjusting, and balancing performance requirements:
1. Comply with procedural standards of certifying association.
2. Execute each step of prescribed testing, balancing, and adjusting procedures without omission.
3. Accurately record required data.
4. Make measurements in accordance with recognized procedures and practices of certifying association.
5. Measure air volume discharged at each outlet and adjust air outlets to design air volumes within 5 percent over.

1.05 SUBMITTALS

A. Resumes of proposed supervisor and personnel showing training and qualifications.

B. Interim reports: At least 30 days prior to starting field work, submit the following:
1. Set of report forms filled out as to design flow values and installed equipment pressure drops, and required cubic feet per minute for air terminals.

2. Develop heating, ventilating, and air conditioning system schematic similar to Figure 6-1 in SMACNA Testing, Adjusting, and Balancing.
3. Complete list of instruments proposed to be used, organized in appropriate categories, with data sheets for each showing:
    a. Manufacturer and model number.
    b. Description and use when needed to further identify instrument.
    c. Size or capacity range.
    d. Latest calibration date.

C. Final report: At least 15 days prior to Contractor's request for final inspection, submit 3 copies of final reports, on applicable reporting forms. Include:
1. Identify instruments which were used and last date of calibration of each.
2. Procedures followed to perform testing, adjusting, and balancing.
3. Identification and succinct description of systems included in report.
4. Initial balance test results made with all dampers and air control devices in full open positions.
5. Description of final locations and sizes, including opening area and dimensioned configuration of orifices and other restrictions used to achieve final balanced flows.
6. Description of final location and opening positions of dampers, registers, louvers, and valves.
7. Schematics of systems included in report; use schematics as part of testing, adjusting, and balancing report to summarize design and final balanced flows.
8. Testing, adjusting, and balancing report forms.
9. Final field results established for system balancing including airflow, fan speeds, and fan static pressures at the fan inlet and outlet.
10. Appendices.
11. Include appendices for:
    a. Raw field data taken during testing.
    b. Sample calculation sheet for each type of calculation made to convert raw field data to final results.
    c. Initial air balance results with dampers and registers in full open position; include airflow at all inlets and outlet, initial fan speed and fan suction and discharge pressures.

D. Proposed schedule for testing and balancing.

E. Provide Manufacturer’s Certificate of Installation and Functionality Compliance as specified in Section 01756 - Commissioning.

1.06 SITE CONDITIONS

A. Prior to start of testing, adjusting, and balancing, verify that:
1. Systems installation is complete and in full operation.
2. Outside conditions are within reasonable range relative to design conditions.
3. Lighting fixtures are energized.
4. Special equipment such as computers, laboratory equipment, and electronic equipment are in full operation.
5. Requirements for preparation for testing and balancing have been met for elements of each system which require testing.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Perform Functional Tests as specified in Section 01756 - Commissioning.

B. Testing, adjusting, and balancing acceptance criteria: Consider testing, adjusting, and balancing procedures successful and complete when heating, ventilating, and air conditioning systems and components are functioning properly, and system air flows are within specified tolerances of design flows.

3.02 TESTING, ADJUSTING, AND BALANCING

A. Test, adjust, and balance separate complete heating, ventilating, and air conditioning systems.

B. Include in testing, adjusting, and balancing related existing heating, ventilating, and air conditioning components.

C. Perform testing, adjusting, and balancing cycles until airflows meet acceptance criteria.
   1. Ascertain airflow balance between overall requirements and flow in individual supply and exhaust grilles.

D. Initial testing, adjusting, and balancing: Perform first test on each system with dampers, grilles, orifices, and other variable airflow devices in their fully open position; measure and report initial airflows, fan speed, and fan static pressures at fan inlet and outlet.
   1. Adjust total system flow downward or upward by adjusting fan speed until 1 inlet or outlet is at indicated flow and all other flows exceed indicated flows.
   2. Adjust fan speed by changing fan drives or sheaves as necessary.

E. Subsequent testing, adjusting, and balancing: Perform adjustments in subsequent testing, adjusting, and balancing by adjusting dampers, louvers, or size of orifices or plates.
   1. Measure and record air volume discharged at each inlet and outlet and adjust air inlets and outlets to design air volumes within 0 to 5 percent over design rates.
   2. Adjust fan speeds and motor drives within drive limitations, for required air volume.
   3. Measure cubic feet per minute and static pressures and adjust air supply and exhaust fan units to deliver at least 100 to 105 percent of the design air volume.
   4. Measure and record static air pressure conditions on fans, including filter and coil pressure drops, and total pressure across the fan.
   5. Evaluate building and room pressure conditions to determine adequate supply and return air conditions.

6. Evaluate space and zone temperature of conditions to determine adequate performance of the systems to maintain temperatures without draft.
7. Permanently mark final balance positions of balancing dampers.

F. Develop heating, ventilating, and air conditioning system schematics similar to Figure 6-1 in SMACNA Testing, Adjusting, and Balancing.

G. Accurately record the required data on AABC, NEBB, or TABB test and balance report forms.

H. Measure amperage draw of fan and pump motors for final balance.

I. Test primary source equipment in accordance with AABC, NEBB, or TABB procedures.
1. Primary source equipment includes items listed in this Section not previously tested as part of this testing, adjusting, and balancing work.
2. Complete appropriate AABC, NEBB, or TABB equipment test forms for each piece of equipment.
3. Calculate cooling and heating capacities to show conformance with specified capacities.
4. Adjust equipment as needed to deliver specified cooling and heating loads.
5. Record final equipment performing characteristics and adjustment settings in the final design report.

END OF SECTION

SECTION 15958

MECHANICAL EQUIPMENT TESTING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Testing of mechanical equipment and systems.

1.02 REFERENCES

A. American National Standards Institute (ANSI):
   1. S1.4 Specification for Sound Level Meters.

B. Hydraulic Institute (HI).

C. National Institute of Standards and Technology (NIST).

1.03 SUBMITTALS

A. Provide Source Test Plans as specified in Section 01756 - Commissioning.

B. Provide Installation and Functional Testing Plans as specified in Section 01756 - Commissioning.

C. Provide vendor operation and maintenance manual as specified in Section 01782 - Operation and Maintenance Manuals.
   1. Include motor rotor bar pass frequencies for motors larger than 500 horsepower.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 GENERAL

A. Commissioning of equipment as specified in:
   1. This Section.
   2. Section 01756 - Commissioning.
   3. Equipment sections:
      a. If testing requirements are not specified, provide Level 1 Tests.

B. Test and prepare piping as specified in Section 15956 - Piping Systems Testing.

C. Provide necessary test instrumentation that has been calibrated within 1 year from date of test to recognized test standards traceable to the NIST or approved source.
   1. Properly calibrated field instrumentation permanently installed as a part of the Work may be utilized for tests.
   2. Prior to testing, provide signed and dated certificates of calibration for test instrumentation and equipment.

D. Test measurement and result accuracy:
   1. Use test instruments with accuracies as recommended in the appropriate referenced standards. When no accuracy is recommended in the referenced standard, use 1 percent or better accuracy test instruments.
      a. Improved (lower error tolerance) accuracies specified elsewhere prevail over this general requirement.
   2. Do not adjust results of tests for instrumentation accuracy.
      a. Measured values and values directly calculated from measured values shall be the basis for comparing actual equipment performance to specified requirements.

3.02 VARIABLE SPEED EQUIPMENT TESTS

A. Establish performance over the entire speed range and at the average operating condition.

B. Establish performance curves for the following speeds:
   1. The speed corresponding to the rated maximum capacity.
   2. The speed corresponding to the minimum capacity.
   3. The speed corresponding to the average operating conditions.

3.03 PUMP TESTS, ALL LEVELS OF TESTING

A. Test in accordance with the following:
   1. Applicable HI Standards.
   2. This Section.
   3. Equipment sections.

B. Test tolerances: In accordance with appropriate HI Standards, except the following modified tolerances apply:
   1. From 0 to plus 5 percent of head at the rated design point flow.
   2. From 0 to plus 5 percent of flow at the rated design point head.
   3. No tolerance for head and flow when ranges are specified.
   4. No negative tolerance for the efficiency at the rated design point, and other specified conditions.
   5. No positive tolerance for vibration limits. Vibration limits and test methods in HI Standards do not apply, use limits and methods specified in this or other Sections of the Specifications.

3.04 DRIVERS TESTS

A. Test motors as specified in Section 16222 - Low Voltage Motors up to 500 Horsepower.

B. Test other drivers as specified in the equipment section.

3.05 NOISE REQUIREMENTS AND CONTROL

A. Perform noise tests in conjunction with vibration test analysis.

B. Make measurements in relation to reference pressure of 0.0002 microbar.

C. Make measurements of emitted noise levels on sound level meter meeting or exceeding ANSI S1.4, Type II.

D. Set sound level meter to slow response.

E. Unless otherwise specified, maximum free field noise level not to exceed 85 dBA measured as sound pressure level at 3 feet from the equipment.

3.06 PRESSURE TESTING

A. Hydrostatically pressure test pressure containing parts at the appropriate standard or code required level above the equipment component specified design pressure or operating pressure, whichever is higher.

3.07 INSPECTION AND BALANCING

A. Statically and dynamically balance each of the individual rotating parts as required to achieve the required field vibration limits.

B. Statically and dynamically balance the completed equipment rotating assembly and drive shaft components.

C. Furnish copies of material and component inspection reports including balancing reports for equipment system components and for the completed rotating assembly.

D. Critical speed of rotating equipment:
   1. Satisfy the following:
      a. The first lateral and torsional critical speed of all constant, variable, and 2-speed driven equipment that is considered rigid such as horizontal pumps, all non-clog pumps, blowers, air compressors, and engines shall be at least 25 percent above the equipment's maximum operating speed.
      b. The first lateral and torsional critical speed of all constant, variable, and 2-speed driven equipment that is considered flexible or flexibly mounted such as vertical pumps (vertical in-line and vertical non-clog pumps excluded) and fans shall at least 25 percent below the equipment's lowest operating speed.
      c. The second lateral and torsional critical speed of all constant, variable, and 2-speed equipment that is considered flexible or flexibly mounted shall be at least 25 percent above the maximum operating speed.

E. Vibration tests:
   1. Definitions:
      a. Root mean square: for pumps operating at speeds greater than 600 rpm, the vibration measurement shall be measured as the overall velocity in inches per second root mean square (RMS).
      b. Peak-to-peak displacement: The root means squared average of the peak-to-peak displacement multiplied by the square root of 2.

c. Peak velocity: The root mean squared average of the peak velocity multiplied by the square root of 2.
d. Peak acceleration: The root mean squared average of the peak acceleration multiplied by the square root of 2.
e. High frequency enveloping: A process to extract very low amplitude time domain signals associated with impact or impulse events such as bearing or gear tooth defects and display them in a frequency spectrum of acceleration versus frequency.
    1) Manufacturers: One of the following or equal:
        a) Rockwell Automation, Entek Group, "Spike Energy" analysis.
        b) CSI, "PeakVue."
f. Rotor bar pass frequency (RBF), for detecting loose rotor bars.
g. Low speed equipment: Equipment or components of equipment rotating at less than 600 revolutions per minute.
h. High speed equipment: Equipment and equipment components operating at or above 600 revolutions per minute.
i. Preferred operating range: Manufacturer's defined preferred operating range (POR) for the equipment.
j. Allowable operating range: Manufacturer's defined allowable operating range (AOR) for the equipment.

2. Vibration instrumentation requirements:
    a. Analyzers: Use digital type analyzers or data collectors with anti-aliasing filter, 12-bit A/D converter, fast fourier transform circuitry, phase measurement capability, time wave form data storage, high-frequency enveloping capabilities, 35 frequency ranges from 21 to 1,500,000 cycles per minute, adjustable fast fourier transform resolution from 400 to 6,400 lines, storage for up to one hundred 3,200 line frequency spectra, data output port, circuitry for integration of acceleration data to velocity or double integration to displacement.
        1) Manufacturers: One of the following or equal:
            a) Computational Systems Inc., (CSI) Division of Emerson Process Management, Model 2120A, Data Collector/analyzer with applicable analysis software.
            b) Pruftechnik, VIBXPERT II.
    b. Analyzer settings:
        1) Units: English, inches/second, mils, and gravitational forces.
        2) Fast fourier transform lines: Most equipment 1,600 minimum; for motors, enough lines as required to distinguish motor current frequencies from rotational frequencies, use 3,200 lines for motors with a nominal speed of 3,600 revolutions per minute; 3,200 lines minimum for High Frequency Enveloping; 1,600 lines minimum for low speed equipment.
        3) Sample averages: 4 minimum.
        4) Maximum frequency (Fmax): 40 times rotational frequency for rolling element bearings, 10 times rotational frequency for sleeve bearings.
        5) Amplitude range: Auto select but full scale not more than twice the acceptance criteria or the highest peak, whichever is lower.
        6) Fast fourier transform windowing: Hanning Window.
        7) High pass filter: Minus 3 dB at 120 cycles per minute for high speed equipment. Minus 3 dB at 21 cycles per minute for low speed equipment.

c. Accelerometers:
    1) For low speed equipment: Low frequency, shear mode accelerometer, 500 millivolts per gravitational force sensitivity, 10 gravitational force range, plus/minus 5 percent frequency response from 0.5 hertz to 850 hertz, magnetic mount.
        a) Manufacturers: One of the following or equal:
            (1) Wilcoxon Research, Model 797L.
            (2) PCB, Model 393C.
    2) For high speed equipment: General purpose accelerometer, 100 millivolts per gravitational force sensitivity, 50 gravitational force range, plus/minus 3dB frequency response range from 2 hertz to 12,000 hertz when stud mounted, with magnetic mount holder.
        a) Manufacturers: One of the following or equal:
            (1) Wilcoxon Research, Model 793.
            (2) Entek-IRD Model 943.

3. Accelerometer mounting:
    a. Use magnetic mounting or stud mounting.
    b. Mount on bearing housing in location with best available direct path to bearing and shaft vibration.
    c. Remove paint and mount transducer on flat metal surface or epoxy mount for High Frequency Enveloping measurements.
4. Vibration acceptance criteria:
    a. Testing of rotating mechanical equipment: Tests are to be performed by an experienced, factory trained, and independent authorized vibration analysis expert.
    b. Vibration displacement limits: Unless otherwise specified, equipment operating at speeds 600 revolutions per minute or less is not to exhibit unfiltered readings in excess of following:

Operating Conditions and Application Data	Overall Peak-to-Peak Displacement	
	Field, mils	**Factory, mils**
Operation within the POR	3.0	4.0
Operation within the AOR	4.0	5.0
Additive value when measurement location is greater than 5 feet above foundation.	2.0	2.0
Additive value for solids-handling pumps	2.0	N/A
Additive value for slurry pumps	2.0	N/A

c. Vibration velocity limits: Unless otherwise specified, equipment operating at speeds greater than 600 revolutions per minute is not to exceed the following peak velocity limits:

HI Pump Type	Horsepower	Field Test	Factory Test
		Overall RMS	Overall RMS
Horizontal Solids Handling Centrifugal Pumps	Below 33 hp	0.25	0.28
Horizontal and Vertical In-Line Centrifugal Pumps (other than Non-Clog type) Vertical Solids Handling Centrifugal Pumps	Between 33 and 100 hp	0.28	0.31
	100 hp and above	0.31	0.34
	Below 33 hp	0.30	0.33
Vertical Turbine, Mixed Flow, and Propeller Pumps (solids-handling type pumps)	Between 33 and 100 hp	0.32	0.35
	100 hp and above	0.34	0.35
Non-Solids Handling Centrifugal Pumps HI Types BB1, BB2, BB3, BB4, BB5, OH1, OH2, OH3, OH4, OH5, and OH7	Below 268 hp	0.15	0.19
	268 hp and above	0.19	0.22
Vertical Turbine, Mixed Flow, and Propeller Pumps HI Types VS1, VS2, VS3, VS4, VS5, VS6, VS7, and VS8	Below 268 hp	0.13	
	268 hp and above	0.17	
Slurry Pumps		0.25	0.30
Motors		See Applicable Motor Specification	See Applicable Motor Specification
Gear Reducers, Radial		Not to exceed AGMA 6000-B96 limits	Not to exceed AGMA 6000-B96 limits
Other Reducers, Axial		0.1	N/A

d. Equipment operation: Measurements are to be obtained with equipment installed and operating within capacity ranges specified and without duplicate equipment running.

e. Additional criteria:
   1) No narrow band spectral vibration amplitude components, whether sub-rotational, higher harmonic, or synchronous multiple of running speed, are to exceed 40 percent of synchronous vibration amplitude component without manufacturer's detailed verification of origin and ultimate effect of such excitation.
   2) The presence of discernable vibration amplitude peaks in Test Level 2 or 3 vibration spectra at bearing inner or outer race frequencies shall be cause for rejection of the equipment.

3) For motors, the following shall be cause for rejection:
a) Stator eccentricity evidenced by a spectral peak at 2 times electrical line frequency that is more than 40 percent of the peak at rotational frequency.
b) Rotor eccentricity evidenced by a spectral peak at 2 times electrical line frequency with spectra side bands at the pole pass frequency around the 2 times line frequency peak.
c) Other rotor problems evidenced by pole pass frequency side bands around operating speed harmonic peaks or 2 times line frequency side bands around rotor bar pass frequency or around 2 times the rotor bar pass frequency.
d) Phasing problems evidenced by 1/3 line frequency side band spectral peaks around the 2 times electrical line frequency peak.
4) The presence of peaks in a High Frequency Enveloping spectra plot corresponding to bearing, gear or motor rotor bar frequencies or harmonics of these frequencies shall be cause for rejection of the equipment; since inadequate lubrication of some equipment may be a cause of these peaks, lubrication shall be checked, corrected as necessary and the high frequency envelope analysis repeated.

5. Vibration testing results presentation:
a. Provide equipment drawing with location and orientation of measurement points indicated.
b. For each vibration measurement take and include appropriate data on equipment operating conditions at the time vibration data is taken; for pumps, compressors, and blowers record suction pressure, discharge pressure, and flow.
c. When Vibration Spectra Data required:
1) Plot peak vibration velocity versus frequency in cycles per minute.
2) Label plots showing actual shaft or part rotation frequency, bearing inner and outer race ball pass frequencies, gear mesh frequencies and relevant equipment excitation frequencies on the plot; label probable cause of vibration peaks whether in excess of specification limits or not.
3) Label plots with equipment identification and operating conditions such as tag number, capacity, pressure, driver horsepower, and point of vibration measurement.
4) Plot motor spectra on a log amplitude scale versus frequency.
d. For low speed equipment, plot peak vibration displacement versus frequency as well as velocity versus frequency.
e. Provide name of manufacturer and model number of the vibration instrumentation used, including analyzer and accelerometer used together with mounting type.

3.08 TESTING LEVELS

A. Level 1 Tests:
1. Level 1 Performance Test:
a. General:
1) For equipment, operate, rotate, or otherwise functionally test for 15 minutes minimum after components reach normal operating temperatures.
2) Operate at rated design load conditions.

3) Confirm that equipment is properly assembled.
4) Confirm the equipment moves or rotates in the proper direction.
5) Confirm shafting, drive elements, and bearings are installed and lubricated in accordance with proper tolerances.
6) Confirm that no unusual power consumption, lubrication temperatures, bearing temperatures, or other conditions are observed.

b. Pumps:
1) Comply with general performance test requirements as specified in this Section.
2) Measure flow and head while operating at or near the rated condition; for factory testing, testing may be at reduced speeds with flow and head corresponding to the rated condition when adjusted for speed using the appropriate affinity laws.
3) Use of a test driver is permitted for factory tests when actual driver is given a separate test at its point of manufacture as specified in Section 16222 - Low Voltage Motors up to 500 Horsepower or the applicable equipment section.
4) Use actual driver for field tests.
5) Record measured flow, suction pressure, discharge pressure, and make observations on bearing temperatures and noise levels.

2. Level 1 Vibration Test:
a. Test requirement:
1) Measure filtered vibration spectra versus frequency in 3 perpendicular planes at each normally accessible bearing housing on the driven equipment, any gears and on the driver; 1 plane of measurement to be parallel to the axis of rotation of the component.
2) Vibration spectra versus frequency shall be in accordance with Vibration Acceptance Criteria.

b. Equipment operating condition: Test at specified maximum speed.

3. Level 1 Noise Test:
a. Measure unfiltered overall A-weighted sound pressure level in dBA at 3 feet horizontally from the surface of the equipment and at a mid-point of the equipment height.

B. Level 2 Tests:
1. Level 2 Performance Test:
a. General:
1) For equipment, operate, rotate, or otherwise functionally test for at least 2 hours after components reach normal operating temperatures.
2) Operate at rated design load conditions.
3) Confirm that equipment is properly assembled.
4) Confirm the equipment moves or rotates in the proper direction.
5) Confirm shafting, drive elements, and bearings are installed and lubricated in accordance with proper tolerances.
6) Confirm that no unusual power consumption, lubrication temperatures, bearing temperatures, or other conditions are observed.

b. Pumps:
1) Comply with general performance test requirements as specified in this Section.

2) Test 2 hours minimum for flow and head at the rated condition; for factory testing, testing may be at a reduced speeds with flow and head corresponding to the rated condition when adjusted for speed using the appropriate affinity laws.
3) Use of a test driver is permitted for factory tests when actual driver is given a separate test at its point of manufacture as specified in Section 16222 - Low Voltage Motors up to 500 Horsepower.
4) Use actual driver for field tests.
5) Test for flow and head at 2 additional conditions; 1 at 25 percent below the rated flow and 1 at 10 percent above the rated flow.
6) Record measured flow, suction pressure, discharge pressure, and observations on bearing temperatures and noise levels at each condition.

2. Level 2 Vibration Test:
   a. Test requirement:
      1) Measure filtered vibration spectra versus frequency and measure vibration phase in 3 perpendicular planes at each normally accessible bearing housing on the driven equipment, any gears and on the driver; 1 plane of measurement to be parallel to the axis of rotation of the component; measure actual rotational speeds for each vibration spectra measured using photometric or other tachometer input connected directly to the vibration data collector.
      2) Vibration spectra versus frequency shall be in accordance with Vibration Acceptance Criteria.
   b. Equipment operating condition: Repeat test requirements at design specified maximum speed and at minimum speed for variable speed equipment.
   c. Natural frequency test of field installed equipment:
      1) Excite the installed equipment and support system in 3 perpendicular planes, use same planes as operating vibration measurement planes, and determine the as-installed natural resonant frequency of the driven equipment, the driver, gears, and supports.
      2) Perform test at each bearing housing, at each support pedestal, and for pumps on the suction and discharge piping.
      3) Perform with equipment and attached piping full of intended service or process fluid.
3. Level 2 Noise Test:
   a. Measure filtered A-weighted overall sound pressure level in dBA for each of 8 octave band mid-points beginning at 63 hertz measured at 3 feet horizontally from the surface of the equipment at mid-point height of the noise source.

C. Level 3 Tests:
   1. Level 3 Performance Tests:
      a. General:
         1) For equipment, operate, rotate, or otherwise functionally test for at least 4 hours after components reach normal operating temperatures.
         2) Operate at rated design load conditions for 1/2 the specified time; operate at each of any other specified conditions for a proportionate share of the remaining test time.
         3) Confirm that equipment is properly assembled.

4) Confirm the equipment moves or rotates in the proper direction.
5) Confirm shafting, drive elements, and bearings are installed and lubricated in accordance with proper tolerances.
6) Confirm that no unusual power consumption, lubrication temperatures, bearing temperatures, or other conditions are observed.
7) Take appropriate capacity, power or fuel consumption, torque, revolutions per minute, pressure, and temperature readings using appropriate test instrumentation to confirm equipment meets specified performance requirements at the design rated condition.
8) Bearing temperatures: During maximum speed or capacity performance testing, measure and record the exterior surface temperature of each bearing versus time.

b. Pumps:
1) Comply with general performance test requirements as specified in this Section.
2) Test 4 hours minimum for flow and head; begin tests at or near the rated condition; for factory and field-testing, test at full speed.
a) Use of a test driver is permitted for factory tests when actual driver is given a separate test at its point of manufacture as specified in Section 16222 - Low Voltage Motors up to 500 Horsepower.
b) Use actual driver for field tests.
3) Test each specified flow and head condition at the rated speed and test at minimum as well as maximum specified speeds; operate at each test condition for a minimum of 15 minutes; for factory testing, test at other speeds may be omitted if test driver at reduced speeds is used for rated condition testing.
4) Record measured shaft revolutions per minute, flow, suction pressure, discharge pressure; record measured bearing temperatures (bearing housing exterior surface temperatures may be recorded when bearing temperature devices are not required by the equipment section) and record observations on noise levels.
5) Perform efficiency and/or Net Positive Suction Head Required (NPSHr) and/or priming time tests when specified in the equipment section in accordance with the appropriate HI standard and as follows:
a) Perform NPSHr testing at maximum rated design speed, head and flow with test fluids at ambient conditions; at maximum rated speed, test at 15 percent above rated design flow, and 25 percent below rated design flow.
b) Perform efficiency testing with test fluids at maximum rated speed.
c) Perform priming time testing with test fluids at maximum rated speed.

2. Level 3 Vibration Test:
a. Requirements: Same as Level 2 vibration test except data taken at each operating condition tested and with additional requirements below.
b. Perform High Frequency Enveloping Analysis for gears and bearings.
1) Measure bearing element vibration directly on each bearing cap in a location close as possible to the bearing load zone that provides a

smooth surface and direct path to the bearing to detect bearing defects.
2) Report results in units of acceleration versus frequency in cycles per minute.

c. Perform Time Wave Form analysis for gears, low speed equipment and reciprocating equipment; plot true peak amplitude velocity and displacement versus time and label the period between peaks with the likely cause of the periodic peaks (relate the period to a cause).

d. Plot vibration spectra on 3 different plots; peak displacement versus frequency, peak acceleration versus frequency and peak velocity versus frequency.

3. Level 3 Noise Test: Measure filtered, un-weighted overall sound pressure level in dB at 3 feet horizontally from the surface of the equipment at mid-point height and at 4 locations approximately 90 degrees apart in plain view; report results for each of 8 octave band mid-points beginning at 63 hertz.

D. Level 4 Tests:

1. Level 4 Performance Test:

a. General:

1) For equipment, operate, rotate, or otherwise functionally test for at least 8 hours after components reach normal operating temperatures.
2) Operate at rated design load conditions for 1/2 the specified time; operate at each of any other specified conditions for a proportionate share of the remaining test time.
3) Confirm that equipment is properly assembled.
4) Confirm the equipment moves or rotates in the proper direction.
5) Confirm shafting, drive elements, and bearings are installed and lubricated in accordance with proper tolerances.
6) Confirm that no unusual power consumption, lubrication temperatures, bearing temperatures, or other conditions are observed.
7) Take appropriate capacity, power or fuel consumption, torque, revolutions per minute, pressure and temperature readings, using appropriate test instrumentation to confirm equipment meets specified performance requirements at the design rated condition.
8) Bearing temperatures: During maximum speed or capacity testing, measure and record the exterior surface temperature of each bearing versus time.

b. Pumps:

1) Comply with general performance test requirements as specified in this Section.
2) Test 8 hours minimum for flow and head; begin tests at or near the rated condition; for factory and field-testing, test with furnished motor at full speed.
3) Test each specified flow and head condition at the rated speed and test at minimum as well as maximum specified speeds; operate at each test condition for a minimum of 20 minutes or longer as necessary to measure required performance, vibration, and noise data at each test condition.
4) Record measured shaft revolutions per minute, flow, suction pressure, discharge pressure; record measured bearing

temperatures (bearing housing exterior surface temperatures may be recorded when bearing temperature devices not required by the equipment section) and record observations on noise levels.

5) Bearing temperatures: During maximum speed or capacity testing, measure and record the exterior surface temperature of each bearing versus time.
6) Perform efficiency and/or Net Positive Suction Head Required (NPSHr) and/or priming time tests when specified in the equipment section in accordance with the appropriate HI standard and as follows:
    a) Perform NPSHr testing at maximum rated design speed, head and flow with test fluids at ambient conditions; at maximum rated speed, test at 15 percent above rated design flow, and 25 percent below rated design flow.
    b) Perform efficiency testing with test fluids at maximum rated speed.
    c) Perform priming time testing with test fluids at maximum rated speed.

2. Level 4 Vibration Test: Same as Level 3 vibration test.
3. Level 4 Noise Test: Same as Level 3 Noise Test except with data taken at each operating condition tested.

END OF SECTION

SECTION 16060

GROUNDING AND BONDING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Grounding materials and requirements.

1.02 REFERENCES

A. As specified in Section 16050 - Common Work Results for Electrical.

B. ASTM International (ASTM):
   1. B3 - Standard Specification for Soft or Annealed Copper Wire.
   2. B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

C. Institute of Electrical and Electronics Engineers (IEEE):
   1. 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System.

D. Underwriters Laboratories, Inc. (UL):
   1. 467 - Ground and Bonding Equipment.

1.03 DEFINITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

1.04 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 16050 - Common Work Results for Electrical.

B. Product data:
   1. Catalog cutsheets.

1.05 QUALITY ASSURANCE

A. As specified in Section 16050 - Common Work Results for Electrical.

B. All grounding components and materials shall be UL listed and labeled.

1.06 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 16050 - Common Work Results for Electrical.

1.07 PROJECT/SITE CONDITIONS (NOT USED)

1.08 SEQUENCING (NOT USED)

1.09 SCHEDULING (NOT USED)

1.10 WARRANTY

A. As specified in Section 16050 - Common Work Results for Electrical.

1.11 SYSTEM START-UP

A. As specified in Section 16050 - Common Work Results for Electrical.

1.12 OWNER'S INSTRUCTIONS (NOT USED)

1.13 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Compression connectors: One of the following or equal:
   1. Erico.
   2. Harger.
   3. Burndy.
   4. Thomas & Betts.
   5. Panduit.

B. Ground rods: One of the following or equal:
   1. Erico.
   2. Harger.
   3. Nehring.
   4. Thomas & Betts.

C. Ground cable: One of the following or equal:
   1. Erico.
   2. Harger.
   3. Nehring.
   4. Southwire.

D. Precast ground well boxes: One of the following or equal:
   1. Brooks Products, 3-RT Valve Box.
   2. Christy Concrete Products, G12 Valve Box.

2.02 SYSTEM DESCRIPTION

A. Ground equipment and raceway systems so that the completed installation conforms to all applicable code requirements.

B. Provide a complete electrical grounding system as indicated on the Drawings and as specified including but not limited to:
   1. Grounding electrodes.
   2. Bonding jumpers.
   3. Ground connections.

C. Provide bonding jumpers and wire, grounding bushings, clamps and appurtenances required for complete grounding system to bond equipment and raceways to equipment grounding conductors.

D. The ground system resistance (electrode to ground) of the completed installation, as determined by tests specified in Section 16950 - Field Electrical Acceptance Tests, shall be:
   1. 5 ohms or less for industrial systems.
   2. 1 ohm or less for electrical buildings.

2.03 EXISTING PRODUCTS (NOT USED)

2.04 MATERIALS

A. Ground rod:
   1. Minimum: 3/4-inch diameter, 10 feet long.
   2. Uniform 10 mil covering of electrolytic copper metallically bonded to a rigid steel core:
      a. The copper-to-steel bond shall be corrosion resistant.
   3. In accordance with UL 467.
   4. Sectional type joined by threaded copper alloy couplings.
   5. Fit the top of the rod with a threaded coupling and steel-driving stud.

B. Ground cable:
   1. Requirements:
      a. Soft drawn (annealed).
      b. Concentric lay, coarse stranded in accordance with ASTM B8.
      c. Bare copper in accordance with ASTM B3.

C. Size is as indicated on the Drawings, but not less than required by the NEC. Compression connectors:
   1. Manufactured of high copper alloy specifically for the particular grounding application.
   2. Suitable for direct burial in earth and concrete.
   3. Identifying compression die number inscription to be impressed on compression fitting.

D. Grounding electrode conductors:
   1. Minimum size in accordance with the NEC.

E. Main bonding jumpers and bonding jumpers:
   1. Minimum size in accordance with the NEC.

2.05 MANUFACTURED UNITS (NOT USED)

2.06 EQUIPMENT (NOT USED)

2.07 COMPONENTS (NOT USED)

2.08 ACCESSORIES

A. Precast ground well boxes:
   1. Minimum 10 inch interior diameter.
   2. Traffic-rated cast iron cover.
   3. Permanent “GROUND” marking on cover.

2.09 MIXES (NOT USED)

2.10 FABRICATION (NOT USED)

2.11 FINISHES (NOT USED)

2.12 SOURCE QUALITY CONTROL (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Provide a separate grounding conductor for each motor and connect at motor terminal box. Do not use bolts securing motor box to frame or cover for grounding connectors:
   1. When grounding motors driven by variable frequency drives (VFD) comply with the requirements of the VFD manufacturer.

C. Provide a grounding type bushing with lug for connection of grounding conductor for conduits that originate from each motor control center section, switchboard, or panelboard:
   1. Individually bond these raceways to the ground bus in the equipment.

D. Provide grounding type bushings with lugs for connection of grounding conductor at both ends of metallic conduit runs. Bond ground bushings to the grounding system.

E. Provide a green insulated wire-grounding jumper from the ground screw to a box grounding screw and, for grounding type devices, to equipment grounding conductor.

F. Interconnect the secondary neutral bus to the ground bus in the secondary equipment only at service entrance point or after a transformer.

G. Duct bank ground system:
   1. Provide a bare copper grounding conductor the entire length of each duct bank, embedded in the concrete of the duct bank as indicated on the Drawings and specified in the Specifications.
   2. Bond duct bank ground conductors together where duct banks join, merge, intersect, or split.

H. Grounding at service (600 V or Less):
   1. Connect the neutral to ground only at one point within the enclosure of the first disconnecting means on the load side of the service transformer.

I. Ground connections:
   1. All connections to the ground grid system, the duct bank grounding system, equipment, ground rods, etc., shall be made using compression type grounding connectors as indicated on the Drawings, UL listed, and labeled for the application.
   2. Make ground connections in accordance with the manufacturer's instructions.
   3. Do not conceal or cover any ground connections until the Engineer or authorized representative has established and provided written confirmation that every grounding connection is as indicated on the Drawings and specified in the Specifications.

J. Grounding electrode system:
   1. Ground ring:
      a. Provide all trenching and materials necessary to install the ground ring as indicated on the Drawings.
      b. Ground ring conductor shall be in direct contact with the earth, or where embedded, concrete, of the size as indicated on the Drawings.
      c. Minimum burial depth 36 inches or as indicated on the Drawings.
      d. Re-compact disturbed soils to original density in 6-inch lifts.
   2. Ground rods:
      a. Locations as indicated on the Drawings.
      b. Length of rods forming an individual ground array shall be equal in length.
      c. Drive ground rods and install grounding conductors before construction of concrete slabs and duct banks.
      d. Pre-crimp all ground rods, as recommended by the manufacturer, before crimping connector to ground rod.
   3. Metal underground water pipe:
      a. Bond metal underground domestic water pipe to grounding electrode system.
   4. Extend grounding conductors through concrete to accessible points for grounding equipment and electrical enclosures.
   5. Where grounding conductors are exposed and subject to physical damage, install in Schedule 80 PVC conduit for protection.
   6. Install grounding system at each structure where switchgear, motor control centers, switchboards, panelboards, panels, or other electrical equipment are installed.

K. Shield grounding:
   1. Analog signal cables shields shall only be grounded at a single point in the loop. Unless otherwise noted, ground signal cable shields at control panel.
   2. For communication and data line signal cable shields and drain wires should be grounded at both ends of the cable run.
   3. Insulate the shielding and exposed drain wire for each signal cable with heat-shrink tubing.
   4. Terminate the signal cable shield on a dedicated grounding terminal block.

L. Where indicated on the Drawings, install ground rods in precast ground wells.

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 COMMISSIONING

A. As specified in Section 01756 - Commissioning.

3.08 FIELD QUALITY CONTROL

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Measure grounding electrode system resistance to ground in accordance with IEEE 81.

3.09 ADJUSTING

A. Under the direction of the Engineer, add additional parallel connected ground rods and/or deeper driven rods until the ground resistance measurement meets the specified resistance requirements:
   1. Use of salts, water, or compounds to attain the specified ground resistance is not acceptable.

3.10 CLEANING (NOT USED)

3.11 PROTECTION

A. As specified in Section 16050 - Common Work Results for Electrical.

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 16075

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Identification of electrical equipment, devices and components.
   2. Material, manufacturing and installation requirements for identification devices.

1.02 REFERENCES

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Occupational Safety and Health Administration (OSHA).

1.03 DEFINITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

1.04 SYSTEM DESCRIPTION

A. Nameplates:
   1. Provide a nameplate for each piece of electrical equipment, device, control panel and control panel components.
   2. Provide all nameplates of identical style, color, and material throughout the facility.
   3. Device nameplates information:
      a. Designations as indicated on the Drawings and identified on the Process and Instrumentation Drawings.

B. Wire numbers:
   1. Coordinate the wire numbering system with all vendors of equipment so that every field wire has a unique number associated with it for the entire system:
      a. Wire numbers shall correspond to the wire numbers on the control drawings or the panel and circuit numbers for receptacles and lighting.
      b. Wire numbers shall correspond to the terminal block number to which they are attached in the control panel.
      c. Internal panel wires on a common terminal shall have the same wire number.
      d. Multi-conductor cables shall be assigned a cable number that shall be attached to the cable at intermediate pull boxes and stub-up locations beneath freestanding equipment. All multi-conductor and instrumentation cables shall be identified at pull points as described above:
         1) Label armored multi-conductor cable using the conduit number as indicated on the Drawings, following the requirements for conduit markers in Section 16130 - Conduits.

2. Provide the following wiring numbering schemes throughout the project for field wires between process control module, (PCM), vendor control panels, (VCP), motor control centers, (MCC), field starters, field instruments, etc.

(ORIGIN LOC.)–(ORIGIN TERM.)/(DEST. LOC.)–(DEST. TERM.)

OR

(ORIGIN LOC.)–(ORIGIN TERM.)
(DEST. LOC.)–(DEST. TERM.)

Where:

ORIGIN LOC .= Designation for originating panel or device
ORIGIN TERM. = Terminal designation at originating panel or device
DEST. LOC. = Designation for destination panel or device
DEST. TERM. = Terminal designation at destination panel or device or PLC I/O address at destination panel:

a. Identify equipment and field instruments as the origin.
b. PCMs are always identified as the destination.
c. Location is the panel designation for VCP, LCP, or PCM. For connections to MCCs, location is the specific starter tag and loop number. Location is the tag and loop number for motor starters, field instruments and equipment. Any hyphen in the panel designation or tag and loop number shall be omitted.
d. Terminal designation is the actual number on the terminal block where the conductor terminates at field devices and vendor control panels. For multi-conductor cables, all terminal numbers shall be shown, separated by commas.
e. Terminal designations at motor leads shall be the motor manufacturer's standard terminal designation (e.g., T1, T2, T3, etc.).
f. Terminal designations at PCMs where the field conductor connects to field terminal blocks for a PLC input or output shall be the PLC address (Note: the following PLC I/O numbering scheme is typical for Allen-Bradley, the numbering scheme should be modified to match that of the actual PLC manufacturer used for the project):
    1) Discrete Point: W:X:Y/Z.
       Analog Point: W:X:Y.Z.
       Where:
       W= I for input, O for output
       X= PLC number (1, 2, 3…)
       Y= Slot number (01, 02, 03…)
       Z= Terminal number (00, 01, 02…) for a discrete point or a word number for an analog point (1, 2, 3…)
g. Terminal designations at PCMs where the conductor does not connect to a PLC I/O point shall be the terminal number with a "C" prefix (e.g., C0010). For common power after a fuse or neutrals after a switch, the subsequent points shall have and capital letter suffix starting with "A" (e.g., C0010A).

1.05 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 16050 - Common Work Results for Electrical.

B. Product data:
   1. Nameplates:
      a. Color.
      b. Size:
         1) Outside dimensions.
         2) Lettering.
      c. Material.
      d. Mounting means.
   2. Nameplate schedule:
      a. Show exact wording for each nameplate.
      b. Include nameplate and letter sizes.
   3. Wire numbers:
      a. Manufacturer's catalog data for wire labels and label printer.

C. Record documents:
   1. Update the conduit schedule to reflect the exact quantity of wire numbers including spares and destination points for all wires.

1.06 QUALITY ASSURANCE (NOT USED)

1.07 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 16050 - Common Work Results for Electrical.

1.08 PROJECT SITE CONDITIONS (NOT USED)

1.09 SEQUENCING (NOT USED)

1.10 SCHEDULING (NOT USED)

1.11 WARRANTY

A. As specified in Section 16050 - Common Work Results for Electrical.

1.12 SYSTEM START-UP

A. As specified in Section 16050 - Common Work Results for Electrical.

1.13 OWNER'S INSTRUCTIONS (NOT USED)

1.14 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nameplates and signs:
   1. One of the following or equal:
      a. Brady.
      b. Seton.

B. Conductor and cable markers:
   1. Heat-shrinkable tubing:
      a. One of the following or equal:
         1) Raychem.
         2) Brady.
         3) Thomas & Betts.
         4) Kroy.
         5) Panduit.

C. Conduit and raceway markers:
   1. Brass, one of the following or equal:
      a. Panduit.

2.02 EXISTING PRODUCTS (NOT USED)

2.03 MATERIALS

A. Nameplates:
   1. Colors:
      a. Warning nameplates: White-center, red face.
      b. Other nameplates: Black-center, white face.
   2. Laminated plastic engraving stock:
      a. 3/32-inch thick material.
      b. 2-ply.
      c. With chamfered edges.
   3. Block style engraved characters of adequate size to be read easily from a distance of 6 feet:
      a. No characters smaller than 1/8-inch in height.

B. Signs:
   1. Automatic equipment and high voltage signs:
      a. Suitable for exterior use.
      b. In accordance with OSHA regulations.

C. Conductor and cable markers:
   1. Machine printed black characters on white tubing.
   2. 10 point type or larger.

D. Conduit and raceway markers:
   1. Solid brass tags:
      a. Dimensions:
         1) Length: 2-inches.
         2) Width: 0/5-inches.
      b. Thickness: 0.036 inches.

c. Engraved letters and numbers.
d. Minimum letter height: 1/4-inch.

2.04 MANUFACTURED UNITS (NOT USED)

2.05 EQUIPMENT (NOT USED)

2.06 COMPONENTS (NOT USED)

2.07 ACCESSORIES (NOT USED)

2.08 MIXES (NOT USED)

2.09 FABRICATION (NOT USED)

2.10 FINISHES (NOT USED)

2.11 SOURCE QUALITY CONTROL

A. Nameplates:
1. Provide all nameplates for control panel operator devices (e.g., pushbuttons, selector switches, pilot lights, etc.):
a. Same material and same color and appearance as the device nameplates, in order to achieve an aesthetically consistent and coordinated system.

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Nameplates:
1. Attach nameplates to equipment with rivets, bolts or sheet metal screws, approved waterproof epoxy-based cement or install in metal holders welded to the equipment.
2. Provide a nameplate for each disconnecting means with the following:
a. Equipment served, voltage, and fuse size as required.
b. Identification of the circuit source that supplies the disconnecting means.
3. On NEMA Type 4, NEMA Type 4X, or NEMA Type 7 enclosures, use epoxy-based cement to attach nameplates.
4. Nameplates shall be aligned and level or plumb to within 1/64 inch over the entire length:
a. Misaligned or crooked nameplates shall be remounted or provide new enclosures at the discretion of the Engineer.

C. Conductor and cable markers:
   1. Apply all conductor and cable markers before termination.
   2. Heat-shrinkable tubing:
      a. Tubing shall be shrunk using a heat gun that produces low temperature heated air.
      b. Tubing shall be tight on the wire after it has been heated.
      c. Characters shall face the open panel and shall read from left to right or top to bottom.
      d. Marker shall start within 1/32 inch of the end of the stripped insulation point.

D. Conduit markers:
   1. Furnish and install conduit markers for every conduit in the electrical system that is identified in the conduit schedule or part of the process system:
      a. Conduit markings shall match the conduit schedule.
   2. Mark conduits at the following locations:
      a. At each end of the conduit.
      b. Within 3 feet of any pull box, junction box, conduit tee or enclosure.
   3. Mark conduits after the conduits have been fully painted.
   4. Position conduit markers so that they are easily read from the floor.
   5. Attach brass tags with #18 Type 304 stainless steel wires.
   6. Mark conduits before construction review by Engineer for punch list purposes.

E. Signs and labeling:
   1. Furnish and install permanent warning signs at mechanical equipment that may be started automatically or from remote locations:
      a. Fasten warning signs with round head stainless steel screws or bolts.
      b. Locate and mount in a manner to be clearly legible to operations personnel.
   2. Furnish and install permanent and conspicuous warning signs on equipment (front and back), doorways to equipment rooms, pull boxes, manholes, etc. where the voltage exceeds 600 volts.
   3. Furnish and install warning signs on equipment that has more than one source of power.
      a. Warning signs to identify every panel and circuit number of the disconnecting means of all external power sources.
   4. Place warning signs on equipment that has 120 VAC control voltage source used for interlocking.
      a. Identify panel and circuit number or conductor tag for control voltage source disconnecting means.
   5. Label service entrance equipment, switchgear, switchboards, MCCs, panelboards, and transfer switches with the available short circuit current, equipment label, and date of application in accordance with NEC. Coordinate with Section 16305 - Electrical System Studies for available fault current data.

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 COMMISSIONING

A. As specified in Section 01756 - Commissioning.

3.08 FIELD QUALITY CONTROL

A. Replace any nameplates, signs, conductor markers, cable markers or raceway labels that in the sole opinion of the Engineer do not meet the Engineer's aesthetic requirements.

3.09 ADJUSTING (NOT USED)

3.10 CLEANING (NOT USED)

3.11 PROTECTION (NOT USED)

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 16123

600-VOLT OR LESS WIRES AND CABLES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. 600-volt class or less wire and cable.

1.02 REFERENCES

A. As specified in Section 16050 - Common Work Results for Electrical.

B. ASTM International (ASTM):
   1. B3 - Standard Specification for Soft or Annealed Copper Wire.
   2. B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

C. CSA International (CSA).

D. Insulated Cable Engineer's Association (ICEA):
   1. S-90-661 – Individually Unshielded Twisted Pair Indoor Cables for Use in Communication Wiring Systems.

E. National Electrical Code (NEC).

F. National Electrical Manufacturers Association /Insulated Cable Engineers Association (NEMA/ICEA):
   1. NEMA WC 57/ICEA S-73-532 - Standard for Control, Thermocouple Extension, and Instrumentation Cables.
   2. NEMA WC 66/ICEA S-116-732 – Standard for Category 6 and 6A, 100 Ohm, Individually Unshielded Twisted Pairs, Indoor Cables (With or Without an Overall Shield) for Use in LAN Communication Wiring Systems.
   3. NEMA WC 70/ICEA S-95-658-1999 - Standard for Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.

G. National Fire Protection Association (NFPA):
   1. 262 – Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

H. Telecommunications Industry Association (TIA):
   1. 568.2-D – Balanced Twisted-Pair Telecommunications Cabling and Components Standard.
   2. 569-B – Commercial Building Standards for Telecommunications Pathways and Spaces.

I. Underwriter's Laboratories Inc., (UL):
   1. 44 – Standard for Thermoset-Insulated Wires and Cables.
   2. 1277 - Electrical Power and Control Tray Cables with Optional-Fiber Members.

3. 1569 - Standard for Metal-Clad Cables.
4. 1666 - Standard for Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts.

1.03 DEFINITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Specific definitions and abbreviations:
1. AWG: American wire gauge.
2. BCCS: Bare copper-covered steel.
3. CPE: Chlorinated polyethylene.
4. FEP: Fluorinated ethylene propylene.
5. FHDPE: Foam high-density polyethylene.
6. FPE: Foam polyethylene.
7. OD: Outside diameter.
8. PVC: Polyvinyl chloride.
9. XHHW: Cross-linked high heat water resistant insulated wire.

C. Definitions of terms and other electrical considerations as set forth in the:
1. ASTM.
2. ICEA.

1.04 SYSTEM DESCRIPTION

A. Furnish and install the complete wire and cable system.

1.05 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 16050 - Common Work Results for Electrical.

B. Product data:
1. Manufacturer of wire and cable.
2. Insulation:
   a. Type.
   b. Voltage class.
3. AWG size.
4. Conductor material.
5. Pulling compounds.

C. Shop drawings:
1. Show splice locations.
   a. For each proposed splice location provide written justification describing why the splice is necessary.

D. Test reports:
1. Submit test reports for meg-ohm tests.

E. Calculations:
1. Submit cable pulling calculations to the Engineer for review and comment for all cables that will be installed using mechanical pulling equipment. Show that

the maximum cable tension and sidewall pressure will not exceed manufacturer recommended values:
   a. Provide a table showing the manufacturer's recommended maximum cable tension and sidewall pressure for each cable type and size included in the calculations.
   b. Submit the calculations to the Engineer a minimum of 2 weeks before conduit installation.

F. Cable lengths:
   1. Submit installed cable lengths using a conduit measuring tape for all 3-phase circuits including, but not limited to:
      a. 480 V circuits.
      b. 208 V circuits.
   2. Submit installed lengths of cable for the following single-phase circuits:
      a. Circuits feeding single-phase transformers.
      b. Circuits feeding single-phase panelboards.

1.06 QUALITY ASSURANCE

A. As specified in Section 16050 - Common Work Results for Electrical.

B. All wires and cables shall be UL listed and labeled.

1.07 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 16050 - Common Work Results for Electrical.

1.08 PROJECT OR SITE CONDITIONS (NOT USED)

1.09 SEQUENCING (NOT USED)

1.10 SCHEDULING (NOT USED)

1.11 WARRANTY

A. As specified in Section 16050 - Common Work Results for Electrical.

1.12 SYSTEM START-UP

A. As specified in Section 16050 - Common Work Results for Electrical.

1.13 OWNER`S INSTRUCTIONS (NOT USED)

1.14 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. One of the following or equal:
   1. 600-volt class wire and cable:
      a. General Cable.

b. Okonite Co.
c. Southwire Co.
d. Service Wire.

2. 600-volt VFD cable:
   a. General Cable.
   b. Southwire Co.
   c. Service Wire.
3. Instrumentation class wire and cable:
   a. Alpha Wire Co.
   b. Belden CDT.
   c. General Cable.
   d. Okonite Co.
   e. Rockbestos Surprenant Cable Corp.
4. Network cables:
   a. General Cable.
   b. Belden.
   c. CommScope.

2.02 EXISTING PRODUCTS (NOT USED)

2.03 MATERIALS

A. Conductors:
   1. Copper in accordance with ASTM B3.

2.04 MANUFACTURED UNITS

A. General:
   1. Provide new wires and cables manufactured within 1 year of the date of delivery to the Site.
   2. Permanently mark each wire and cable with the following at 24-inch intervals:
      a. AWG size.
      b. Voltage rating.
      c. Insulation type.
      d. UL symbol.
      e. Month and year of manufacture.
      f. Manufacturer's name.
   3. Identify and mark wire and cable as specified in Section 16075 - Identification for Electrical Systems:
      a. Use integral color insulation for #2 AWG and smaller wire.
      b. Wrap colored tape around cable larger than #2 AWG.

B. 600-volt class wire and cable:
   1. Provide AWG or kcmil sizes as indicated on the Drawings or in the Conduit Schedules:
      a. When not indicated on the Drawings, size wire as follows:
         1) In accordance with the NEC:
            a) Use 75 degree Celsius ampacity ratings.
            b) Ampacity rating after all derating factors, equal to or greater than rating of the overcurrent device.
         2) Provide #12 AWG minimum for power conductors.
         3) Provide #14 AWG minimum for control conductors.

2. Provide Class B stranding in accordance with ASTM B8:
    a. Provide Class C stranding where extra flexibility is required.
3. Insulation:
    a. XHHW-2.
    b. 90 degree Celsius rating.

C. 600-volt VFD cables:
1. Conductor:
    a. Provide Class B stranding in accordance with ASTM B3 and B8.
    b. Copper conductor.
2. Insulation:
    a. Cross-linked Polyethylene, XLPE.
    b. 90 degree Celsius rating.
    c. UL 44 Type RHH/RHW-2 or XHHW-2.
    d. 2,000 volts.
3. Ground:
    a. Provide Class B compressed stranded bare copper in accordance with ASTM B3 and B8.
    b. 3 symmetrically placed bare copper conductors in direct contact with shield.
    c. Equivalent ground size 50 percent of the phase conductor size.
4. Filler:
    a. Cable sizes 8 and 6 use polypropylene filler.
    b. Other cable sizes use paper filler.
5. Metallic shield:
    a. Overall 5 mil bare copper tape shield with 50 percent overlap.
6. Outer jacket:
    a. UL 1277 Type PVC.
7. Cable tray rated, UL Type TC-ER.

D. Instrumentation class cable:
1. Type TC.
2. Suitable for use in wet locations.
3. Voltage rating: 600 volts.
4. Temperature rating:
    a. 90 degree Celsius rating in dry locations.
    b. 75 degree Celsius rating in wet locations.
5. Conductors:
    a. Insulation:
        1) Flame-retardant PVC, 15 mils nominal thickness, with nylon jacket 4 mils nominal thickness.
    b. #16 AWG stranded and tinned.
    c. Color code: ICEA Method 1:
        1) Pair: Black and white.
        2) Triad: Black, white and red.
        3) Multiple pairs or triads:
            a) Color-coded and numbered.
6. Drain wire:
    a. #18 AWG.
    b. Stranded, tinned.

7. Jacket:
    a. Flame retardant, moisture and sunlight resistant PVC.
    b. Ripcord laid longitudinally under jacket to facilitate removal.
8. Shielding:
    a. Individual pair/triad:
        1) Minimum 1.35-mil double-faced aluminum foil-polyester tape overlapped to provide 100 percent coverage.
    b. Multiple pair or triad shielding:
        1) Group shield: Minimum 1.35-mil double-faced aluminum foil-polyester tape overlapped to provide 100 percent coverage.
        2) Completely isolate group shields from each other.
        3) Cable shield: 2.35 mils double-faced aluminum and synthetic polymer backed tape overlapped to provide 100 percent coverage.
    c. All shielding to be in contact with the drain wire.

E. Network cables:
1. Copper Ethernet cable:
    a. Provide copper Ethernet cable types as indicated in the Drawings and Specifications.
    b. General requirements:
        1) All cables shall meet the standards set by TIA-568.2-D and verified by third-party testing laboratory.
        2) Conductors:
            a) Four balanced twisted pairs.
                (1) #22 to #24 AWG thermoplastic insulated solid copper conducts enclosed by a thermoplastic jacket. Copper clad aluminum is not allowed.
        3) Insulation:
            a) Non-Plenum: Polyolefin.
            b) Plenum: Fluoropolymer.
        4) Color coded per T568B.
        5) Outer jacket with ripcord.
        6) Shielding:
            a) Provide F/UTP cables with drain wire for cables inside any equipment, enclosures, or raceway that also contains circuits exceeding 480 VAC and as indicated on the Drawings.
        7) Electrical rating:
            a) Equipment cables: 600 VAC.
            b) Horizontal cables: 300 VAC.
        8) Approvals and listings:
            a) Meets any necessary NEC and NFPA requirements for each application.
            b) Riser applications: CMR in accordance with UL 1666.
            c) Plenum applications: CMP in accordance with NFPA 262.
        9) Certification:
            a) Provide Category 6 cables with NEMA WC 66/ICEA S-116-732 certification.

2.05 EQUIPMENT (NOT USED)

2.06 COMPONENTS (NOT USED)

2.07 ACCESSORIES

A. Wire ties:
   1. One of the following or equal:
      a. T&B, "Ty-Rap" cable ties.
      b. Panduit, cable ties.

B. Wire markers:
   1. As specified in Section 16075 - Identification for Electrical Systems.

2.08 MIXES (NOT USED)

2.09 FABRICATION (NOT USED)

2.10 FINISHES (NOT USED)

2.11 SOURCE QUALITY CONTROL

A. Assembly and testing of cable shall comply with the applicable requirements of NEMA WC 70/ICEA S-95-658-1999.

B. Test Type XHHW-2 in accordance with the requirements of UL 44.

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Color-coding:
   1. Color-coding shall be consistent throughout the facility.
   2. The following color code shall be followed for all 240/120 volt and 208/120 volt systems:
      a. Phase A: Black.
      b. Phase B: Red.
      c. Phase C: Blue.
      d. Single phase system: Black for 1 hot leg, red for the other.
      e. Neutral: White.
      f. High phase or wild leg: Orange.
      g. Equipment ground: Green.
   3. The following color code shall be followed for all 480/277 volt systems:
      a. Phase A: Brown.
      b. Phase B: Orange.
      c. Phase C: Yellow.
      d. Neutral: Gray.
      e. Equipment ground: Green.

4. The following color code shall be followed for all 120 VAC control wiring:
    a. Power: Red.
    b. Neutral: White.
5. The following color code shall be followed for all general purpose DC control circuits:
    a. Grounded conductors: White with blue stripe.
    b. Ungrounded conductors: Blue.
6. Switch legs shall be violet. 3-way switch runners shall be pink.
7. Wires in intrinsically safe circuits shall be light blue.
8. Wire colors shall be implemented in the following methods:
    a. Wires manufactured of the desired color.
    b. Continuously spiral wrap the first 6 inches of the wire from the termination point with colored tape:
        1) Colored tape shall be wrapped to overlap 1/2 of the width of the tape.

C. Install conductors only after the conduit installation is complete, and all enclosures have been vacuumed clean, and the affected conduits have been swabbed clean and dry:
1. Install wires only in approved raceways.
2. Do not install wire:
    a. In incomplete conduit runs.
    b. Until after the concrete work and plastering is completed.

D. Properly coat wires and cables with pulling compound before pulling into conduits:
1. For all #4 AWG and larger, use an approved wire-pulling lubricant while cable is being installed in conduit:
    a. Ideal Products.
    b. Polywater Products.
    c. 3M Products.
    d. Greenlee Products.
    e. Or equal as recommended by cable manufacturer.
    f. Do not use oil, grease, or similar substances.

E. Cable pulling:
1. Prevent mechanical damage to conductors during installation.
2. For cables #1 AWG and smaller, install cables by hand.
3. For cables larger than #1 AWG, power pulling winches may be used if they have cable tension monitoring equipment.
4. Provide documentation that maximum cable pulling tension was no more than 75 percent of the maximum recommended level as published by the cable manufacturer. If exceeded, the Engineer may, at his discretion, require replacement of the cable.
5. Ensure cable pulling crews have all calculations and cable pulling limitations while pulling cable.
6. Make splices or add a junction box or pullbox where required to prevent cable pulling tension or sidewall pressure from exceeding 75 percent of manufacturer's recommendation for the specified cable size:
    a. Make splices in manholes or pull boxes only.
    b. Leave sufficient slack to make proper connections.

F. Install and terminate all wire in accordance with manufacturer's recommendations.

G. Neatly arrange and lace conductors in all switchboards, panelboards, pull boxes, and terminal cabinets by means of wire ties:
   1. Do not lace wires in gutter or panel channel.
   2. Install all wire ties with a flush cutting wire tie installation tool:
      a. Use a tool with an adjustable tension setting.
   3. Do not leave sharp edges on wire ties.

H. Terminate stranded conductors on equipment box lugs such that all conductor strands are confined within the lug:
   1. Use ring type lugs if box lugs are not available on the equipment.

I. Lighting circuits:
   1. Each circuit shall have a dedicated neutral.

J. Apply wire markers to all wires at each end after being installed in the conduit and before meg-ohm testing and termination.

K. Instrumentation class cable:
   1. Install instrumentation class cables in separate raceway systems from power cables:
      a. Install instrument cable in metallic conduit within non-dedicated manholes or pull boxes.
      b. Install cable without splices between instruments or between field devices and instrument enclosures or panels.
   2. Do not make intermediate terminations, except in designated terminal boxes as indicated on the Drawings.
   3. Shield grounding requirements as specified in Section 16060 - Grounding and Bonding.

L. Copper Ethernet cables:
   1. In accordance with TIA-568.2-D.
   2. Pathways:
      a. For initial installation, the maximum fill capacity for pathways (i.e., conduit, raceways, trays, baskets) is 40 percent. The maximum fill capacity of 60 percent is allowed to accommodate future additions after initial installation.
      b. Conduit should be run in the most direct route possible with no more than two 90 degree bends between pull boxes and serve no more than 3 outlet boxes.
   3. Cable bend radius:
      a. Proper cable bend radius control must be maintained throughout the pathways. The bend radius needs to be at a minimum 10 times the cable diameter.
   4. Cable pulling:
      a. Provide cable pulling swivel system to prevent winding and tangling of rope and cables during pull.
      b. The maximum pulling tension is not to exceed manufacturer recommendations. Cable installation should not in any way deform the cable jacket.
      c. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

5. Cable management:
    a. Organize and manage cables for quick and easy moves, adds and changes.
6. Cable termination:
    a. Install equipment outlet connector hardware (e.g., RJ45, M12, etc.), and connect to field equipment outlet (e.g., instrument, VFD, actuator, etc.).
    b. Use shielded connectors as required by the installation.
    c. Coordinate cable termination at copper patch panels with ICSC and General Contractor.
7. Testing:
    a. Copper Ethernet cable testing requirements as specified in Section 16950 - Field Electrical Acceptance Tests.
8. Separation from EMI sources:
    a. Comply with TIA-569-B recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
    b. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
        1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
        2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
        3) Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.
    c. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
        1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
        2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
        3) Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
    d. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
        1) Electrical Equipment Rating Less Than 2 kVA: No requirement.
        2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
        3) Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
    e. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.

M. Signal cable:
    1. Separate and isolate electrical signal cables from sources of electrical noise and power cables by minimum 12 inches.

N. Wiring allowances:
    1. Equipment locations may vary slightly from the drawings. Include an allowance for necessary conductors and terminations for motorized equipment, electrical

outlets, fixtures, communication outlets, instruments, and devices within 10 linear feet of locations indicated on the Drawings.

2. Locations for pull boxes, manholes, and duct banks may vary slightly from the drawings. Include an allowance for necessary conductors and related materials to provide conductors to all pull boxes, manholes and duct banks within 20 linear feet of locations indicated on the Drawings.

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 COMMISSIONING

A. As specified in Section 01756 - Commissioning.

3.08 FIELD QUALITY CONTROL

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Grounding:
   1. As specified in Section 16060 - Grounding and Bonding.

3.09 ADJUSTING (NOT USED)

3.10 CLEANING (NOT USED)

3.11 PROTECTION

A. As specified in Section 16050 - Common Work Results for Electrical.

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 16130

CONDUITS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Metallic conduits.
   2. Nonmetallic conduits.
   3. Conduit bodies.
   4. Conduit fittings and accessories.
   5. Conduit installation.

1.02 REFERENCES

A. As specified in Section 16050 - Common Work Results for Electrical.

B. American National Standards Institute (ANSI):
   1. C80.1 - Electrical Rigid Steel Conduit.
   2. C80.3 - Steel Electrical Metallic Tubing.
   3. C80.5 - Electrical Rigid Aluminum Conduit.
   4. C80.6 - Electrical Intermediate Metal Conduit.

C. National Electrical Manufacturer's Association (NEMA):
   1. RN-1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Steel Conduit.
   2. TC2 - Electrical Polyvinyl Chloride (PVC) Conduit.
   3. TC3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.
   4. TC7 - Smooth-Wall Coilable Electrical Polyethylene Conduit.
   5. TC13 - Electrical Nonmetallic Tubing.
   6. TC14 - Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.

D. Underwriters Laboratories (UL):
   1. 1 - Standard for Flexible Metal Conduit.
   2. 6 - Standard for Electrical Rigid Metal Conduit - Steel.
   3. 6A - Standard for Electrical Rigid Metal Conduit - Aluminum, Red Brass, and Stainless Steel.
   4. 360 - Standard for Liquidtight Flexible Steel Conduit.
   5. 651 - Standard for Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.
   6. 651B - Standard for Continuous Length HDPE Conduit.
   7. 797 - Standard for Electrical Metallic Tubing - Steel.
   8. 1203 –Standard for Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations.
   9. 1242 - Standard for Electrical Intermediate Metal Conduit - Steel.
   10. 1653 - Standard for Electrical Nonmetallic Tubing.

11. 1660 - Standard for Liquidtight Flexible Nonmetallic Conduit.
12. 1684 - Standard for Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.

1.03 DEFINITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Specific definitions and abbreviations:
   1. Conduit bodies: A separate portion of a conduit system that provides access through a removable cover to the interior of the system at a junction of 2 or more conduit sections. Includes, but not limited to, Shapes C, E, LB, T, X, etc.
   2. Conduit fitting: An accessory that primarily serves a mechanical purpose. Includes, but not limited to, bushings, locknuts, hubs, couplings, reducers, etc.
   3. GRC: Galvanized rigid steel conduit.
   4. PCS: Polyvinyl chloride (PVC) coated rigid steel conduit.
   5. SLT: Sealtight-liquidtight flexible conduit.
   6. NPT: National pipe thread.

1.04 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 16050 - Common Work Results for Electrical.

B. Product data:
   1. Furnish complete manufacturer's catalog sheets for every type and size of conduit, fitting, conduit body, and accessories to be used on the Project.
   2. Furnish complete manufacturer's recommended special tools to be used for installation if required.
   3. Certified test results for PVC-coated metallic conduit showing the adhesive bond is stronger than the tensile strength of the PVC.

C. Shop drawings:
   1. Furnish conduit routing plans for conduits before the installation of any conduit.
   2. Detail the intended routing of each conduit, conduit material and include supporting methods.
   3. Number conduits in accordance with the Contract Documents.
      a. Provide conduit labels as specified in Section 16075 - Identification for Electrical Systems.

D. Certifications:
   1. Furnish PVC-coated conduit manufacturer's valid, unexpired certification for each installer.

E. Record Documents:
   1. Incorporate all changes in conduit routing on electrical plan drawings.
   2. Dimension underground and concealed conduits from building lines.
   3. Furnish hard copy drawings.

1.05 QUALITY ASSURANCE

A. As specified in Section 16050 - Common Work Results for Electrical.

B. All conduits, conduit bodies, and fittings shall be UL listed and labeled.

C. Every installer of PVC-coated metallic conduit shall be certified by the manufacturer for installation of the conduit, and be able to present a valid, unexpired installer certification card prior to installation beginning.

1.06 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Do not expose non-metallic conduit to direct sunlight.

C. Do not store conduit in direct contact with the ground.

1.07 PROJECT OR SITE CONDITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

1.08 SEQUENCING

A. Before installing any conduit or locating any device box:
   1. Examine the complete set of Drawings and Specifications, and all applicable shop drawings.
   2. Verify all dimensions and space requirements and make any minor adjustments to the conduit system as required to avoid conflicts with the building structure, other equipment, or the work of other trades.

B. Duct bank construction and direct buried conduit installation have a prerequisite of fulfilling all aspects of Section 02280 – Subsurface Utility Engineering.

1.09 SCHEDULING (NOT USED)

1.10 WARRANTY

A. As specified in Section 16050 - Common Work Results for Electrical.

1.11 SYSTEM START-UP

A. As specified in Section 16050 - Common Work Results for Electrical.

1.12 OWNER'S INSTRUCTIONS (NOT USED)

1.13 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Galvanized rigid steel conduit:
   1. One of the following or equal:
      a. Western Tube and Conduit.

b. Allied Tube and Conduit.
c. Wheatland Tube Co.

B. PVC-coated rigid steel conduit:
1. One of the following or equal:
a. Robroy Ind.
b. Ocal, Inc.
c. Calbond.
d. Allied.
e. NEC, Inc. BlackGuard.

C. Sealtight-liquidtight flexible conduit:
1. One of the following or equal:
a. Southwire.
b. AFC Cable Systems.
c. Electri-Flex Co.
d. Anaconda.

D. Rigid nonmetallic PVC conduit:
1. One of the following or equal:
a. Carlon.
b. Cantex.
c. Triangle Conduit and Cable.

E. Conduit bodies:
1. One of the following or equal:
a. Crouse-Hinds.
b. Appleton.
c. O-Z/Gedney.
d. Ocal, Inc.
e. Robroy Ind.
f. Calbond.
g. Carlon.

F. Joint compound:
1. The following or equal:
a. Thomas & Betts.

G. Galvanized rigid steel conduit expansion fittings:
1. One of the following or equal:
a. Crouse-Hinds.
b. Appleton.
c. O-Z/Gedney.

H. PVC-coated rigid steel conduit expansion fittings:
1. One of the following or equal:
a. Ocal, Inc.
b. Robroy Ind.
c. NEC, Inc. BlackGuard.

I. Conduit hangers and supports:
1. As specified in Section 16070 - Hangers and Supports.

2.02 SYSTEM DESCRIPTION

A. Provide conduits, conduit bodies, fittings, junction boxes, and all necessary components, whether or not indicated on the Drawings, as required, to install a complete electrical raceway system.

B. Provide location and protection of existing underground utilities, underground conduit trenching, conduit and backfill necessary for the complete installation of underground conduits.

2.03 EXISTING PRODUCTS (NOT USED)

2.04 MATERIALS (NOT USED)

2.05 MANUFACTURED UNITS (NOT USED)

2.06 EQUIPMENT (NOT USED)

2.07 COMPONENTS

A. GRC:
   1. All threads: NPT standard conduit threads with a 3/4-inch taper per foot:
      a. Running conduit threads are not acceptable.
   2. Hot-dip galvanized inside and out:
      a. Ensures complete coverage and heats the zinc and steel to a temperature that ensures the zinc alloys with the steel over the entire surface.
      b. Electro-galvanizing is not acceptable.
   3. Manufactured in accordance with:
      a. UL-6.
      b. ANSI C80.1.

B. PCS:
   1. The steel conduit, before PVC coating, shall be new, unused, hot-dip galvanized material, conforming to the requirements for Type GRC.
   2. Coated conduit NEMA Standard RN-1:
      a. The galvanized coating may not be disturbed or reduced in thickness during the cleaning and preparatory process.
   3. Factory-bonded PVC jacket:
      a. The exterior galvanized surfaces shall be coated with primer before PVC coating to ensure a bond between the zinc substrate and the PVC coating.
      b. Nominal thickness of the exterior PVC coating shall be 0.040 inch except where part configuration or application of the piece dictates otherwise.
      c. PVC coating on conduits and associated fittings shall have no sags, blisters, lumps, or other surface defects and shall be free of holes and holidays.
      d. The PVC adhesive bond on conduits and fittings shall be greater than the tensile strength of the PVC plastic coating:
         1) Confirm bond with certified test results.
   4. A urethane coating shall be uniformly and consistently applied to the interior of all conduits and fittings:
      a. Nominal thickness of 0.002 inch.

b. Conduits having areas with thin or no coating are not acceptable.
c. All threads shall be coated with urethane.

5. The PVC exterior and urethane interior coatings applied to the conduits shall afford sufficient flexibility to permit field bending without cracking or flaking at temperature above 30 degrees Fahrenheit (-1 degree Celsius).
6. PCS conduit bodies and fittings:
   a. Malleable iron.
   b. The conduit body, before PVC coating, shall be new, unused material and shall conform to appropriate UL standards.
   c. The PVC coating on the outside of conduit bodies shall be 0.040-inch thick and have a series of ribs to protect the coating from tool damage during installation.
   d. 0.002-inch interior urethane coating.
   e. Utilize the PVC coating as an integral part of the gasket design.
   f. Stainless steel cover screw heads shall be encapsulated with plastic to ensure corrosion protection.
   g. A PVC sleeve extending 1 conduit diameter or 2 inches, whichever is less, shall be formed at each female conduit opening.
      1) The inside diameter of the sleeve shall be the same as the outside diameter of the conduit to be used.
      2) The sleeve shall provide a vapor- and moisture resistant seal at every connection.
      3) Fittings shall be Form 8 and supplied with plastic encapsulated stainless steel cover screws. Fittings shall be UL Type 4X. Fittings shall be from the same manufacturer as the conduit in order to maintain system continuity and warranty.

C. SLT:
1. Temperature rated for use in the ambient temperature at the installed location but not less than the following:
   a. General purpose:
      1) Temperature range: -20 degrees Celsius to +80 degrees Celsius.
   b. Oil-resistant:
      1) Temperature range: -20 degrees Celsius to +60 degrees Celsius.
2. Sunlight-resistant, weatherproof, and watertight.
3. Manufactured from single strip steel, hot-dip galvanized on all 4 sides before conduit fabrication.
4. Strip steel spiral wound resulting in an interior that is smooth and clean for easy wire pulling.
5. Overall PVC jacket.
6. With integral copper ground wire, built in the core, in conduit trade sizes 1/2 inch through 1-1/4 inch.

D. Conduit bodies:
1. Material consistent with conduit type:
   a. Malleable iron bodies and covers when used with Type GRC.
   b. PVC-coated malleable iron bodies and covers when used with Type PCS.

2. Conduit bodies to conform to Form 8, Mark 9, or Mogul design:
    a. Mogul design conforming to NEC requirements for bending space for large conductors for conduit trade sizes of 1 inch and larger with conductors #4 AWG and larger, or where required for wire-bending space.
3. Gasketed covers attached to bodies with stainless steel screws secured to threaded holes in conduit body.

2.08 ACCESSORIES

A. Connectors and fittings:
    1. Manufactured with compatible materials to the corresponding conduit.

B. Insulated throat metallic bushings:
    1. Construction:
        a. Malleable iron or zinc-plated steel when used with steel conduit.
        b. Positive metallic conduit end stop.
        c. Integrally molded non-combustible phenolic-insulated surfaces rated at 150 degrees Celsius.
        d. Use fully insulated bushings on nonmetallic conduit system made of high-impact 150 degrees Celsius rated non-combustible thermosetting phenolic.

C. Insulated grounding bushings:
    1. Construction:
        a. Malleable iron or steel, zinc-plated, with a positive metallic end stop.
        b. Integrally molded non-combustible phenolic-insulated surfaces rated at 150 degrees Celsius.
        c. Tin-plated copper grounding saddle for use with copper or aluminum conductors.

D. Electrical unions (Erickson Couplings):
    1. Construction:
        a. Malleable iron for use with steel conduit.
        b. Concrete tight, 3-piece construction.
        c. Rated for Class I Division 1 Group D in hazardous areas.

E. SLT fittings:
    1. Construction:
        a. Malleable iron.
        b. Furnished with locknut and sealing ring.
        c. Liquidtight, raintight, oiltight.
        d. Insulated throat.
        e. Furnish as straight, 45-degree elbows, and 90-degree elbows.
        f. Designed to prevent sleeving:
            1) Verify complete bonding of the raceway jacket to the plastic gasket seal.
        g. Equipped with grounding device to provide ground continuity irrespective of raceway core construction. Grounding device, if inserted into raceway and directly in contact with conductors, shall have rolled-over edges for sizes under 5 inches.
        h. Where terminated into a threadless opening using a threaded hub fitting, a suitable moisture-resistant/oil-resistant synthetic rubber gasket shall be

provided between the outside of the box or enclosure and the fitting shoulder. Gasket shall be adequately protected by and permanently bonded to a metallic retainer.

2. Corrosion-resistant and outdoor SLT fittings:
    a. Construction:
        1) PVC-coated liquidtight fittings with a bonded 0.040-inch thick PVC coating on the metal connector to form a seal around the SLT conduit.
        2) Insulated throat and an integral sealing ring.

F. Hubs for threaded attachment of steel conduit to sheet metal enclosures:
1. Construction:
    a. Insulated throat.
    b. PVC-coated when used in corrosive areas.
    c. Bonding locknut.
    d. Recessed neoprene o-ring to ensure watertight and dusttight connector.
    e. 1/2-inch through 1-1/4-inch steel zinc electroplated.
    f. 1-1/2-inch through 6-inch malleable iron zinc plated.
2. Usage:
    a. All conduits in damp, wet, outdoor, and corrosive areas shall use threaded hubs for connections to sheet metal enclosures.

G. Expansion/deflection couplings:
1. Use to compensate for movement in any directions between 2 conduit ends where they connect.
2. Shall allow movement of 3/4 inch from the normal in all directions.
3. Shall allow angular movement for a deflection of 30 degrees from normal in any direction.
4. Constructed to maintain electrical continuity of the conduit system.
5. Materials:
    a. End couplings: Bronze or galvanized ductile iron.
    a. Sleeve: Neoprene.
    b. Bands: Stainless steel.
    c. Bonding jumper: Tinned copper braid.

H. Expansion couplings:
1. Shall allow for expansion and contraction of conduit:
    a. Permitting 8-inch movement, 4 inches in either direction.
2. Constructed to maintain electrical continuity of the conduit system.
3. Materials:
    a. Head: Malleable or ductile iron.
    a. Sleeve: Steel.
    b. Insulating bushing: Phenolic.
    c. Finish: Hot-dip galvanized.
    d. PVC-coated steel when used with Type PCS.

I. Conduit markers:
1. As specified in Section 16075 - Identification for Electrical Systems.

2.09 MIXES (NOT USED)

2.10 FABRICATION (NOT USED)

2.11 FINISHES (NOT USED)

2.12 SOURCE QUALITY CONTROL

A. As specified in Section 16050 - Common Work Results for Electrical.

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 16050 - Common Work Results for Electrical.

B. General:
   1. Conduit routing:
      a. The electrical drawings are diagrammatic in nature:
         1) Install conduit runs as specified with schematic representation indicated on the Drawings and as specified.
         2) Modify conduit runs to suit field conditions, as accepted by the Engineer:
            a) Make changes in conduit locations that are consistent with the design intent but are dimensionally different, or routing to bypass obstructions.
            b) Make changes in conduit routing due to the relocation of equipment.
         3) The electrical drawings do not indicate all required junction boxes and pull boxes:
            a) Provide junction boxes and pull boxes to facilitate wire pulling as required:
               (1) To meet cable manufacturer's pulling tension requirements.
               (2) To limit total conduit bends between pull locations.
            b) Install junction boxes and pull boxes at locations acceptable to the Engineer.
      b. The Contractor is responsible for any deviations in general location, conduit size, routing, or changes to the conduit schedule without the express written approval or direction by the Engineer:
         1) The Engineer is the sole source in determining whether the change is constituted as a deviation:
         2) Perform any changes resulting in additional conduits, or extra work from such deviations.
         3) Incorporate any deviations on the Record Documents.
   2. Use only tools recommended by the conduit manufacturer for assembling the conduit system.
   3. Provide adequate clearances from high-temperature surfaces for all conduit runs. Provide minimum clearances as follows:
      a. Clearance of 6 inches from surfaces 113 degrees Fahrenheit to 149 degrees Fahrenheit.
      b. Clearance of 12 inches from surfaces greater than 149 degrees Fahrenheit.

c. Keep conduits at least 6 inches from the coverings on hot water and steam pipes, 18 inches from the coverings on flues and breechings, and 12 inches from fuel lines and gas lines.
d. Where it is necessary to route conduits close to high-temperature surfaces, provide a high-reflectance thermal barrier between the conduit and the surface.

4. Do not install 1-inch or larger conduits in or through structural members unless approved by the Engineer.
5. Run conduits exposed to view parallel with or at right angles to structural members, walls, or lines of the building:
   a. Install straight and true conduit runs with uniform and symmetrical elbows, offsets, and bends.
   b. Make changes in direction with long radius bends or with conduit bodies.
6. Install conduits with total conduit bends between pull locations less than or equal to 270 degrees.
7. Route all exposed conduits to preserve headroom, access space and work space, and to prevent tripping hazards and clearance problems:
   a. Install conduit runs so that runs do not interfere with proper and safe operation of equipment and do not block or interfere with ingress or egress, including equipment-removal hatches.
   b. Route conduits to avoid drains or other gravity lines. Where conflicts occur, relocate the conduit as required.
8. Conduits may be run in concrete members or slabs with permission of the Engineer or as indicated on the Drawings:
   a. Refer to the typical details for conduit spacing and size requirements.
9. When installing conduits through slabs or walls, make provisions for locating any possible conflicting items where the conduit is to penetrate. Use tone signal or X-ray methods to make certain that no penetrations will be made into the existing conduits, piping, cables, post-tensioning cables, etc.
10. Plug conduits brought into pull boxes, manholes, handholes, and other openings until used to prevent entrance of moisture.
11. Install conduits through wall and floor seals where indicated on the Drawings.
12. For 2-inch and larger conduit runs, snake conduits with a conduit cleaner equipped with a cylindrical mandrel of a diameter not less than 85 percent of nominal diameter of the conduit:
   a. Remove and replace conduits through which mandrel will not pass.
13. Provide all sleeves and openings required for the passage of electrical raceways or cables even when these openings or sleeves are not specifically indicated on the Drawings.
14. Install complete conduit systems before conductors are installed.
15. Provide metallic conduits terminating in equipment conduit windows with grounding bushings and ground with a minimum No. 6 AWG ground wire.
16. Underground conduits:
   a. Install underground conduits, including conduit runs below slabs-on-grade in concrete-reinforced duct bank construction:
      1) As specified in Section 16133 - Duct Banks.
   b. Make underground conduit size transitions at handholes and manholes.
   c. Install spare conduits in underground duct banks towards top center of runs to allow for ease of installation of future cables as conduits enter underground manholes and handholes.
   d. Seal around conduit penetrations of below grade walls with a mechanical seal.

17. Underground conduit trenching:
    a. Perform trenching as specified in Section 02318 - Trenching.
    b. Trench must be uniformly graded with the bottom, rock free and covered with select material.
    c. Damage occurring to existing ducts, conduits, cables, and other utilities during underground conduit installation shall be remediated to the satisfaction of the Owner.
    d. Whenever possible, use the walls of the trench as forms for concrete encasement:
        1) Forms are required where the soil is not self-supporting.

C. Equipment grounding conductors:
    1. Provide a separate, green insulated, grounding conductor in each raceway independent of raceway material:
        a. Multi-conductor power and control cables shall include an integral green insulated grounding conductor.
        b. Provide a separate grounding conductor in each individual raceway for parallel feeders.
    2. Conductors shall be the same type and insulation as the circuit conductors:
        a. Use 600-volt insulation for the equipment grounding conductors for medium voltage systems.
    3. Minimum size in accordance with the NEC.

D. Lighting and receptacle conduits:
    1. Provide conduit runs for lighting and receptacle circuits, whether or not indicated on the Drawings:
    2. Install conduits in accordance with the requirements of this Section unless otherwise indicated.
    3. Minimum conduit size:
        a. 3/4-inch for exposed conduits.
        b. 1-inch for underground or in-slab conduits.
    4. Provide conduit materials for the installed location as specified in Section 16050 - Common Work Results for Electrical.

E. Conduit usage:
    1. Exposed conduits:
        a. Rigid conduit:
            1) Install the rigid conduit type for each location as specified in Section 16050 - Common Work Results for Electrical.
            2) Minimum size: 3/4-inch.
        b. Flexible conduit:
            1) Use flexible conduit for final connections between rigid conduit and motors, vibrating equipment, instruments, control equipment, or where required for equipment servicing:
                a) Use Type SLT with rigid metallic conduit.
            2) Minimum size: 3/4-inch:
                a) 1/2 when required for connection to instruments.

3) Maximum length:
a) Fixed equipment:

Conduit Trade Size	Flexible Conduit Length (inch)
3/4	18
1	18
1-1/4	18
1-1/2	18
2	36
2-1/2	36
3	36
3-1/2	38
4	40

b) Removable instruments or hinged equipment:
(1) As required to allow complete removal or full movement without disconnecting or stressing the conduit.

2. Concrete-encased and embedded conduits:
   a. Straight runs and bends less than 45 degrees:
      1) Type PVC Schedule 40.
   b. Bends with total deflection greater than 45 degrees:
      1) PCS.
   c. Entering and exiting duct bank, underground or embedded conduit runs a minimum 12 inches above and below grade, finished floor, or entering equipment:
      1) PCS.
   d. Minimum size:
      1) 2-inch in duct banks.
      2) 1-inch for in-slab conduits.
      3) Provide conduit fittings to enlarge the conduit from the exposed size in the conduit schedule as required.
3. Below-slab conduits:
   a. Type PCS.
   b. Minimum size: 1-inch.
4. PVC-coated rigid metallic conduit:
   a. Use specifically manufactured or machined threading dies to manufacturer's specifications to accommodate the PVC jacket.
   b. Repair damage to PVC coatings with manufacturer supplied touchup compound or PVC Coating Repair Kit for PVC Coated Raceway Systems.
5. GRC:
   a. Conduit shall be cut square and reamed before threading.

F. Conduit joints and bends:
   1. General:
      a. Where conduit is underground, under slabs on grade, exposed to the weather, or in NEMA Type 4 or NEMA Type 4X locations, make joints liquidtight.
      b. Keep bends and offsets in conduit runs to an absolute minimum.

c. All bends shall be symmetrical.
d. The following conduit systems shall use large-radius sweep elbows:
    1) Underground conduits.
    2) Conduits containing fiber optic cables.
e. Provide large-radius factory-made bends for 1-1/4-inch trade size or larger.
f. Make field bends with a radius of not less than the requirements found in the NEC:
    1) The minimum bending radius of the cable must be less than the radius of the conduit bend.
    2) Make all field bends with power bending equipment or manual benders specifically intended for the purpose:
        a) Make bends so that the conduit is not damaged and the internal diameter is not effectively reduced.
        b) For the serving utilities, make bends to meet their requirements.
g. Replace all deformed, flattened, or kinked conduit.

2. Threaded conduit:
    a. Cut threads on rigid metallic conduit with a standard conduit-cutting die that provides a 3/4-inch per foot taper and to a length such that all bare metal exposed by the threading operation is completely covered by the couplings or fittings used. In addition, cut the lengths of the thread such that all joints become secure and wrench-tight just preceding the point where the conduit ends would butt together in couplings or where conduit ends would butt into the ends or shoulders of other fittings.
    b. Thoroughly ream conduit after threads have been cut to remove burrs.
    c. Use bushings or conduit fittings at conduit terminations.
    d. On exposed conduits, repair scratches and other defects with galvanizing repair stick, Enterprise Galvanizing "Galvabar™," or CRC "Zinc It."
    e. Coat conduit threads with an approved electrically conductive sealant and corrosion inhibitor that is not harmful to the conductor insulation:
        1) Apply to the male threads and tighten joints securely.
        2) Clean excess sealant from exposed threads after assembly.
    f. Securely tighten all threaded connections.
    g. Any exposed threaded surfaces must be cleaned and coated with a galvanizing solution so that all exposed surfaces have a galvanized protective coating.
3. PVC:
    a. Use approved solvent-weld cement specifically manufactured for the purpose. Spray-type cement is not allowed.
    b. Apply heat for bends so that conduit does not distort or discolor. Use a spring mandrel as required to ensure full inside diameter at all bends:
        1) Utilize a heater specifically for PVC conduit as recommended by the conduit manufacturer.

G. Conduit sealing and drainage:
1. Conduit drainage and sealing other than required for hazardous and classified areas:
    a. Provide sealing and drainage in vertical drops of long (in excess of 20 feet), exterior, above-grade conduit runs at the points at which the conduit enters buildings, switchgear, control panels, lighting panelboards, and other similar enclosures.

b. Provide seal fittings with drains in vertical drops directly above grade for exterior and above-grade conduit runs that are extended below grade.
c. Provide conduit seals with drains in areas of high humidity and rapidly changing temperatures:
1) Where portions of an interior raceway pass through walls, ceilings, or floors that separate adjacent areas having widely different temperatures.
d. Provide conduit seals similar to O-Z/Gedney (Type CSM) on all conduits between corrosive and non-corrosive areas.
e. Seal one end only of all underground conduits at highest point with O-Z/Gedney sealing (non-hazardous) filling, or equal.

2. Install seals with drains at any location along conduit runs where moisture may condense or accumulate. This requirement includes, but is not limited to, the following locations: control panels, junction boxes, pullboxes, or low points of the conduit.

H. Conduit supports:
1. General:
a. Provide appropriate hangers, supports, fasteners, and seismic restraints to suit applications:
1) As specified in Section 16070 - Hangers and Supports.
2) Provide support materials consistent with the type of conduit being installed as specified in Section 16050 - Common Work Results for Electrical.
b. Support conduit at the intervals required by the NEC.
c. Perforated strap and plumbers tape are not acceptable for conduit supports.
2. Conduit on concrete or masonry:
a. Use 1-hole malleable iron straps with metallic or plastic expansion anchors and screws or support from preset inserts.
b. Use preset inserts in concrete when possible.
c. Use pipe spacers (clamp backs) in wet locations.
3. Conduit on metal decking:
a. Use 1-hole malleable iron straps with 1-inch long cadmium-plated Type A panhead sheet-metal screws. Fully or partially hammer-driven screws are not acceptable.
4. Suspended conduit:
a. Use malleable-iron factory-made split-hinged pipe rings with threaded suspension rods sized for the weight to be carried (minimum 3/8-inch diameter), Kindorf, or equal.
b. For grouped conduits, construct racks with threaded rods and tiered angle iron or preformed channel cross members. Clamp each conduit individually to a cross member. Where rods are more than 2-feet long, provide rigid sway bracing.
5. Supports at structural steel members:
a. Use beam clamps.
b. Drilling or welding may be used only as specified or with approval of the Engineer.
6. PVC-coated rigid metal systems:
a. Provide right-angle beam clamps and “U” bolts specially formed and sized to snugly fit the outside diameter of the coated conduit. Provide "U" bolts

with PVC-encapsulated nuts that cover the exposed portions of the threads.

b. Securely fasten exposed conduits with Type 316 stainless steel clamps or straps.

I. Expansion or expansion/deflection fittings:
   1. General:
      a. Align expansion coupling with the conduit run to prevent binding.
      b. Follow manufacturer's instructions to set the piston opening.
      c. Install expansion fittings across concrete expansion joints and at other locations where necessary to compensate for thermal or mechanical expansion and contraction.
      d. Furnish fittings of the same material as the conduit system.
   2. For metallic conduit, provide expansion or expansion/deflection couplings, as appropriate, where:
      a. Install expansion fittings a minimum of every 200 feet in straight conduit runs.

J. Empty conduits:
   1. Provide a pull tape in each empty conduit more than 10 feet in length.
   2. Seal ends of all conduits with approved, manufactured conduit seals, caps, or plugs immediately after installation:
      a. Keep ends sealed until immediately before pulling conductors.

K. Miscellaneous:
   1. Seal roof penetrations for raceways and other items that penetrate the roof in accordance with roofing manufacturer's instructions and as indicated on the Drawings.
   2. Provide electrical unions at all points of union between ends of rigid conduit systems that cannot otherwise be coupled:
      a. Running threads and threadless couplings are not allowed.
   3. Replace any conduits installed that the Engineer determines do not meet the requirements of this Specification.
   4. Provide conduit housekeeping curb around all embedded or below-grade conduits exiting or entering the slab, per the Typical Details.

3.04 ERECTION, INSTALLATION, APPLICATIONS, CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 COMMISSIONING

A. As specified in Section 01756 - Commissioning.

3.08 FIELD QUALITY CONTROL

A. As specified in Section 16050 - Common Work Results for Electrical.

3.09 ADJUSTING (NOT USED)

3.10 CLEANING (NOT USED)

3.11 PROTECTION

A. As specified in Section 16050 - Common Work Results for Electrical.

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 16222

LOW VOLTAGE MOTORS UP TO 500 HORSEPOWER

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Low voltage motors up to 500 horsepower (hp).

1.02 REFERENCES

A. As specified in Section 16050 - Common Work Results for Electrical.

B. American Bearing Manufacturers Association (ABMA):
   1. 9 - Load Ratings and Fatigue Life for Ball Bearings.
   2. 11 - Load Ratings and Fatigue Life for Roller Bearings.

C. American Petroleum Institute (API):
   1. 670 - Machinery Protection Systems.

D. ASTM International (ASTM).
   1. B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

E. Institute of Electrical and Electronic Engineers (IEEE):
   1. 43 - IEEE Recommended Practice for Testing Insulation Resistance of Rotating Machinery.
   2. 112 - IEEE Standard Test Procedure for Polyphase Induction Motors and Generators.
   3. 303 - Recommended Practice for Auxiliary Devices for Rotating Electrical Machines in Class I, Division 2 and Zone 2 Locations.
   4. 841 - IEEE Standard for Petroleum and Chemical Industry-Premium-Efficiency, Severe Duty, Totally Enclosed Fan-Cooled (TEFC) Squirrel Cage Induction Motors - Up to and Including 370 kW (500 hp).
   5. 1349 - Guide for Application of Electric Motors in Class I, Division 2 and Class I, Zone 2 Hazardous (Classified) Locations.

F. National Electrical Manufacturers' Association (NEMA):
   1. MG-1 - Motors and Generators.
   2. MG-2 - Safety Standard for Construction and Guide for Selection, Installation, and Use of Electric Motors and Generators.

G. Underwriters Laboratories Inc. (UL):
   1. 674 - Electric Motors and Generators for Use in Division 1 Hazardous (Classified) Locations.

1.03 DEFINITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

1.04 SYSTEM DESCRIPTION

A. Furnish and install electric motors and accessories as specified in this Section and the Sections specifying driven equipment to provide a complete and operable installation.

1.05 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 16050 - Common Work Results for Electrical.

B. Submit completed motor data sheets for each motor supplied:
   1. As specified in Attachment A - Motor Data Sheet.
   2. Manufacturer's or other data sheets are not acceptable.

C. Product data:
   1. Descriptive bulletins.
   2. Machine tag and loop number as indicated on the Drawings and in the specification section number of the driven machine.
   3. Complete electrical data.
   4. Manufacturer's storage recommendations.
   5. Torque, current, and power factor versus speed curves:
      a. At 100 percent rated voltage for all full voltage started and VFD-driven motors.
      b. For motors on reduced voltage start at 70, 80, 90, and 100 percent rated voltage.
   6. Accessories data:
      a. Motor winding heaters:
         1) Voltage.
         2) Watts.
      b. Winding temperature detectors:
         1) Type.
         2) Rating.
      c. Moisture detectors.
   7. Mechanical data:
      a. Bearing design and bearing life calculations.
      b. Resonant frequencies for all VFD-driven motors 50 hp or greater.

D. Shop drawings:
   1. Motor weight.
   2. Frame size.
   3. Conduit box(es), size(s), and location(s).
   4. Outline drawings with dimensions.
   5. Installation details for the project seismic criteria.

E. Test reports:
   1. Factory test reports with test reference standard identified.

F. Certification:
   1. When motors are driven by variable speed drive systems, submit certification that selected motor:
      a. Is capable of satisfactory performance under the intended load.
      b. Meets the requirements of the latest edition of NEMA MG-1 Part 31.

1.06 QUALITY ASSURANCE

A. As specified in Section 16050 - Common Work Results for Electrical.

1.07 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 16050 - Common Work Results for Electrical.
   1. Store motors in accordance with the manufacturer's recommendations.

1.08 PROJECT OR SITE CONDITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

1.09 SEQUENCING (NOT USED)

1.10 SCHEDULING (NOT USED)

1.11 WARRANTY

A. As specified in Section 16050 - Common Work Results for Electrical.

1.12 SYSTEM START-UP

A. As specified in Section 16050 - Common Work Results for Electrical.

1.13 OWNER'S INSTRUCTION (NOT USED)

1.14 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. One of the following or equal:
   1. US Motors.
   2. General Electric.
   3. Reliance.
   4. Toshiba.
   5. Baldor.

2.02 EXISTING PRODUCTS (NOT USED)

2.03 MATERIALS (NOT USED)

2.04 MANUFACTURED UNITS (NOT USED)

2.05 EQUIPMENT

A. 3-phase induction motors - general:
   1. Voltage:
      a. All motors 1/2 hp and larger shall be rated 460 V, 3-phase unless otherwise indicated on the Drawings.
      b. Dual voltage motors rated 230/460 V, 3-phase are acceptable provided all leads are brought to the conduit box.
   2. Motors driving identical machines shall be identical.
   3. All motors greater than 1 hp and up to 500 hp shall meet the "NEMA Premium Efficiency" percent listed in NEMA MG-1.
   4. Horsepower as indicated on the Drawings:
      a. Horsepower ratings indicated on the Drawings are based on vendor's estimates. Provide motors sized for the load of the actual equipment furnished without operating in the service factor.
   5. Service factor:
      a. 1.15 service factor on sine wave power.
      b. 1.0 when driven by VFD.
   6. Torque:
      a. Provide motors that develop sufficient torque for acceleration to full speed at voltage 10 percent less than motor nameplate rating.
      b. When started using reduced voltage starters:
         1) Provide motors that develop sufficient torque for acceleration to full speed.
      c. NEMA Design B except where driven load characteristics require other than normal starting torque:
         1) In no case shall starting torque or breakdown torque be less than the values specified in NEMA MG-1.
   7. Enclosures:
      a. As specified in the individual equipment Specifications or in this Section.
      b. Totally enclosed fan cooled:
         1) Cast iron conduit box.
         2) Tapped drain holes with Type 304 stainless steel plugs for frames 286 and smaller, and automatic breather and drain devices for frames 324 and larger.
      c. Explosion-proof:
         1) Tapped drain holes with corrosion resistant plugs for frames 286 and smaller and automatic breather and drain devices for frames 324 and larger.
      d. Lifting devices: All motors weighing 265 pounds (120 kilograms) or more shall have suitable lifting devices for installation and removal.
   8. Manufactured with cast iron frames in accordance with NEMA MG-1 or manufacturer's standard material for the specified rating.
   9. Nameplates:
      a. Provide all motors with a permanent, stainless steel nameplate indelibly stamped or engraved with:
         1) NEMA standard motor data.
            a) Indicate compliance with NEMA MG-1 Part 31 for inverter duty motors.
         2) AFBMA bearing numbers and lubrication instructions.
   10. Hardware:
      a. Type 304 stainless steel.

11. Conduit boxes:
    a. Cast iron or stamped steel.
    b. Split from top to bottom.
    c. Provide gaskets at the following interfaces:
        1) Frames and conduit boxes.
        2) Conduit boxes and box covers.
    d. Rotatable through 360 degrees in 90-degree increments.
        1) Where available based on the size of the conduit box.
    e. Exceeding the dimensions defined in NEMA MG-1.
    f. Provide grounding lugs inside conduit boxes for motor frame grounding.
12. Motor bearings:
    a. Antifriction.
    b. Regreasable and initially filled with grease for horizontal motors and vertical motors per manufacturer's standard design.
    c. Bearings and lubrication suitable for ambient temperature and temperature rise.
    d. Suitable for intended application and have ABMA L-10 rating life of 60,000 hours or more.
    e. Fit bearings with easily accessible grease supply, flush, drain, and relief fittings using extension tubes where necessary.
    f. Where specified in the equipment Specifications, provide split-sleeve type hydrodynamic radial bearings. Provide a bearing isolator to protect bearings from contaminants.
13. Insulation systems:
    a. Motors installed in ambient temperatures 40 degrees Celsius or less:
        1) Provide Class F insulation.
        2) Design temperature rise consistent with Class B insulation.
        3) Rated to operate at an ambient temperature of 40 degrees Celsius at the altitude where the motor will be installed.
14. Motor leads:
    a. Insulated leads with non-wicking, non-hydroscopic material. Class F insulation.
15. Noise:
    a. Maximum operating noise level in accordance with NEMA MG-1.

B. Vertical motors:
1. Enclosures:
    a. Totally enclosed fan cooled (TEFC) for motors 200 hp and less installed outdoors.
    b. Weather protected Type II (WPII) for motors greater than 200 hp installed outdoors.
    c. Weather protected Type I (WPI) where installed indoors.
2. Thrust bearings:
    a. Selected for combined rotor and driven equipment loads.
    b. Coordinate with driven equipment supplier for maximum vertical thrust of driven equipment.
3. Anti-reverse ratchet.

C. Motors driven by variable frequency drives:
1. Compatible with the variable frequency drives specified.
2. Inverter duty rated and labeled.
3. Meet the requirements of NEMA MG-1 Part 31.

4. Winding insulation meets the requirements of NEMA MG-1 Part 31.4.4.2.
5. Capable of running continuously at 1/10th of full speed, with no harmful effects or overheating.
6. Shaft grounding ring:
    a. Provide a shaft grounding ring for each VFD-driven motor.
    b. Aluminum frame and internal components.
    c. Conductive microfiber brushes.
    d. Maintenance free design.
    e. Aegis Bearing Protection ring as manufactured by Electro Static Technology or equal.
7. Insulated bearings:
    a. Motors 100 hp and larger: Provide insulated bearings on both ends of the motor or the end opposite the shaft grounding ring as recommended by the motor manufacturer.

D. Single-phase motors:
1. Capacitor start type rated for operation at 115 volts, 60 hertz, unless otherwise specified or as indicated on the Drawings.
2. Totally enclosed fan cooled (TEFC) motors manufactured in accordance with NEMA MG 1.
3. Ball bearings: Sealed.
4. 1/2 hp or less fan motors:
    a. Split-phase or shaded pole type when standard for the equipment.
    b. Open type when suitably protected from moisture, dripping water, and lint accumulation.
5. Wound rotor or commutator type single-phase motors only when their specific characteristics are necessary for application and their use is acceptable to the Engineer.
6. Integral overload protection.

2.06 COMPONENTS (NOT USED)

2.07 ACCESSORIES

A. Motor winding heaters:
1. Provide all 3-phase motors with belted or cartridge space heaters mounted within the motor enclosure.
2. Space heater rating shall be 120 volts, single-phase, unless otherwise indicated on the Drawings.
3. Power leads for heaters wired into conduit box.
4. Installed within motor enclosure adjacent to core iron.

B. Winding temperature detectors:
1. Provide factory installed winding temperature detector with leads terminating in the conduit box:
    a. Where required by the driven equipment Specification or as indicated on the Drawings.
    b. RTD type, 2 per phase, 100-ohm platinum.
2. Temperature switches with normally closed contacts for motors greater than 10 horsepower as indicated on the Drawings.

C. Bearing temperature detectors:
   1. Where required by the driven equipment Specification or as indicated on the Drawings.
   2. RTD type and wiring matches the winding RTDs.

2.08 MIXES (NOT USED)

2.09 FABRICATION (NOT USED)

2.10 FINISHES (NOT USED)

2.11 SOURCE QUALITY CONTROL (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Install motors in accordance with manufacturer's instructions.

C. Install shaft grounding ring on VFD-driven motors in accordance with the manufacturer’s instructions.

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 COMMISSIONING AND PROCESS START-UP

A. As specified in Section 01756 - Commissioning.

B. Factory testing:
   1. Motors less than 250 hp:
      a. Perform manufacturer’s standard production tests including but not limited to:
         1) No load current.
         2) High potential test.
         3) Winding resistance.
      b. Furnish copies of standard test reports on prototype or identical units.
   2. Motors 250 hp and larger:
      a. Perform tests in accordance with IEEE 112 or IEEE 43.
      b. Tests shall include the following:
         1) Winding resistance (cold).
         2) Locked rotor test.
         3) Temperature rise test.

4) Load test.
5) Breakdown torque test.
6) No-load test.
7) High-potential test.
8) Insulation resistance test.
9) Vibration test in accordance with NEMA MG-1.
10) Polarization index.
11) Speed-torque curve.
12) Shaft voltage.
13) Efficiency and power factor versus load test performed at rated speed and 50 percent, 75 percent, 90 percent, and 100 percent of rated load. The curves from the motor tests shall be submitted for information.
14) The maximum allowable residual unbalance in each correction plane (journal) shall be calculated using the following equation:
U = 4 W/N
where:
U = residual correction plane unbalance, in ounces-inches
W = static correction plane journal loading, in pounds
N = maximum specified operating speed, in revolutions per minute.

c. Furnish copies of test reports.

3.08 FIELD QUALITY CONTROL

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Before start-up, perform insulation resistance test on each motor furnished or installed on this project:
1. Windings energized to 1,000 volts DC for 1 minute.
2. Resistance measured at the end of the test, recorded, and submitted to the Engineer for review.
3. Inform the Engineer of any unusual or unacceptable test results.
4. This test is in addition to the acceptance tests in Section 16950 - Field Electrical Acceptance Tests.

3.09 ADJUSTING (NOT USED)

3.10 CLEANING (NOT USED)

3.11 PROTECTION

A. As specified in Section 16050 - Common Work Results for Electrical.

END OF SECTION

ATTACHMENT A - MOTOR DATA SHEET

MOTOR DATA SHEET

MOTOR/ EQUIPMENT TAG _____ MOTOR NUMBER _____

SPECIFICATION NUMBER OF DRIVEN MACHINE _____

MOTOR NAMEPLATE DATA

MANUFACTURER _____ MODEL/SERIES _____ MODEL NO. _____

FRAME _____ ENCLOSURE _____ NEMA DESIGN _____

HP _____ SERVICE FACTOR _____ RPM _____

INSULATION CLASS _____ VOLTS _____ FULL LOAD AMPS _____

AMBIENT TEMP _____ PHASE _____ NO LOAD AMPS _____

DESIGN TEMP _____ HERTZ _____ LOCK ROTOR AMPS _____

INRUSH CODE LETTER _____

	100% LOAD	75% LOAD	50% LOAD
GUARANTEED MINIMUM EFFICIENCIES:			
GUARANTEED MINIMUM POWER FACTOR:			

MAXIMUM SIZE OF POWER FACTOR CORRECTION CAPACITOR: _____ KVAR

ACCESSORIES

MOTOR WINDING HEATER _____ VOLTS _____ WATTS

WINDING THERMAL PROTECTION

WINDING TEMP SWITCHES (YES/NO) _____

RTD:

TYPE _____ QUANTITY PER PHASE _____ # OF WIRES _____

NOMINAL RESISTANCE _____ NOMINAL TEMP _____ COEFFICIENT _____

RECOMMENDED ALARM _____ DEGREES CELSIUS RECOMMENDED TRIP _____ DEGREES CELSIUS

SPECIAL APPLICATIONS

INVERTER DUTY* (YES/NO) _____ PART WINDING (YES/NO) _____ WYE - DELTA (YES/NO) _____

2 SPEED, 1 WINDING (YES/NO) _____ 2 SPEED, 2 WINDING (YES/NO) _____

AREA CLASSIFICATION:

CLASS _____ DIVISION _____ GROUP _____ TEMP CODE _____

* Conforms to NEMA MG-1 Part 31.

SECTION 16265

REDUCED HARMONIC VARIABLE FREQUENCY DRIVES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Reduced harmonic, 18 pulse or active front end, variable frequency drives (VFD), 60 to 500 horsepower for control of standard NEMA Design B squirrel cage induction motors.

1.02 REFERENCES

A. As specified in Section 16050 – Common Work Results for Electrical.

B. Underwriters' Laboratories (UL):
   1. 50 – Standards for Enclosures for Electrical Equipment.
   2. 508A – Standard for Safety for Industrial Control Panels.

1.03 DEFINITIONS

A. As specified in Section 16050 – Common Work Results for Electrical.

B. Specific Definitions:
   1. VFD: Variable Frequency Drive.
   2. AFE: Active Front End.
   3. IGBT: Insulated Gate Bipolar Transistor.

1.04 SYSTEM DESCRIPTION

A. Design requirements:
   1. Each VFD system shall consist of all components required to meet the performance, protection, safety, testing and certification criteria of this Section.
   2. The VFD system:
      a. Is a fully integrated package.
      b. Includes all material necessary to interconnect VFD system elements, even if shipped separately.
   3. Any modifications to a standard product necessary to meet this Section shall be made only by the VFD manufacturer.
   4. Each VFD shall be completely factory pre-wired, assembled and then tested as a complete package by the VFD manufacturer to ensure a properly coordinated, fully integrated drive system.
   5. The VFD shall be capable of operating standard NEMA Design B motors. It is the responsibility of the VFD manufacturer to ensure that the drive will not damage motor insulation due to high carrier frequency, reflected wave, dv/dt or other drive electrical characteristics:
      a. The VFD manufacturer shall furnish equipment necessary to mitigate potential damage to motor insulation.

b. Coordinate bearing protection methods with the supplier of the driven equipment.
c. Motors as specified in Section 16222 – Low Voltage Motors up to 500 Horsepower.

B. Performance:
1. Operating envelope:
a. Speed and torque requirements:
1) Provide a variable torque or constant torque VFD as required by the driven load.
2) The VFD shall be capable of producing a variable alternating voltage/frequency output to provide continuous operation over the 40 to 110 percent (25 to 66 hertz) speed range.
b. Current requirements:
1) Provide 100 percent of rated output current on a continuous basis.
2) Variable torque VFD:
a) Minimum 110 percent current overload for 1 minute.
3) Constant torque VFD:
a) Minimum 150 percent current overload for 1 minute.
2. Harmonics:
a. The VFD shall meet the following distortion limits at 2 percent line voltage unbalance measured at the input terminals of the VFD:
1) Voltage harmonics: The maximum allowable total harmonic distortion, THD, for each VFD shall not exceed 5 percent.
2) Current harmonics: The maximum allowable total harmonic current distortion limit, TDD, for each VFD shall not exceed 5 percent as measured at the input terminals of the VFD system.
3. Efficiency:
a. VFD system minimum efficiency shall be 93 percent at rated kilowatt output of the VFD. VFD system efficiency shall be calculated as follows:

$$Efficiency\ (\%) = \frac{Power\ (Load)}{Power\ (Supply)}\ x\ 100$$

b. Power:
1) Load power is the total 3-phase power measured at the output terminals of the drive system, including the output filter.
2) Supply power is the total power measured at the input terminals of the VFD including phase shifting transformer or active front end components and auxiliary equipment (e.g., controls, fans) for complete system operation.
4. Total power factor:
a. Minimum of 0.96 lagging across the entire speed range.
b. Under no operating conditions shall the VFD have a leading power factor.
5. Frequency accuracy:
a. Minimum of within 0.01 percent.
6. Speed regulation:
a. Minimum of within 0.5 percent across the entire speed range.
7. Capable of working with all available power sources (utility and on-site generation) and with all new and existing VFDs.

1.05 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 – Submittal Procedures and 16050 – Common Work Results for Electrical:
   1. Custom prepared by the VFD manufacturer and specific for the equipment furnished.

B. Product data:
   1. Manufacturer of the VFD.
   2. Manufacturer of all components of the VFD.
   3. Dimensions:
      a. Height.
      b. Width.
      c. Depth.
   4. Weight.
   5. Nameplate schedule.
   6. Bill of material.
   7. Ratings:
      a. Voltage.
      b. Phase.
      c. Input current.
      d. Output current.
      e. Interrupting rating.
      f. Momentary current rating.
   8. Catalog cutsheets for major components.
   9. Surge protection data.
   10. Design data:
      a. Efficiency and power factor values.
      b. Certification that the drive is sized for the full nameplate motor horsepower and current (at rated RPM) of the driven load at the installed altitude.
      c. Certification that based upon VFD design, cable length to motor, and motor dielectric insulation level that the VFD will not damage motor insulation due to carrier frequency, reflected wave, dv/dt, or other VFD produced characteristics.
      d. Certification that all electronic circuits and printed circuit boards are conformably coated.
      e. Certification that the VFD will operate with all power sources (including alternate utilities and on-site generation when applicable).
   11. List of recommended spare parts.
   12. For equipment installed in structures designated as seismic design category C, D, E, or F submit the following as specified in Section 16050 – Common Work Results for Electrical:
      a. Manufacturer's statement of seismic qualification with substantiating test data.
      b. Manufacturer's special seismic certification with substantiating test data.

C. Shop drawings:
   1. Complete plan and elevation drawings showing:
      a. All dimensions.
      b. Panel, sub-panel and component layout indexed to the bill of material.

c. Conduit connections.
d. Required clearance around equipment.

2. Block diagram showing the basic control and protection systems identifying the protection, control, trip and alarm functions, the reference signals and commands and the auxiliary devices.
3. Complete schematic, wiring and interconnection diagrams showing connections to both internal and external devices:
   a. Wiring diagrams shall include terminal number and wire numbers.
4. Complete 1-line and 3-line diagrams including, but not limited to, circuit breakers, motor circuit protectors, contactors, instrument transformers, meters, relays, timers, control devices, and other equipment comprising the complete system:
   a. Device electrical ratings shall be clearly indicated on the Drawings.

D. Certifications:
   1. Certification letter from the VFD manufacturer stating that the VFD(s) are capable of operating with all sources.
   2. Certification letter from the VFD manufacturer stating that the VFD(s) are capable of operating with all new and existing VFDs on site.

E. Installation instructions:
   1. Detail the complete installation of the equipment including rigging, moving, and setting into place.
   2. For equipment installed in structures designated as seismic design category A or B:
      a. Provide manufacturer's installation instructions and anchoring details for connecting equipment to supports and structures.
   3. For equipment installed in structures designated as seismic design category C, D, E, or F:
      a. Provide project-specific installation instructions and anchoring details based on support conditions and requirements to resist seismic and wind loads as specified in Section 16050 – Common Work Results for Electrical.
      b. Submit anchoring drawings with supporting calculations.
      c. Drawings and calculations shall be stamped by a professional engineer registered in the state where the Project is being constructed.

F. Calculations:
   1. Harmonic study:
      a. A preliminary harmonic analysis shall be performed. A power system short circuit ratio of 20 shall be used. All VFDs shall be assumed to be operating at maximum speed and maximum load. The short circuit current (ISC) utilized for the harmonic analysis calculations is defined as:
         1) ISC = 20 * (Sum Total Full Load Amps of all VFDs).
   2. Detailed calculations or details of the actual physical testing performed on the VFD to prove the VFD is suitable for the seismic conditions at the Project Site.

G. Test forms and reports:
   1. Submit complete factory acceptance test procedures and all forms used during the test.
      a. For VFD units less than 250 horsepower, provide certified test results for the actual VFD being furnished or prototype units. For VFD units

250 horsepower and larger, provide certified test results for the actual VFD being furnished.

b. Provide the following certified test reports:
   1) Efficiency at rated power output and output frequency of 60 hertz.
   2) Power factor at 0 percent, 25 percent, 50 percent, 75 percent, and 100 percent speed.
   3) Harmonics at the input terminals of the VFD at 100 percent speed and 100 percent load.
      a) Voltage distortion: Measure individual harmonics up to and including the 50th harmonic and total harmonic distortion.
      b) Current distortion: Measure individual harmonics up to and including the 50th harmonic and total demand distortion.

c. Submit complete field acceptance test procedures and all forms used during the test:
   1) Certification that the actual measured harmonic distortion for both voltage and current is within the specification limits at the installed site.
   2) Certification that the actual measured peak voltage at the motor terminations is less than 90 percent of the motor insulation dielectric withstand level.

H. Record documents:
   1. Certified record documents of all equipment with information listed above.

I. Manufacturer's field reports:
   1. Certification letter from the VFD manufacturer that the VFD(s) has been inspected and installed in accordance with the manufacturer's requirements.
   2. Report listing the setting of all VFD adjustable parameters and their values after start-up.
   3. Certification letter from the VFD manufacturer stating that the VFD(s) are programmed to avoid system resonances when connected to high impedances sources like standby generator.

J. Operation and maintenance manuals:
   1. Spare parts list with supplier names and part numbers.
   2. Start-up and commissioning instructions and data.
   3. Complete bill of material indexed to the drawings, identifying the catalog or part numbers, manufacturer, and quantities of components of the VFD system.
   4. Operating manuals:
      a. Submit operating instructions and a maintenance manual presenting full details for care and maintenance of each model of VFD provided under this Contract.
   5. Operating instructions:
      a. The written descriptions shall detail the operational functions of all controls on the front panel including keypad functions and parameters.
   6. Maintenance manual:
      a. Furnish maintenance manuals with instructions covering all details pertaining to care and maintenance of all equipment as well as identifying all parts.
      b. Manuals shall include but are not limited to the following:
         1) Adjustment and test instructions covering the steps involved in the initial test, adjustment and start-up procedures.

2) Detailed control instructions that outline the purpose and operation of every control device used in normal operation.
3) All schematic wiring and external diagrams:
    a) Furnish drawings in a fully legible reduced 11-inch by 17-inch format.

1.06 QUALITY ASSURANCE

A. As specified in Section 16050 – Common Work Results for Electrical.

B. Qualifications:
1. Any third party certification, safety or protection requirements shall be applied to the VFD system as a whole. Certification or protection of system elements or individual components by themselves is not acceptable.
2. VFDs shall be UL 508C listed and labeled.
3. VFD systems (packaged VFD panels) shall be UL 508A listed and labeled.
4. VFDs shall be manufactured by the VFD manufacturer at its own facility, which shall have a quality assurance program that is certified in accordance with ISO 9001.

1.07 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 16050 – Common Work Results for Electrical.

B. Ship VFDs to the job site on a dedicated air ride vehicle that will allow the Contractor to utilize on site off-loading equipment:
1. VFDs shall be delivered to the site pre-assembled and wired.
2. Ship each VFD with 2 tamperproof accelerometers that record the maximum shock and vibration experienced by the VFD during shipping and handling.

C. Furnish temporary equipment heaters within the VFD to prevent condensation from forming.

1.08 PROJECT OR SITE CONDITIONS

A. As specified in Section 16050 – Common Work Results for Electrical.

1.09 SEQUENCING

A. Conduct factory acceptance test and submit certified test results for Engineer's review.

B. Ship equipment to Project Site after successful completion of factory acceptance test.

C. Assemble equipment in the field.

D. Conduct field acceptance tests including harmonic testing and submit results for Engineer's review.
1. All utility power sources and on-site generation shall be installed and operable for field test.

E. Submit manufacturer's certification that equipment has been properly installed and is fully functional for Engineer's review.

F. Conduct Owner's training sessions.

G. Commissioning and process start-up as specified in Section 01756 – Commissioning.

1.10 SCHEDULING

A. As specified in Section 16050 – Common Work Results for Electrical.

1.11 WARRANTY

A. As specified in Section 16050 – Common Work Results for Electrical.

1.12 SYSTEM START-UP

A. As specified in Section 16050 – Common Work Results for Electrical.

B. The VFD manufacturer shall be responsible for start-up of the VFDs in the presence of the equipment suppliers, Contractor, Engineer, and Owner.

1.13 OWNERS INSTRUCTIONS (NOT USED)

1.14 MAINTENANCE

A. As specified in Section 16050 – Common Work Results for Electrical.

B. Maintenance service: Manufacturer shall describe the field service system available to support the proposed VFD system. As a minimum describe:
   1. Type of technical support available (e.g., system engineering and technician).
   2. Location of field service personnel.
   3. Field service daily rates in dollars per hour and dollars per day.
   4. Guaranteed response times to service requests.

C. Spare parts:
   1. The following spare parts shall be furnished:
      a. 1 set of all power and control fuses for each VFD.
      b. 1 spare fan for each VFD unit.
      c. 2 sets of ventilation filters for each VFD unit (if applicable in VFD cabinet louvers).
      d. Any special dedicated tools for emergency service and troubleshooting.
      e. All hardware and software required for configuration, maintenance, troubleshooting and inquiry of all drive parameters.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. One of the following or equal:
   1. Eaton.

2. Allen-Bradley.
3. Schneider-Electric.
4. GE by ABB.

2.02 EXISTING PRODUCTS (NOT USED)

2.03 MATERIALS (NOT USED)

2.04 MANUFACTURED UNITS (NOT USED)

2.05 EQUIPMENT

A. General:
   1. Sinusoidal pulse width modulated, (PWM), voltage source type drive shall consist of the following:
      a. Rectifier section.
      b. Direct current link with capacitors.
      c. Insulated gate bipolar transistor (IGBT), inverter section.
      d. Microprocessor based controls.
      e. Output filter.
   2. Rectifier section:
      a. Provide VFDs with either an 18-pulse rectifier section or an active front end.
      b. 18-pulse rectifier:
         1) Integral phase shifting auto-transformer:
            a) Converts 3-phase utility power to 3 sets of 3 power circuits with each set phase shifted and powering its own 3-phase bridge rectifier.
         2) Minimum 18-pulse diode rectifier section consisting of 3 three-phase bridge rectifiers.
            a) Specifically designed as a system to share currents between the bridges to within 1 percent.
      c. Active front end rectifier:
         1) IGBT based converter module.
            a) Six IGBTs minimum.
         2) Inductor/capacitor/inductor, LCL, harmonic filter.
            a) Low pass filter.
            b) The filter shall be disconnected from the line when the VFD is not running or powered off.

B. Ratings:
   1. Voltage:
      a. Input voltage: 480 Volts plus or minus 10 percent, 3-phase, 3-wire, 60 hertz.
      b. Solidly grounded.
   2. Short-circuit rating:
      a. 65 kA RMS symmetrical.

C. Operational features:
   1. Protective features:
      a. Annunciated at the keypad and available via network connection.
      b. Include the following protective features:
         1) Motor overload protection.

2) Instantaneous overcurrent.
3) Instantaneous overvoltage.
4) Undervoltage.
5) Power unit overtemperature.
6) Phase loss.
7) VFD output short circuit.
8) VFD output ground fault.
9) Blown fuse with blown fuse indication.
10) IGBT protection.
11) Cooling fan failure.
12) Component failure.
13) Motor overtemperature protection:
    a) Winding and bearing temperature:
        (1) From 100 ohm, platinum RTDS.
        (2) Quantity as specified in Section 16222 - Low Voltage Motors up to 500 Horsepower and the driven equipment specification or as indicated on the Drawings.

2. Control mode:
    a. The VFD shall operate in a either a constant volts/hertz or sensorless vector mode. Selectable using the programming keypad.
3. Frequency control:
    a. Minimum of 3 selectable skip frequencies with adjustable bandwidths.
    b. Programmable minimum frequency.
    c. Programmable maximum frequency.
4. Acceleration/Deceleration:
    a. Separately adjustable acceleration and deceleration rates.
    b. Each rate shall be adjustable from 0.01 to 1,800 seconds.
5. Spinning load:
    a. Capable of determining the speed and direction of a spinning load, “catch” the load and accelerate or decelerate it without damage to the load.
6. Programmable loss of signal:
    a. Upon loss of reference speed signal the VFD shall be programmable to either stop, maintain current speed, or default to preselected speed.
7. Power interrupt ride through:
    a. Capable of continuous operation in the event of a power loss of 5 cycles or less.
8. Hardwired inputs and outputs:
    a. Manufacturer’s standard number the following:
        1) Analog inputs:
            a) Configurable as either 0 to 10 volts or 4 to 20 milliamperes.
        2) Analog outputs:
            a) Programmable 4 to 20 milliamperes isolated.
        3) Discrete inputs:
            a) Programmable.
        4) Discrete outputs:
            a) Programmable.
            b) Form C relay contacts.
        5) Potentiometer 3-wire input.
    b. Provide additional inputs and outputs as required to meet the control functions indicated on the Drawings.

9. Communications:
    a. Provide each VFD with a EtherNet TCP/IP communications interface module.
    b. The use of gateways is not acceptable.
    c. Control and monitoring of the bypass starter shall be available over the communications network.
    d. All protocols shall be certified by the governing authority.
10. Real-time clock:
    a. Capable of providing time-stamped events.
    b. Set locally or via a remote controller.
    c. Programmable for day, month, year, local time zones in hours, minutes and seconds.
11. Diagnostics:
    a. Minimum of 4 fault conditions in memory on a first in - first out basis.
    b. Time stamped.
    c. Operating frequency, drive status and power mode shall also be stored at the time of the fault.
    d. Fault memory shall be maintained in the event of a power outage.
    e. The fault memory shall be accessible via RS-232, RS-422 or RS-485.
12. Automatic restart:
    a. User selectable, automatic restart feature allowing the VFD to restart following a momentary power failure or other VFD fault:
        1) Programmable for up to 9 automatic restart attempts with an adjustable time delay between restart attempts.

2.06 COMPONENTS

A. Enclosure:
    1. NEMA Type 12.
    2. Provide cooling devices required to maintain the VFD within the manufacturer's specified temperature limits for the Project conditions:
        a. Provide cooling device alarm.

B. Power disconnect:
    1. Flange mounted thermal magnetic circuit breaker:
        a. Lockable in the OFF position.

C. Phase shifting transformer:
    1. Auto-transformer.
    2. Integral part of the VFD assembly and factory mounted and wired within the VFD enclosure.
    3. Embedded thermal protection.
    4. Rated for rectifier duty.
    5. Copper or aluminum windings with 180-degree Celsius insulation.

D. Output filter:
    1. 3 percent load reactor.

E. Keypad:
    1. Furnished with a keypad for programming and control.
    2. Password security to protect drive parameters.
    3. Mounted on the door of the VFD.

4. Back-lit LCD with a minimum of 2 lines of a minimum of 16 characters each.
5. Programming and display features language: English.
6. Capable of displaying the following parameters:
    a. Speed (percent).
    b. Input current (amperes).
    c. Output current (amperes).
    d. Output frequency (hertz).
    e. Input voltage.
    f. Output voltage.
    g. Total 3-phase kilowatt.
    h. Kilowatt hour meter.
    i. Elapsed run time meter.
    j. Revolutions per minute.
    k. Direct current bus voltage.
7. In addition to all keys required for programming, the keypad shall have the following:
    a. Automatic/Manual selector.
    b. Start pushbutton.
    c. Stop pushbutton.
    d. Jog pushbutton.
    e. Speed increment.
    f. Speed decrement.
    g. Forward/Reverse selector.
    h. RUN indicator.
    i. PROGRAM indicator.
    j. FAULT indicator.
    k. DRIVE READY indicator.
    l. Diagnostics.
8. Provide the VFD with the hardwired controls indicated on the Drawings.

F. Control power transformer:
1. Furnish a control power transformer mounted and wired inside the drive enclosure:
    a. Primary and secondary fusing.
2. Size the transformer to supply power to all VFD controls and options as well as any external devices indicated on the Drawings including the motor winding heater.

2.07 ACCESSORIES

A. Surge protection:
1. Metal oxide varistors:
    a. Provide protection for the VFD against:
        1) Line transients: 5,000 volt peak minimum.
        2) Line to ground transients: 7,000 peak minimum.

B. Conformal coating:
1. Provide conformal coating material applied to electronic circuitry and printed circuit boards to act as protection against moisture, dust, temperature extremes, and chemicals such as H_2S and chlorine.

C. Air filters:
    1. Mounted on the outside of the VFD enclosure:
        a. Replaceable without requiring that the VFD be turned off or the door opened.
    2. Located on the front or top of the VFD enclosure.
        a. Side or rear mounted air filters are not acceptable.

2.08 MIXES (NOT USED)

2.09 FABRICATION (NOT USED)

2.10 FINISHES

A. Enclosure finish shall be manufacturer's standard gray.

2.11 SOURCE QUALITY CONTROL (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Install the equipment in accordance with the accepted installation instructions and anchorage details to meet the seismic and wind load requirements at the Project site.

C. General:
    1. Furnish all cables, conduit, lugs, bolts, expansion anchors, sealants, and other accessories needed to complete installation of the VFD (free-standing or within motor control center).
    2. Assemble and install the VFD in the locations and with the layouts indicated on the Drawings.
    3. Perform Work in accordance with the manufacturer's instructions and shop drawings.
    4. Furnish components, and equipment as required to complete the installation.
    5. Replace any hardware lost or damaged during the installation or handling to provide a complete installation.
    6. Install free-standing enclosures on a raised concrete housekeeping pad:
        a. Provide structural leveling channels in accordance with the manufacturer's recommendations to provide proper alignment of the units.
        b. Weld and/or bolt the VFD frame to the leveling channels.
    7. Provide openings in top or bottom of the VFD (free-standing or within motor control center) enclosure for conduit only, no additional openings will be allowed:
        a. Improperly cut holes will require that the entire panel be replaced:
            1) No hole closers or patches will be allowed.

8. Bundle circuits together and terminate in each unit:
    a. Tie with nylon wire ties. As specified in Section 16123 - 600-Volt or Less Wires and Cables.
    b. Label all wires at each end with wire numbers shown on the approved Control Drawings.
    c. All connections to and from the VFD (free-standing or within motor control center) enclosure must be made via terminal blocks.

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 COMMISSIONING

A. As specified in Section 01756 - Commissioning.

B. Factory testing:
1. Owner and Engineer will witness the factory acceptance test as specified in Section 16050 - Common Work Results for Electrical.
2. General:
    a. All VFDs furnished under this Section shall be tested and inspected as specified below.
    b. The testing procedures specified are the minimum acceptable requirements. The manufacturer may perform additional tests at its discretion.
3. Failure of any component during testing requires replacement of the faulted component and a complete retest.
4. Testing sequence:
    a. Submit a detailed test procedure for the VFD factory test:
        1) A minimum of 8 weeks in advance of the proposed testing date.
        2) No tests shall be performed until the test procedure is reviewed and accepted by the Engineer.
5. Component tests:
    a. Preliminary inspection:
        1) Verify that all components are correct.
        2) Verify that all connections are properly torqued.
    b. Printed circuit boards:
        1) Test each printed circuit board per the manufacturer's standard testing procedure.
    c. Wiring:
        1) Control and power wiring continuity verified point-to-point.
        2) Hi-pot power and control wiring at manufacturer's recommended levels.
        3) Verify ground bond resistance.
    d. Load testing:
        1) No load testing in accordance with the manufacturer's standard factory test procedure.

2) Full load testing:
a) Test each VFD and all control logic with a representative motor or dynamometer load to simulate field operation conditions at 25 percent, 50 percent, and 100 percent full load current.
b) Tests shall be conducted in a manner in which the inverter (IGBT) section supplies all the output power (kw) of the VFD system. Control strategies using a contactor or other means of bypassing the VFD when operating at the line frequency shall not be permitted.
c) Tests shall be conducted using a minimum output frequency of 60 hertz, and a minimum switching frequency of 2.5 kHz.

C. Owner training:
1. As specified in Sections 01756 - Commissioning and 16050 - Common Work Results for Electrical.

3.08 FIELD QUALITY CONTROL

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Provide the services of a VFD manufacturer representative for start-up assistance and training:
1. Inspection and field adjustment:
a. Supervise the following and submit written certification that the equipment and controls have been properly installed, aligned, adjusted, and readied for operation.
2. Start-up field testing:
a. Provide technical direction for testing, checkout, and startup of the VFD equipment in the field.
b. Under no circumstances are any portions of the drive system to be energized without authorization from the manufacturer's representative.
c. Compliance with the following specified parameters shall be verified by the VFD manufacturer:
1) Motor terminal voltage:
a) Make field measurements at the motor connection box.
b) Make measurements of the full speed range of the VFD.
c) Make measurements with a recording type oscilloscope.
2) Harmonics:
a) Make field measurements at the input terminals of the VFD with and without the VFD in operation.
b) Make measurements with a recording type harmonic analyzer displaying individual and total harmonic currents and voltages:
(1) Record currents and voltages for a minimum of 10 minutes.
(2) Analyzers using snapshots are not acceptable.
d. All utility sources and on-site generation shall be operational for start-up field testing.

3.09 ADJUSTING

A. Make all adjustments as necessary and recommended by the manufacturer, Engineer, or testing firm.

B. Provide the services of a VFD manufacturer factory technician to make all drive parameter and protective device settings:
   1. Protective device settings provided by the VFD manufacturer in accordance with the manufacturer of the driven equipment requirements.
   2. Provide documentation of VFD settings included but not limited to:
      a. Minimum speed.
      b. Maximum speed.
      c. Skip speeds.
      d. Current limit.
      e. Acceleration time.
      f. Deceleration time.
      g. Carrier frequency.

3.10 CLEANING

A. As specified in Section 16050 - Common Work Results for Electrical.

3.11 PROTECTION

A. As specified in Section 16050 - Common Work Results for Electrical.

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 16305

ELECTRICAL SYSTEM STUDIES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Short-circuit fault analysis study.
   2. Protective device coordination study.
   3. Arc-flash hazard study.

1.02 REFERENCES

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Institute of Electrical and Electronics Engineers (IEEE):
   1. 1584 - IEEE Guide for Specification of Scope and Deliverable Requirements for an Arc-Flash Hazard Calculations Study in Accordance with IEEE Std 1584(TM).

C. National Fire Protection Association (NFPA).

1.03 DEFINITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

1.04 SYSTEM DESCRIPTION

A. General study requirements:
   1. Scope:
      a. The short-circuit fault analysis, protective device coordination, and arc-flash hazard studies shall include all equipment in the power distribution system including, but not limited to:
         1) Utility equipment.
         2) All electrical equipment including:
            a) Dry-type transformers.
            b) 240 and 208 volt panelboards.
         3) Motors.
         4) Vendor control panels.
         5) HVAC equipment.
      b. Study scenarios:
         1) The studies shall include all possible electrical system configurations:
            a) Operation on normal (utility) source.
   2. Obtain, for all equipment, the required data for preparation of the study including, but not limited to:
      a. Transformer kilovolt-ampere (kVA) and impedances.
      b. Bus withstand ratings.
      c. Cable and bus data.

d. Protective device taps, time dials, instantaneous pickups, and time-delay settings.
e. As-built lengths for all new wire and cable installations covered by the studies.

3. Obtain the Electric Utility information on the minimum and maximum available fault current, minimum and maximum utility impedances, utility protective device settings including manufacturer and model number, interrupting ratings, X/R ratios, and model information one level above the point of connection:
   a. Utility tolerances and voltage variations.
4. The individual performing the studies shall visit the site and collect all necessary field data in order to perform and complete comprehensive electrical system studies.
5. Obtain equipment layouts and configurations from the manufacturer's final submittal requirements and project layout drawings as required.
6. Bus and conductor data:
   a. Use impedances of the actual installed or specified conductors, unless otherwise indicated.
   b. Use cable and bus impedances calculated at 25 degrees Celsius, unless otherwise indicated.
   c. Use 600-volt cable reactance based on typical dimensions of actual installed or specified conductors, unless otherwise indicated.
   d. Use bus withstand values for all equipment having buses.
7. Motors:
   a. Each motor shall be individually modeled:
      1) Grouping of motors for fault contribution current is not acceptable.
   b. Motors with variable frequency drives (VFDs) may be assumed to have no contribution to fault current unless VFDs are equipped with bypass starters.
8. Use the equipment, bus, and device designations as indicated on the Drawings for all studies.

B. Short-circuit fault analysis study additional requirements:
   1. The short-circuit fault analysis shall be performed and submitted in 2 phases:
      a. Initial short-circuit fault analysis:
         1) Based on the Contract Documents and Electric Utility information.
         2) The initial short-circuit fault analysis study shall indicate the estimated available short-circuit current at the line side terminals of each piece of equipment covered by the scope of the study.
            a) Measure conductor lengths from the Drawings. Use of arbitrary short conductor lengths is not allowed.
         3) Provide a list of assumptions used in the initial study.
      b. Final short-circuit fault analysis:
         1) The final short-circuit fault analysis shall modify the initial analysis as follows:
            a) Utilize the actual equipment provided on the project.
            b) Utilize conductor lengths based on installation.
   2. Calculate 3-phase bolted fault, line-to-line fault, line-to-ground fault, double line-to-ground fault, short-circuit 1/2 cycle momentary symmetrical and asymmetrical RMS, 1-1/2 to 4 cycle interrupting symmetrical RMS, and 30-cycle steady-state short-circuit current values at each piece of equipment in the distribution system.

3. Evaluate bus bracing, short-circuit ratings, fuse interrupting capacity and circuit-breaker-adjusted interrupting capacities against the fault currents, and calculate X/R values:
    a. Identify and document all devices and equipment as either inadequate or acceptable.
4. Calculate line-to-ground and double line-to-ground momentary short-circuit values at all buses having ground-fault devices.
5. Provide calculation methods, assumptions, one-line diagrams, and source impedance data, including utility X/R ratios, typical values, recommendations, and areas of concern.

C. Protective device coordination study additional requirements:
1. Furnish protective device settings for all functions indicated on the Drawings including, but not limited to:
    a. Current.
    b. Voltage:
        1) Provide settings for all voltage relays based upon actual utility and generator tolerances and specifications.
    c. Frequency:
        1) Provide settings for all frequency relays based upon actual utility and generator tolerances and specifications.
    d. Negative sequence.
    e. Reverse power.
    f. Machine protection functions:
        1) Provide settings for all motor and generator protective relays based on the manufacturer's recommended protection requirements.
2. Provide log-log form time-current curves (TCCs) graphically indicating the coordination proposed for the system:
    a. Include with each TCC a complete title and one-line diagram with legend identifying the specific portion of the system covered by the particular TCC:
        1) Typical TCCs for identical portions of the system, such as motor circuits, are acceptable as allowed by the Engineer.
    b. Include a detailed description of each protective device identifying its type, function, manufacturer, and time-current characteristics:
        1) These details can be included on the TCC.
    c. Include a detailed description of each protective device tap, time dial, pickup, instantaneous, and time delay settings:
        1) These details can be included on the TCC.
3. TCCs shall include all equipment in the power distribution system where required to demonstrate coordination. Include utility relay and fuse characteristics, medium-voltage equipment protective relay and fuse characteristics, low-voltage equipment circuit breaker trip device characteristics, transformer characteristics, motor and generator characteristics, and characteristics of other system load protective devices:
    a. Include all devices down to the largest branch circuit and largest feeder circuit breaker in each motor control center, main breaker in branch panelboards, and fused disconnect switches.
    b. Provide ground fault TCCs with all adjustable settings for ground fault protective devices.
    c. Include manufacturing tolerances and damage bands in plotted fuse and circuit breaker characteristics.

d. On the TCCs, show transformer full load currents, transformer magnetizing inrush, ANSI transformer withstand parameters, and transformer damage curves.
e. Cable damage curves.
f. Terminate device characteristic curves at a point reflecting the maximum symmetrical or asymmetrical fault current to which the device is exposed based on the short-circuit fault analysis study.
g. Coordinate time interval medium-voltage relay characteristics with upstream and downstream devices to avoid nuisance tripping.

4. Site generation: When site generation (including cogeneration, standby, and emergency generators) is part of the electrical system, include phase and ground coordination of the generator protective devices:
   a. Show the generator decrement curve and damage curve along with the operating characteristic of the protective devices.
5. Suggest modifications or additions to equipment rating or settings in a tabulated form.

D. Arc-flash hazard study additional requirements:
1. Include the calculated arc-flash boundary and incident energy (calories/square centimeter) at each piece of equipment in the distribution system:
   a. Perform study with 15 percent arcing fault variation as defined by IEEE 1584.
   b. Perform arc-flash calculations at minimum and maximum utility fault contributions.
   c. Perform arc-flash calculations for both the line side and load side of the switchgear, switchboard, motor control center, and panelboard main breakers.
   d. Perform arc-flash calculations for all short-circuit scenarios with all motors on for 3 to 5 cycles and with all motors off.
2. Provide executive summary of the study results:
   a. Provide summary based upon worst case results.
3. Provide a detailed written discussion and explanation of the tabulated outputs:
   a. Include all scenarios.
4. Provide alternative device settings to allow the Owner to select the desired functionality of the system:
   a. Minimize the arc-flash energy by selective trip and time settings for equipment maintenance purposes.
   b. Identify the arc-flash energy based upon the criteria of maintaining coordination and selectivity of the protective devices.

E. Electrical system study meetings:
1. The individual conducting the short-circuit fault analysis, protective device coordination, and the arc-flash hazard studies shall meet with the Owner and Engineer 3 times.
2. The purpose of the 3 meetings is as follows:
   a. Initial meeting:
      1) Meet with the Owner and Engineer to discuss the scope of the studies.
         a) Confirm assumptions to be used in the electrical system study with the Owner including but not limited to:
            (1) Maximum protective device fault clearing time.

2) Discuss the Owner's operational requirements for both normal operation and maintenance.

b. Preliminary results meeting:
1) This meeting will be held after the studies have been completed, reviewed, and accepted by the Engineer.
2) The purpose of this meeting is to inform the Owner of the results of the study and impacts on normal operation and maintenance including:
a) Protective device coordination problems and recommended solutions.
b) Explanation of the arc-flash hazard study results and its potential impact on operations.
c) Recommendations for reduction of arc-flash category levels including reduction of protective device settings or changes in operational practices.

c. Final meeting:
1) Discuss changes to the studies based on the previous meeting.
2) Discuss with the Owner how changes to the electrical system may change the arc-flash hazard category.

d. Deliver the final report after substantial completion.

3. The meetings will be at the Owner's facility:
a. Provide a minimum of 3-weeks' notice to the Owner and Engineer in advance of the projected meeting date.
b. Submit a draft of the meeting agenda when each meeting is requested.

4. Meeting materials:
a. Prepare and provide the following materials:
1) Meeting agenda. Include, at a minimum, the scope of the meeting, estimated time length for the meeting, and meeting goals.
2) **[6]** copies of the project one-line diagrams for the initial meeting.
3) **[6]** copies of the submitted studies.

F. Owner training:
1. Training shall include, but is not limited to:
a. Introduction and basics of NFPA 70E: At least **[1][ ]** hour.
b. Detailed review of the electrical system study for at least **[1][2][3]** hours.
c. Questions and Answers period: 0.5 hours.

G. By virtue of the fact that this is a professional study, the Owner reserves the right to modify the requirements of the study to comply with its operational requirements. The protective device coordination study and the arc-flash hazard study shall be modified based on the results of the meetings with the Owner.

1.05 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 16050 - Common Work Results for Electrical.

B. Initial studies and reports:
1. Include the following in the initial short-circuit current report:
a. List of all devices included in the studies.
b. A description of all operating scenarios.
c. Form and format of arc-flash labels.

C. Final studies and reports:
    1. Format and quantity:
        a. Provide 6 bound copies of all final reports.
        b. Provide 3 complete sets of electronic files on CD or DVD media, including the electrical system model(s), configuration files, custom libraries, and any other files used to perform the studies and produce the reports. Also provide an electronic version of the bound reports in PDF format.
        c. Provide the number of copies specified in Section 01330 - Submittal Procedures.
    2. Include the sections below in the final report:
        a. Copies of correspondence and data obtained from the electric utility company.
        b. Letter certifying the inspection and verification of existing equipment.
        c. One-line diagrams:
            1) The following information shall be included at a minimum:
                a) Motor horsepower.
                b) Transformer data:
                    (1) kVA.
                    (2) Configuration.
                c) Cable data:
                    (1) Insulation.
                    (2) Size.
                    (3) Length.
            2) One-line diagrams shall be fully legible at 11-inch by 17-inch size.
        d. Include in the short-circuit fault analysis study:
            1) Descriptions, purpose, basis, assumptions, recommendations, and scope of the study.
            2) Normal system connections and those that result in maximum fault conditions.
            3) Tabulation of circuit breaker, fuse, and other protective device ratings compared to maximum calculated short-circuit duties.
            4) Fault current calculations for the cases run including a definition of terms and guide for interpretation of computer software printouts.
        e. Protective device coordination study shall include:
            1) Descriptions, purpose, basis, assumptions, recommendations, and scope of the study.
            2) List all requirements used in the selection and setting criteria for any protective devices.
            3) TCCs graphically indicating the coordination proposed for the system on log-log graphs:
                a) All TCCs shall be in color.
            4) Tabulation of relay, fuse, circuit breaker, and other protective devices in graphical form with a one-line diagram to display area coordination.
            5) Where coordination could not be achieved, an explanation shall be included in the report to support the statement along with recommendations to improve coordination. Recommended equipment modifications or settings shall be in a tabulated form.
        f. Include in the arc-flash hazard study:
            1) Descriptions, purpose, basis, assumptions, recommendations, and scope of the study.

2) Normal system connections and those that result in maximum arc-flash conditions.
3) Arc-flash raw data, calculations, and assumptions.
4) Arc-flash label data:
   a) Identifying the content of each label.
   b) Identifying the location of each label.

D. Certification:
   1. Submit written certification, sealed and signed by the professional engineer conducting the study, equipment supplier, and electrical subcontractor stating that the data used in the study is correct.

E. Submit the credentials of the individual(s) performing the study and the individual in responsible charge of the study.

F. The Engineer will review all studies and reports. After review, the Engineer will make recommendations and/or require changes to be made to the short-circuit fault analysis, protective device coordination, or arc-flash hazard studies. These changes shall be provided as part of the scope of work.

G. Submit course outline for Owner's training.

1.06 QUALITY ASSURANCE

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Qualifications of the entity responsible for electrical system studies:
   1. The studies shall be performed, stamped, and signed by a professional engineer registered in the state where the project is located.
   2. A minimum of 5 years of experience in power system analysis is required for the individual in responsible charge of the studies.
   3. The short-circuit fault analysis, protective device coordination, and arc-flash hazard studies shall be performed with the aid of a digital computer program:
      a. Point-to-point calculations are not acceptable.

C. The study shall be performed by an independent firm.

1.07 DELIVERY, STORAGE, AND HANDLING (NOT USED)

1.08 PROJECT/SITE CONDITIONS (NOT USED)

1.09 SEQUENCING

A. Below is an outline of the typical work sequence. Proposed changes to the work sequence may be reviewed and approved by the Engineer.
   1. Initial electrical system study meeting.
   2. Submit the initial short-circuit fault analysis study before submittal of any electrical equipment.
      a. Only the initial short-circuit results will be reviewed.
   3. Submit the preliminary short-circuit fault analysis, protective device coordination, and arc-flash hazard studies after the approval of all electrical equipment.
   4. Second electrical system study meeting for preliminary results.

5. Update the model with all changes to the electrical system made during start-up and commissioning.
6. Final arc-flash meeting and final short-circuit fault analysis, protective device coordination, and arc-flash hazard studies.
7. Submit the final electrical system studies.
8. Label equipment with approved arc-flash labels.
9. Owner's training.

1.10 SCHEDULING (NOT USED)

1.11 WARRANTY (NOT USED)

1.12 SYSTEM START-UP (NOT USED)

1.13 OWNER'S INSTRUCTIONS (NOT USED)

1.14 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Electrical system study software, no equal:
   1. SKM Systems Analysis, Powertools.

2.02 EXISTING PRODUCTS (NOT USED)

2.03 MATERIALS (NOT USED)

2.04 MANUFACTURED UNITS (NOT USED)

2.05 EQUIPMENT (NOT USED)

2.06 COMPONENTS

A. Arc-flash hazard labels:
   1. Dimensions:
      a. Minimum 5 inches by 3.5 inches.
   2. Materials:
      a. Polyester with polyvinyl polymer over-laminate.
      b. Self-adhesive.
      c. Resistant to:
         1) UV.
         2) Chemicals and common cleaning solvents.
         3) Scuffing.
         4) Wide temperature changes.
   3. Contents:
      a. Short-circuit bus identification.
      b. Calculated incident energy (calories/square centimeter) range:
         1) Based on worst-case study results.

c. Arc-flash protection boundary.
d. Shock hazard boundary:
1) The Contractor may provide separate labels for indication of the shock hazard boundary.

4. Color scheme:
a. For locations above 40 calories/square centimeter:
1) White label with red “DANGER” strip across the top.
2) Black lettering.
b. For locations below 40 calories/square centimeter:
1) White label with orange “WARNING” strip across the top.
2) Black lettering.

2.07 ACCESSORIES (NOT USED)

2.08 MIXES (NOT USED)

2.09 FABRICATION (NOT USED)

2.10 FINISHES (NOT USED)

2.11 SOURCE QUALITY CONTROL (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 16050 - Common Work Results for Electrical.

B. After review and acceptance of the arc-flash hazard study by the Engineer, install all arc-flash hazard labels:
1. Install labels at all locations required by NFPA, ANSI, or IEEE standards.
2. At a minimum, install labels in the following locations:
a. The front of each main or incoming service compartment.
b. The front of each low-voltage switchgear section.
c. The front of each medium-voltage circuit breaker door.
d. The front of each accessible auxiliary or conductor compartment.
e. Each accessible rear or side vertical section.
f. Each motor control center vertical section.
g. Each panelboard covered by the study.
h. Each control panel, individual starter or VFD, or other equipment covered by the scope of the study.

C. After review and acceptance of the draft arc-flash hazard study and protective device coordination study by the Engineer, adjust protective device settings per final study prior to equipment energization.
   1. Devices that require power for configuration may be set during energization, but before any subfed loads are energized.
   2. Ensure that settings for upstream equipment are set prior to energizing downstream devices.

3.04 ERECTION, INSTALLATION, APPLICATION, AND CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 COMMISSIONING

A. As specified in Section 01756 - Commissioning.

3.08 FIELD QUALITY CONTROL

A. As specified in Section 16050 - Common Work Results for Electrical.

B. The individual performing the arc-flash hazard study shall direct the installation of the arc-flash hazard labels:
   1. Remove and replace any improperly applied labels.
   2. Repair the equipment finish damaged by removal of any label.
   3. Install labels level or plumb across the entire dimension of the label.

3.09 ADJUSTING (NOT USED)

3.10 CLEANING (NOT USED)

3.11 PROTECTION (NOT USED)

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 16444

LOW VOLTAGE MOTOR CONTROL CENTERS

PART 1GENERAL

1.01 SUMMARY

A. Section includes:
   1. Low voltage motor control centers.

1.02 REFERENCES

A. As specified in Section 16050 - Common Work Results for Electrical.

B. National Electrical Manufacturer's Association (NEMA):
   1. ICS 18-2001 - Motor Control Centers.

C. National Electrical Code (NEC).

D. Underwriters Laboratories (UL):
   1. 845 - Motor Control Centers.

1.03 DEFINITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

B. SELV: Safety extra-low voltage.

1.04 SYSTEM DESCRIPTION

A. Factory assembled, factory wired and factory tested motor control centers:
   1. Motor control centers and major components to be products of a single manufacturer.

1.05 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 16050 - Common Work Results for Electrical.

B. Product data:
   1. Manufacturer of motor control center.
   2. Manufacturer of motor control center parts.
   3. Nameplate schedule.
   4. Bill of material.
   5. Enclosure:
      a. NEMA rating.
      b. Finish color.
   6. Ratings:
      a. Voltage.
      b. Phase.

c. Current:
    1) Horizontal bus ampacity.
    2) Vertical bus ampacity.
    3) Ground bus ampacity.
d. Short circuit withstand rating.
e. Protective device interrupting rating.

7. List of recommended spare parts.
8. Catalog cutsheets:
    a. Submit complete manufacturer's catalog information:
        1) Clearly indicate the features of the equipment including any options necessary to meet the required functionality.
9. Furnish component submittals as specified in the appropriate Section.
10. For equipment installed in structures designated as seismic design category C, D, E, or F submit the following as specified in Section 16050 - Common Work Results for Electrical:
    a. Manufacturer's statement of seismic qualification with substantiating test data.
    b. Manufacturer's special seismic certification with substantiating test data.

C. Shop drawings:
1. Layout drawings:
    a. Provide fully dimensioned and to scale layout drawings which include:
        1) Dimensions:
            a) Overall length.
            b) Overall width.
            c) Overall height.
            d) Overall weight and weight of individual shipping splits.
2. Interfaces to other equipment.
3. Shipping splits.
4. Allowable top and bottom conduit windows.
5. Complete component and unit layout drawings, including all control, networking and metering components.
6. Indicate lug sizes, type, and manufacturer based on the cable size specified in the Contract Documents and as indicated on the Drawings.
7. Elementary schematics:
    a. Provide one custom schematic diagram for each compartment:
        1) Include all remote devices.
        2) Show wire numbers on the schematics:
            a) Provide wire numbering as specified in Section 16075 - Identification for Electrical Systems.
8. External connection diagram showing the wiring to the external controls and devices associated with the motor control center.
9. One-line diagrams:
    a. Provide complete one-line diagrams for each motor control center, including but not limited to: protective devices, starters, drives, metering, and other equipment.
    b. Indicate electrical ratings of the equipment shown on the one-line diagrams.

D. Control descriptions and control logic program:
   1. Provide control descriptions describing the full control functionality to be incorporated into the programmable overloads including the following:
      a. Functionality in local and remote.
      b. Software and hardware interlocks.
      c. Control response upon loss and restoration of power.
   2. Provide complete register list of all IO available to the Plant PCS.
   3. Submit the completed control logic program for each and every device supplied.
   4. Submit a list of all networking address tables.
   5. Submit configuration settings in accordance with actual motor and field equipment being supplied.

E. Installation instructions:
   1. Detail the complete installation of the equipment including rigging, moving, and setting into place.
   2. For equipment installed in structures designated as seismic design category A or B:
      a. Provide manufacturer's installation instructions and anchoring details for connecting equipment to supports and structures.
   3. For equipment installed in structures designated as seismic design category C, D, E, or F:
      a. Provide project-specific installation instructions and anchoring details based on support conditions and requirements to resist seismic and wind loads as specified in Section 16050 - Common Work Results for Electrical.
      b. Submit anchoring drawings with supporting calculations.
      c. Drawings and calculations shall be stamped by a professional engineer registered in the state where the Project is being constructed.

F. Operation and maintenance manuals:
   1. Provide complete operating and maintenance instructions presenting full details for care and maintenance of all types of equipment furnished and/or installed under this Section. Include the following:
      a. Electrical ratings:
         1) Phase.
         2) Wire.
         3) Voltage.
         4) Ampacity.
         5) Bus bracing and protective device interrupting ratings.
      b. Manufacturer's operating and maintenance instructions for the motor control center and all component parts, including:
         1) Starters.
         2) Overload relays and heater elements.
         3) Variable frequency drives.
         4) Protective devices including, but not limited to, fuses, circuit breakers and protective relays.
         5) Pilot devices.
      c. Complete renewal parts list.

G. Test forms and reports:
   1. Submit complete factory acceptance test procedures and all forms used during the test.
   2. Submit complete control description checklist and IO checklist organized by individual starter or VFD for use during the control logic portion of the witnessed factory acceptance testing as well as the witnessed field acceptance testing.

H. Manufacturer's Certificate of Installation and Functionality Compliance.

I. Record Documents:
   1. Elementary schematics:
      a. Furnish as-built elementary schematics indicating final:
         1) Wire numbers.
         2) Interfaces with other equipment.
      b. Provide one custom schematic diagram for each compartment:
         1) Include all remote devices.
         2) Show wire numbers on the schematics.
      c. Layout drawings: Provide complete dimensioned component and unit layout drawings.
   2. The Record Documents shall reflect all modifications made during the submittal review process and during construction.

J. Calculations:
   1. Detailed calculations or details of the actual physical testing performed on the motor control center to prove the motor control center is suitable for the seismic requirements at the Project Site.

1.06 QUALITY ASSURANCE

A. As specified in Section 16050 - Common Work Results for Electrical.

B. All portions of the motor control center, vertical bays, and components shall be UL listed and labeled.
   1. Where indicated as service entrance equipment, the motor control center shall be UL labeled and listed "Suitable for Service Entrance".

1.07 DELIVERY, STORAGE AND HANDLING

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Ship the motor control center and associated equipment to the job site on a dedicated air ride vehicle that will allow the Contractor to utilize onsite off-loading equipment.

C. Furnish temporary equipment heaters within the motor control center to prevent condensation from forming.

1.08 PROJECT OR SITE CONDITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

1.09 SEQUENCING

A. Conduct the initial fault current study as specified in Section 16305 - Electrical System Studies and submit results for Engineer's review.

B. After successful review of the initial fault current study, as specified in Section 16305 - Electrical System Studies, submit complete equipment submittal.

C. Conduct factory acceptance test.

D. Submit Manufacturer's Certificate of Installation and Functionality Compliance.

E. Ship equipment to the Project Site after successful completion of factory acceptance test.

F. Assemble equipment in the field.

G. Conduct field acceptance test and submit results for Engineer's review.

H. Submit manufacturer's certification that the equipment has been properly installed and is fully functional for Engineer's review.

I. Conduct Owner's training sessions.

J. Commissioning and process start-up as specified in Section 01756 - Commissioning.

1.10 SCHEDULING

A. As specified in Section 16050 - Common Work Results for Electrical.

1.11 WARRANTY

A. As specified in Section 16050 - Common Work Results for Electrical.

1.12 SYSTEM START-UP

A. As specified in Section 16050 - Common Work Results for Electrical.

1.13 OWNER'S INSTRUCTION (NOT USED)

1.14 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. One of the following or equal:
   1. Allen-Bradley.
   2. Eaton.
   3. GE by ABB.
   4. Schneider Electric.

2.02 EXISTING PRODUCTS (NOT USED)

2.03 MATERIALS (NOT USED)

2.04 MANUFACTURED UNITS (NOT USED)

2.05 EQUIPMENT

A. General:
   1. Furnish motor control centers as specified in the Contract Documents and indicated on the Drawings.
   2. Arrange the equipped sections to form continuous motor control center lineups as indicated on the Drawings:
      a. Identify any deviations from the Drawings in writing and submit for approval.
   3. Provide wire markers at each end of every wire as specified in Section 16075 - Identification for Electrical Systems.
   4. Provide complete and functional motor control centers.
   5. Provide devices or accessories not specified in this Section but necessary for the proper installation and operation of the equipment.

B. Design and construct motor control center to operate at the voltage level and configuration indicated on the Drawings.

C. Bus system:
   1. Material:
      a. Tin-plated copper.
      b. Short-circuit rating:
         1) As indicated on the Drawings.
      c. Bus bar supports:
         1) High impact strength, non-tracking glass-polyester material that is impervious to moisture and gases.
   2. Horizontal power bus:
      a. Current-carrying capacity as indicated on the Drawings.
      b. Mounting:
         1) Mount horizontal bus bars edgewise, one above the other, and fully isolated from all wireways and units.
      c. Temperature rise:
         1) In accordance with UL 845.
         2) De-rate the temperature rating of the bus for the specified conditions of ambient temperature and altitude as specified in Section 16050 - Common Work Results for Electrical.
   3. Vertical power bus:
      a. Current-carrying capacity of not less than 600 amps.
      b. Mounting:
         1) Enclose the vertical bus in a polyester-glass cover with small openings to permit unit stabs to mate with the bus:
            a) Provide a shutter mechanism to cover the stab openings when plug-in units are removed.
         2) Provide top and bottom bus covers for insulation and isolation of the ends of the bus.
      c. Isolated from the unit compartments by a full height barrier.

4. Ground bus:
    a. Horizontal ground bus:
        1) Current-carrying capacity:
            a) 300 amps when the horizontal bus is 2,000 amps or less.
            b) 600 amps when the horizontal bus is greater than 2,000 amps.
        2) Mounting:
            a) Full-width, firmly secured to each vertical section structure:
                (1) Located in the top or bottom wireway.
            b) Pre-drilled and furnished with lugs for connection to equipment ground wires:
                (1) Furnish a minimum of 10 lugs per vertical section of MCC.
    b. Vertical ground bus.
        1) Mounting:
            a) Furnish in each vertical section.
            b) Bolted to the horizontal ground bus.
            c) Install parallel to the vertical power bus.
            d) Mount vertical ground bus such that plug-in units engage the ground bus before any connection to the power bus is made. Upon removal of plug-in units, ground stabs are disconnected from the ground bus after the power stabs have been disconnected.
5. Bus splice bars:
    a. Provided to join the bus at the splits.
    b. Connected to each horizontal bus bar with a minimum of two bolts.
    c. Employ conical or spring washers at connections, designed to maintain constant pressure against the splice joint.
    d. Same ampacity rating as the horizontal bus.
6. Provide bus system configured for back-to-back MCCs, where required.

D. Enclosures:
1. Each motor control center shall consist of 1 or more vertical sections bolted together:
    a. Freestanding.
    b. Totally enclosed.
    c. Dead-front assembly.
    d. Designed for modification and/or addition of future vertical sections.
    e. Form each vertical section of heavy gauge steel.
    f. Designed for back-to-back arrangement installation, where required and/or as indicated on the Drawings.
2. Enclosure rating:
    a. Indoor:
        1) NEMA Type 1 gasketed.
3. Standard section dimensions:
    a. Nominal height: 90 inches.
    b. Nominal depth: 20 inches.
    c. Vertical section width as indicated on the Drawings.
4. Wireways:
    a. Provide each vertical section with a horizontal wireway at the top and bottom of the section:
        1) Arranged to provide a full-width metal enclosed wiring trough across the entire motor control center assembly.
    b. Provide each vertical section with a full-height vertical wireway.

c. Completely isolated from the vertical and horizontal bus bars.
d. Provide a removable, hinged door.

5. Shipping splits:
   a. No more than 3 vertical sections and not more than 60 inches in width.
   b. Solid bussing between vertical sections in a shipping split is not acceptable.
6. Lifting angles:
   a. Furnish each vertical section and/or shipping split with a removable lifting angle mounted to the top of the enclosure:
      1) Extending the entire width of the shipping split.
7. Mounting channels:
   a. Mount each vertical section and/or shipping split on an external 1.5-inch by 3-inch mounting channel.

E. Units:
1. A plug-in unit consists of:
   a. Unit assembly.
   b. Unit support pan.
   c. Unit door assembly.
2. Completely enclosed and isolated from adjacent units, buses, and wireways, except for conductor entries into the unit, by a metal enclosure.
3. Constructed so that any fault will be contained in the unit compartment.
4. Supported and guided by a removable unit support pan:
   a. Re-arrangement of units and the removal of a unit so that a new and possibly larger unit can be added without the removal of an in-service unit to gain access to the unit support pan.
5. Held in place by screws or other positive locking means after insertion.
6. Provide a test position with the unit supported in the structure but disengaged from the bus.
7. Integral plug-in ground stab.
8. Stabs:
   a. Free floating.
   b. Self-aligning.
   c. Backed by spring steel clips to ensure high pressure contacts.
   d. Electrolytically tin-plated copper.
9. Handle:
   a. Provide a flange mounted handle mechanism to operate each disconnect switch or circuit breaker.
   b. Door mounted operators or operator handles are not acceptable.
   c. Engaged with the disconnect device at all times as an integral part of the unit independent of the door position.
   d. Lockable in the “OFF” position with up to 3 padlocks.
   e. Mechanically interlocked so that the door cannot be opened with the handle in the “ON” position.
      1) Provide a means for qualified personnel to defeat this interlock.
   f. Interlocked so the unit cannot be inserted or withdrawn with the handle in the “ON” position.
   g. Lockable in the “ON” position:
      1) This shall not prevent the circuit breaker from operating and opening the contacts in the event of a fault condition.

h. Color-coded to indicate position.
i. Located so the center of the grip when it is in its highest position is not more than 6 feet 7 inches above the finished floor, including the height of the housekeeping pad and mounting channels.

10. Where indicated on the Drawings, provide units for spaces and future equipment:
    a. Equip these units to accept a future plug-in unit without modification to the vertical sections.

2.06 COMPONENTS

A. Provide components contained within the motor control center as specified in:
1. Section 16075 - Identification for Electrical Systems.
2. Section 16123 - 600-Volt or Less Wires and Cables.
3. Section 16150 - Low Voltage Wire Connections.
4. Section 16290 - Electrical Power Monitoring.
5. Section 16262 - Variable Frequency Drives 0.50 - 50 Horsepower.
6. Section 16272 - Dry-Type Transformers.
7. Section 16285 - Surge Protective Devices.
8. Section 16295 - Protective Relays.
9. Section 16412 - Low Voltage Molded Case Circuit Breakers.
10. Section 16422 - Motor Starters.
11. Section 16445 - Panelboards.

2.07 ACCESSORIES

A. Wiring:
1. Wire the motor control center in accordance with the following NEMA Class and Type as defined by NEMA ICS 18-2001:
    a. NEMA Class II-S:
        1) Furnish wiring diagrams for individual units consisting of drawings that identify electrical devices, electrical connections, and indicate terminal numbering designations.
        2) Furnish individual unit diagrams with each unit and include inter-wiring between units, i.e., electrical interlocking, etc., as specifically specified in the Contract Documents.
        3) Provide custom drawings with unique terminal numbering designations in lieu of standard manufacturer drawings.
    b. NEMA Type B wiring:
        1) Control wiring:
            a) Type B-T pull-apart terminal blocks.
        2) Power wiring:
            a) Type B-T for Size 1 starters.
            b) Type B-T or B-D for Size 2 and 3 starters.
            c) Type B for Size 4 and larger starters and feeder units.

B. Lugs and terminals:
1. For all external connections of No. 6 AWG wire or larger:
    a. UL listed for copper or aluminum conductors.
2. Compression type, requiring a hydraulic press and die for installation.
3. Provide 20 percent spare control block terminals.

C. Nameplates:
   1. Provide nameplates as specified in Section 16075 - Identification for Electrical Systems:
      a. Identifying the motor control center designation as indicated on the Drawings.
   2. Identifying each vertical section:
      a. Mounted and centered on the top horizontal wireway of the vertical section.
   3. Furnish individual nameplates for each unit indicated on the Drawings:
      a. 1 nameplate to identify the unit designation.
      b. 1 nameplate to identify the load served.
      c. Furnish space units with blank nameplates.
   4. Manufacturer's labels:
      a. Furnish each vertical section with a label identifying:
         1) Serial number.
         2) Bus rating.
         3) Vertical section reference number.
         4) Date of manufacture.
         5) Catalog number of section.

2.08 MIXES (NOT USED)

2.09 FABRICATION (NOT USED)

2.10 FINISHES

A. Finish metal surfaces and structural parts with phosphatizing, or equal, treatment before painting.

B. Finish interior surfaces including bus support angles, control unit back plates, and top and bottom barrier plates with baked white enamel.

C. Finish exterior of enclosure with manufacturer's standard gray.
   1. Finish NEMA Type 3R exterior cabinets with ultraviolet resistant enamel paint that is UL recognized for outdoor use.

2.11 SOURCE QUALITY CONTROL

A. Perform manufacturer's standard factory test on all motor control centers prior to shipment.

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Install the equipment in accordance with the accepted installation instructions and anchorage details to meet the seismic and wind load requirements at the Project site.

C. General:
   1. Furnish all cables, conduit, lugs, bolts, expansion anchors, sealants, and other accessories necessary to completely install the motor control center for the line, load, and control connections.
   2. Assemble and install the motor control center in the locations and with the layouts as indicated on the Drawings.
   3. Make bus splice connections.
   4. Perform work in accordance with manufacturer's instruction and shop drawings.
   5. Furnish all components, and equipment necessary to complete the installation.
   6. Replace hardware, lost or damaged during installation or handling, in order to provide a complete installation.
   7. Install the MCC on a raised concrete housekeeping pad:
      a. Provide structural leveling channels in accordance with the manufacturer's recommendations to provide proper alignment of the units.
         1) Remove the manufacturer's supplied mounting channels as required by the manufacturer's installation instructions.
      b. Weld and/or bolt the motor control center frame to leveling channels.

D. Provide openings in the top or bottom of the motor control center for conduit only.
   1. No additional openings will be accepted:
      a. Miscut holes will require that the entire vertical section or removable panel be replaced.
      b. No hole closers or patches will be accepted.

E. Bundle circuits together and terminate in each unit:
   1. Tie with nylon wire ties as specified in Section 16123 - 600-Volt or Less Wires and Cables.
   2. Label all wires at each end with wire markers as specified in Section 16075 - Identification for Electrical Systems as shown on the approved elementary schematics.

3.04 ERECTION, INSTALLATION, APPLICATION CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 REINSTALLATION (NOT USED)

3.07 COMMISSIONING

A. As specified in Section 01756 - Commissioning.

B. Source testing (Factory Acceptance Tests):
   1. Owner and Engineer will witness the factory acceptance test as specified in Section 16050 - Common Work Results for Electrical.

2. Test the complete motor control center at the manufacturer's establishment. Completely assemble, wire and test the motor control center:
   a. Detailed inspections before and after assembly to ensure correctness of design and workmanship.
3. Provide groups of wires leaving the shipping-assembled equipment with terminal blocks with suitable numbering strips.

C. Provide Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 01756 - Commissioning.

3.08 FIELD QUALITY CONTROL

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Provide the services of a manufacturer's representative to:
1. Inspect, verify, and certify that the motor control center installation meets the manufacturer's requirements.
2. Test each MCC network to ensure proper communications.
3. Test all gateway communications between the MCC to the Owner's control system as required.
4. Test configuration of all MCC mounted Ethernet switches, including performance and security settings, IP addresses and any other addressing tables required to provide a fully functioning system.
5. Test and confirm all IP addresses for all switches and equipment in accordance with Owner's IP addressing scheme.
6. Load and test all configuration settings in accordance with actual motor and field equipment.
7. Test the functionality of all overload logic as well as interaction with Owner's control and maintenance systems in accordance with the control descriptions.
8. Test control response upon loss and restoration of power for every starter.

3.09 ADJUSTING

A. Make all adjustments as necessary and recommended by the manufacturer, Engineer, or testing firm.

3.10 CLEANING

A. As specified in Section 16050 - Common Work Results for Electrical.

3.11 PROTECTION

A. As specified in Section 16050 - Common Work Results for Electrical.

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 16710

FIRE ALARM AND SMOKE DETECTION SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Fire alarm systems, including:
      a. Initiating devices.
      b. Notification appliances.
      c. Controls.
      d. Supervisory devices.
      e. Software.

B. Utilize a single Fire Alarm System Supplier (FASS) to design, furnish, and install all materials, equipment, labor, and services required to achieve a fully integrated and operational fire alarm system, in complete compliance with the NFPA Class and Style specified.

C. Coordinate the fire alarm system with related equipment and materials furnished under other sections of these Specifications.

1.02 REFERENCES

A. As specified in Section 16050 - Common Work Results for Electrical.

B. FM Global (FM).

C. Factory Mutual (FM).

D. Federal Communications Commission (FCC).

E. National Electric Code (NEC).

F. National Fire Protection Association (NFPA):
   1. 70 - National Electrical Code.
   2. 72 - National Fire Alarm and Signaling Code.
   3. 75 - Standard for the Protection of Information Technology Equipment.
   4. 90A - Standard for the installation of Air Conditioning and Ventilation systems.

G. National Institute for Certification in Engineering Technologies (NICET).

H. Underwriters Laboratories, Inc. (UL):
   1. 268 - Standard for Smoke Detectors for Fire Alarm Systems.
   2. 268A - Standard for Smoke Detectors for Duct Application.
   3. 464 - Standard for Audible Signal Appliances.
   4. 864/1730 - Standard for Control Units and Accessories for Fire Alarm Systems.

5. 1424 - Standard for Cables for Power-Limited Fire-Alarm Circuits.
6. 1971 - Standard for Signaling Devices for the Hearing Impaired.

1.03 DEFINITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

1.04 SYSTEM DESCRIPTION

A. Provide a complete, non-coded, addressable, microprocessor-based fire alarm system with initiating devices, notification appliances, and controls and supervisory devices as specified in this Section.
   1. System connections for initiating (signaling) circuits and notification appliance circuits shall be Class B Style 4.
   2. Circuit supervision: Circuit faults shall be indicated by a trouble signal at the FACP. Provide a distinctive audible tone and alphanumeric annunciation.

1.05 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 16050 - Common Work Results for Electrical.

B. Product data:
   1. Data sheets for all system components highlighted to indicate the specific products, features, or functions required to meet this specification including electrical characteristics such as voltage and current ratings, connection requirements, software and firmware versions and operational details of all equipment.
   2. Alternate or as-equal products submitted under this contract must provide a detailed line-by-line comparison of how the submitted product meets, exceeds, or does not comply with this Specification.

C. Shop drawings:
   1. Fire detection system block diagram including interconnection with fire sprinkler flow switches and valves.
      a. Fire detection functions and control interconnections for each building as described in this Section.
      b. FACP layout, schematic, and wiring diagrams, panel displays, and LED arrangement.
      c. Detection device type, features, and setpoints.
      d. Number and size of wires, type of wire insulation required for devices specified, and conduit size for proposed circuits.
   2. System power and battery charts with performance graphs and voltage drop calculations to ensure that system will operate per the specified backup time periods and under all voltage conditions per UL and NFPA standards.
   3. Test reports indicating satisfactory completion of required tests and inspections.
   4. System layout on floor plan drawings, drawn to scale using AutoCad software.
   5. Location diagrams for all ventilation duct mounted smoke detectors and corresponding ventilation system shutdown interlock.
   6. Fire alarm system input-output point list.

7. Spare parts list for extra materials being furnished.
8. Operating and Maintenance data as specified in Section 01782 - Operation and Maintenance Manuals.

D. Manufacturer's installation instructions.

E. Designer, manufacturer and installer qualifications.

F. Submit the equipment layout drawings and product data to the local authority having jurisdiction (AHJ), for review and approval of the proposed system.
1. Contractor is responsible for paying plan check, permit and inspection fees as necessary.
2. Submit AHJ's approval to Engineer.

1.06 QUALITY ASSURANCE

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Designer qualifications:
1. Designer of similar installations for a minimum of 5 years with a satisfactory performance record.

C. Manufacturer qualifications: Manufacturer of proposed system for a minimum of 10 years with satisfactory performance record.

D. Installer qualifications: Manufacturer approved installer of products similar to specified products on a minimum of 5 projects of similar scope as this project with a satisfactory performance record.

E. Installation to be supervised by NICET Level II Technician.

F. Fire alarm systems shall be UL approved.

1.07 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 16050 - Common Work Results for Electrical.

1.08 PROJECT OR SITE CONDITIONS

A. As specified in Section 16050 - Common Work Results for Electrical.

1.09 SEQUENCING

A. Submit plans to AHJ for approval.

B. Make submittals, including AHJ's approval to the Engineer.

1.10 SCHEDULING (NOT USED)

1.11 WARRANTY

A. As specified in Section 16050 - Common Work Results for Electrical.

1.12 SYSTEM START-UP

A. As specified in Section 16050 - Common Work Results for Electrical.

1.13 OWNER'S INSTRUCTIONS (NOT USED)

1.14 MAINTENANCE

A. Furnish service and maintenance of fire alarm system for 1 year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire alarm and smoke detection systems:
   1. One of the following or equal:
      a. Siemens.
      b. Simplex Grinnell.
      c. Honeywell, Inc.
      d. Notifier.
      e. ADT Security System.
      f. GE by ABB.
      g. Commercial Wireless Systems International (CWSI).
      h. Bosch Security.

B. Fire alarm cable:
   1. One of the following or equal:
      a. Southwire.
      b. Belden.
      c. General Cable, Carol Brand.

2.02 EXISTING PRODUCTS (NOT USED)

2.03 MATERIALS (NOT USED)

2.04 MANUFACTURED UNITS (NOT USED)

2.05 EQUIPMENT

A. Provide the fire alarm system with all necessary hardware and software to perform the following functions:
   1. Fire alarm and detection operations.
      a. Provide all required network interface modules, fiber optic communication modules, relay modules, and zone modules for interconnections as required and specified in this Section.
   2. Control and monitoring of fire suppression systems, heat detectors, smoke detectors, and other equipment as indicated in the Specifications.
   3. Annunciation:
      a. Operation of alarm and supervisory initiating devices shall be annunciated at the FACP indicating the location and type of device.

b. Signal transmission:
    1) Alarms from the FACP shall be routed to:
        a) **[Individual Air Handling Equipment (MAUs, HAUs etc).]**
        b) **[Central Station.]**
        c) **[Auxiliary System.]**
        d) **[Remote Station.]**
        e) **[PLC.]**
        f) **[Pager.]**
        g) **[AC Powered Repeater (900 MHz Frequency Hopping Spread Spectrum format.]**

4. System general alarm sequence:
    a. Indication of alarm condition at the FACP.
    b. Identification of the zone that is the source of the alarm at the FACP.
    c. Operation of audible and visible notification devices throughout the building until silenced at FACP.
    d. Shutting down supply and return fans serving zone where alarm is initiated.
    e. Closing smoke dampers on system serving zone where alarm is initiated.
    f. Initiation of smoke control sequence through the building temperature control system.
    g. Notifying the local fire department.
5. Alarm silencing:
    a. When the “Alarm Silence” button is pressed, all audible alarm signals turn off.
6. System reset:
    a. Provide a system reset button that returns the system to its normal state.
    b. Display messages providing operator assurance of the sequential steps as they occur.
    c. The system shall verify all circuits or devices are restored before resetting the system to avoid the potential for re-alarming the system.
    d. Should an alarm condition continue, the system remains in an alarmed state.

2.06 COMPONENTS

A. Fire alarm control panel (FACP):
    1. Power requirements:
        a. 120 VAC input power via a dedicated circuit.
        b. Battery system:
            1) Provided with sufficient battery capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of 24 hours with 5 minutes of alarm operation at the end of this period.
            2) The system shall automatically transfer to battery standby upon power failure.
            3) Provide automatic battery charging and recharging operations.
            4) Supervise the system batteries so that a low battery condition or disconnection of the batteries indicates a trouble at the FACP.
            5) Battery Charger with battery volt meter and ammeter.
        c. All circuits requiring system operating power shall be 24 VDC with individual fuses at the FACP.

d. Supervise the incoming power to the system so that any power failure will be indicated at the control unit.
    1) A green "power on" LED shall be displayed continuously while incoming power is present.
    2) FACP shall sound a trouble signal at loss of primary power and to indicate when the system is operating on battery power.

2. Alphanumeric display and system controls:
    a. Include an LCD display to indicate alarm, supervisory, and component status messages and include a keypad for use in entering and executing control commands.
    b. Display battery voltage and amperage readouts on LCD display.
3. System supervision: Component or power supply failure places system in trouble mode.
4. Distributed module operation: Capable of allowing remote location of the following modules; through a Style 4 (Class B) supervised serial communications channel:
    a. Addressable signaling line circuits.
    b. Initiating device circuits.
    c. Notification appliance circuits.
    d. Auxiliary control circuits.
    e. Graphic annunciator LED/switch control modules.
5. Group actuating devices together in zones represented by zone light emitting diodes, LED.
    a. Provide provisions for supervised zone remote annunciator outputs.
    b. Actuation of a UL approved alarm-initiating device shall cause the respective red alarm LED to flash.
        1) This LED should continue to flash until the alarm acknowledge switch is actuated.
        2) Once acknowledged, the LED or zone LED will be constantly illuminated until the actuating device is restored to normal and the system is reset.
6. Supply with an alarm silence/acknowledge switch to silence the audible alarms.
    a. Should a subsequent alarm actuation of a different zone occur, the alarm devices shall sound until silenced.
7. Cabinet:
    a. UL listed, lockable steel enclosure.
    b. Front access only.
    c. If more than a single unit is required to form a complete control unit, provide matching modular unit enclosures.
    d. Control panels shall operate and be constructed and tested in compliance with UL 864/1730 for low powered RF signaling devices.

B. Software:
1. Allows for loading and editing instructions and operating sequences as necessary.
2. Capable of on-site programming to accommodate system expansion and facilitate changes in operation.
3. Stored in a non-volatile programmable memory within the fire alarm control unit.

4. Loss of primary and secondary power shall not erase the instructions stored in memory.
5. Capable of full system operation during a new configuration download.

C. Manual pull stations:
1. Description:
   a. Double action type.
   b. Red Lexan™ or metal enclosure.
   c. Molded, raised-letter operating instructions of contrasting color.
   d. Mechanically latches upon operation and remain so until manually reset by opening with a key common with the FACPs.
2. Protective shield: Provide a tamperproof, clear Lexan™ shield and red frame that easily fits over manual pull stations.

D. Smoke detectors:
1. Non-Hazardous duct mounted detectors:
   a. Manufacturers: The following or equal:
      1) System Sensor Series D4120.
   b. General:
      1) Provide duct mounted smoke detectors in air ducting with flows greater than 2,000 cubic feet per minute whether or not smoke detectors are indicated on the Drawings.
      2) Supply ducting: Locate smoke detectors downstream of fans and ahead of branch connections.
      3) Exhaust/return ducting: Locate smoke detectors after branch connections and upstream of fans.
   c. Smoke detectors shall be UL listed for use in air distribution/collection systems and in accordance with NFPA 90A.
      1) Connect the smoke detector to:
         a) Building fire alarm system.
            (1) Fan control circuit to shut down respective fan upon detection of smoke.
            (2) Damper control circuits to close respective air dampers to prevent spread of smoke.
   d. Characteristics:
      1) Photoelectric type.
      2) Operating temperature range of 32 degrees Fahrenheit to 150 degrees Fahrenheit.
      3) Operate at airflow velocities of 100 to 4,000 feet per minute.
      4) Capable of mounting to rectangular or round ducts.
      5) Integral filter to reduce dust.
      6) Comply in accordance with UL 268A for air handling systems.
   e. Accessories:
      1) Provide metal sampling tube and end cap to match duct width. Sampling tube shall be able to be installed without use of tools.
      2) Provide mounting base and hardware.
      3) Provide duct access door as specified in Section 15812 - Metal Ducts. Provide similar for non-metallic ducting.
      4) Provide a 120 volt 10 amp DPDT auxiliary contact and a 30 VDC 10 amp DPDT auxiliary contact.
      5) Provide remote annunciator with alarm and power LEDs.
      6) Provide remote test station.

E. Heat detectors:
   1. Provide heat fire detectors as required by the AHJ.
   2. UL listed and FM approved.
   3. Heat detector:
      a. Combination fixed-temperature and rate-of-rise unit with plug-in base and alarm indication lamp.
      b. Fixed-temperature setting: 135 degrees Fahrenheit.
   4. Thermistor-based, rate-compensated, and not be affected by thermal lag.
   5. Provide end-of-line resistors as required.

F. Standard alarm-notification appliances:
   1. Horn: In accordance with UL 464.
      a. Minimum sound pressure level of 83.
   2. Visible/Only (V/O):
      a. In accordance with UL 1971.
      b. Xenon flash tube.
      c. Minimum flash intensities of 15cd, 75cd, and 110cd.
      d. Provide a label inside the strobe lens to indicate the listed candela rating of the specific V/O appliance.
   3. Audible/Visible:
      a. In accordance with UL 1971 and UL 464.
      b. Xenon flash tube.
      c. Provide a label inside the strobe lens to indicate the listed candela rating of the specific strobe.
      d. Minimum sound pressure level of 83 dBA.
      e. Capable of 2-wire synchronization with one of the following options:
         1) Synchronized strobe with horn on steady.
         2) Synchronized strobe with temporal code pattern on horn.

G. Addressable circuit interface modules:
   1. Arrange to monitor one or more system components that are not otherwise equipped for addressable communication. Modules shall be used for monitoring of water flow, valve tamper, non-addressable devices, and for control of evacuation indicating appliances and AHU systems.
   2. Mounted in a standard electric outlet box.
   3. Furnish with cover plates to allow surface or flush mounting.
   4. Receive their operating power from the signaling line or a separate 2 wire pair running from an appropriate power supply as required.

H. Circuit interface modules:
   1. Type 1: Monitor circuit interface module:
      a. For conventional 2-wire smoke detector and/or contact device monitoring with Class B or Class A wiring supervision.
         1) Supervision of the zone wiring will be Class B.
         2) Module shall communicate status (normal, alarm, trouble) to the FACP.
      b. For conventional 4-wire smoke detector with Class B wiring supervision.
         1) Module shall provide detector reset capability.
         2) Fuse to provide over-current power protection for the 4-wire detector: 2 amp.
         3) Module will communicate status (normal, alarm, trouble) to the FACP.

2. Type 2: Control circuit interface module:
    a. Module for signals and other device control with Style 4 and Style 6 wiring supervision.
    b. For non-supervised control.
    c. Provide double pole double throw relay switching for 1 A at 28 VDC resistive, power limited and at 1/2 A at 120 VAC resistive, non-power limited.
    d. The system shall be capable of energizing 100 percent of the relays connected to the signaling line circuit.
3. Type 3: Line powered monitor circuit interface module:
    a. Power and its communications supplied by the 2 wire multiplexing signaling line circuit.
    b. Provides location specific addressability to an initiating device by monitoring normally open dry contacts.
    c. Module is required for monitoring water flow and tamper switches.
4. Type 4: Line powered combination monitor circuit and control circuit interface module:
    a. Individually addressable.
    b. Power and its communications supplied by the 2 wire multiplexing signaling line circuit.
        1) System shall be capable of energizing 100 percent of the relays connected to the signaling line circuit.
    c. Input circuit provides location specific addressability to an initiating device by monitoring normally open dry contacts.
        1) Module shall communicate 3 zone status conditions (normal, alarm, trouble) to the FACP.
    d. Provide a non-supervised form C relay switching with contact rated at 2 A at 30 VDC resistive, power limited and at 1/2 A at 120 VAC resistive, non-power limited.
5. The circuit interface module to be supervised and uniquely identified by the control unit.
    a. Identification to be transmitted to the control unit for processing according to the program instructions.
    b. On-board LED to provide an indication that the module is powered and communicating with the FACP.
    c. LEDs provide a troubleshooting aid since the LED blinks on poll whenever the peripheral is powered and communicating.

I. Wiring:
1. General:
    a. Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the AHJ.
    b. UL 1424 compliant.
    c. Suitable for installation in accordance with Article 760 of the National Electrical Code.
    d. Plenum rated where required by the installation.
    e. Rated for 300 volts and 75 degrees Celsius.
2. Conductors:
    a. Provide the number of pairs required for the application.

b. Copper per ASTM B3.
c. Color coded PVC insulation.

3. Jacket:
   a. Red PVC.
   b. Shall include a ripcord.
   c. Sequential foot markings.

2.07 ACCESSORIES (NOT USED)

2.08 MIXES (NOT USED)

2.09 FABRICATION (NOT USED)

2.10 FINISHES (NOT USED)

2.11 SOURCE QUALITY CONTROL (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Install system components and all associated devices in accordance with applicable NFPA Standards and manufacturer's recommendations.

C. Smoke detectors shall not be installed until after construction cleanup on all trades is complete and final in accordance with NFPA 70, NFPA 72, NFPA 75, NFPA 90A, FCC and other codes applicable to the individual installation location.

D. Locate FACP as indicated on the Drawings.

E. Water-flow and valve supervisory switches: Connect each sprinkler valve required to be supervised.

F. Device location-indicating lights: Locate in the public space immediately adjacent to the device.

G. Wiring:
   1. System wiring:
      a. Installed in accordance with the appropriate articles from NEC.
   2. Color coding:
      a. Color-code fire alarm conductors differently from the normal building power wiring.
      b. Use 1 color code for alarm initiating device circuits wiring and a different color code for supervisory circuits.
      c. Color-code notification appliance circuits differently from alarm-initiating circuits.

d. Paint fire alarm system conduits, junction boxes, and covers red.
e. Circuit that provides power to the FACP shall have a red marking and be identified as “FIRE ALARM CIRCUIT” in accordance with NFPA 72.

3. Risers:
   a. Install at least 2 vertical cable risers to serve the fire alarm system.
   b. Separate risers in close proximity to each other, in accordance with NFPA 72, with a minimum 2-hour rated cable assembly, so the loss of 1 riser does not prevent the receipt or transmission of signal from other floors or zones.

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 COMMISSIONING

A. As specified in Section 01330 - Submittal Procedures.

B. Owner training:
   1. As specified in Sections 01330 - Submittal Procedures and 16050 - Common Work Results for Electrical.

3.08 FIELD QUALITY CONTROL

A. As specified in Section 16050 - Common Work Results for Electrical.

B. Manufacturer's field services: Provide services of a factory-authorized service representative to:
   1. Supervise the field assembly and connection of components and the pre-testing, testing, and adjustment of the system.
   2. Verify proper installation, correct deficiencies, and be present at the jobsite during final inspection by the Engineer.

C. Field tests:
   1. Notify the Engineer and the AHJ in writing a minimum of 2 weeks before the scheduled day for the field acceptance tests.
   2. Furnish the services of a field service engineer, and any special tools, equipment and labor to perform the tests.
   3. Each device and control function shall be individually witness tested and recorded:
      a. All acceptance tests shall be witnessed by and signed off by the Engineer, the FASS’s field engineer, the installing Subcontractor, and a representative of the AHJ.
   4. The approved Field Acceptance Test Binder shall form the basis of the documentation of the system acceptance tests:
      a. Furnish 2 certified copies of the tests.
      b. Approved wireless system radio path field surveys shall be documented and saved in the Operation and Maintenance Manual binder.

3.09 ADJUSTING (NOT USED)

3.10 CLEANING

A. As specified in Section 16050 - Common Work Results for Electrical.

3.11 PROTECTION (NOT USED)

3.12 SCHEDULE (NOT USED)

END OF SECTION

SECTION 16950

FIELD ELECTRICAL ACCEPTANCE TESTS

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PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Responsibilities for testing the electrical installation.
   2. Adjusting and calibration.
   3. Acceptance tests.

B. Copyright information:
   1. Some portions of this Section are copyrighted by the InterNational Electrical Testing Association, Inc. (NETA). See NETA publication ATS for details.

1.02 REFERENCES

A. General standards:
   1. As specified in Section 16050 - Common Work Results for Electrical.
   2. Specification sections for the electrical equipment being tested.
   3. Shop drawings.

B. National standards:
   1. American National Standards Institute (ANSI).
   2. Institute of Electrical and Electronics Engineers (IEEE):
      a. 43 - IEEE Recommended Practice for Testing Insulation Resistance of Rotating Machinery.
      b. 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System.
      c. 95 - IEEE Recommended Practice for Insulation Testing of AC Electric Machinery (2300 V and Above) With High Direct Voltage.
      d. 421.3 - IEEE Standard for High-Potential Test Requirement for Excitation Systems for Synchronous Machines.
      e. 450 - IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications.
      f. 1106 - IEEE Recommended Practice for Installation, Maintenance, Testing, and Replacement of Vented Nickel-Cadmium Batteries for Stationary Applications.
      g. 1188 - IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications.
      h. C57.13 - IEEE Standard Requirements for Instrument Transformers.
      i. C57.13.1 - IEEE Guide for Field Testing of Relaying Current Transformers.
      j. C57.13.3 - IEEE Guide for Grounding of Instrument Transformer Secondary Circuits and Cases.
      k. C57.104 - IEEE Guide for the Interpretation of Gases Generated in Oil-Immersed Transformers.
   3. Insulated Cable Engineer's Association (ICEA).
   4. InterNational Electrical Testing Association (NETA).
      a. ATS- Standard for Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems.
   5. International Electrotechnical Commission (IEC).
   6. Manufacturer's testing recommendations and instruction manuals.

7. National Fire Protection Association (NFPA):
    a. 70 - National Electrical Code (NEC).
    b. 110 - Standard for Emergency and Standby Power Systems.
8. National Institute of Standards and Technology (NIST).

1.03 DEFINITIONS

A. Project definitions:
    1. As specified in Sections 01756 - Commissioning and 16050 - Common Work Results for Electrical.

B. Specific definitions:
    1. Testing laboratory: The organization performing acceptance tests.

1.04 SYSTEM DESCRIPTION

A. General requirements:
    1. Testing of all electrical equipment installed under this Contract in accordance with the manufacturer's requirements and as specified in this Section.
    2. Conduct all tests in the presence of the Engineer or the Engineer's representative:
        a. Engineer will witness all visual, mechanical, and electrical tests, and inspections.
    3. The testing and inspections shall verify that the equipment is operational within the tolerances required and expected by the manufacturer, and these Specifications.

B. Responsibilities:
    1. Contractor responsibilities:
        a. Ensure that all resources are made available for testing, and that all testing requirements are met.
    2. Electrical subcontractor responsibilities:
        a. Perform routine tests during installation.
        b. Demonstrate operation of electrical equipment.
        c. Commission the electrical installation.
        d. Provide the necessary services during testing, and provide these services to the testing laboratory, Contractor, and other subcontractors, including but not limited to:
            1) Providing electrical power as required.
            2) Operating of electrical equipment in conjunction with testing of other equipment.
            3) Activating and shutting down electrical circuits.
            4) Making and recording electrical measurements.
            5) Replacing blown fuses.
            6) Installing temporary jumpers.
    3. Testing laboratory responsibilities:
        a. Perform all acceptance tests specified in this Section.
        b. Provide all required equipment, materials, labor, and technical support during acceptance tests.

1.05 SUBMITTALS

A. General submittal requirements:
   1. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 16050 - Common Work Results for Electrical.

B. Copper Ethernet test form:
   1. Cable test reports:
      a. Submit 3 copies of test reports showing the results of all tests specified in this Section:
         1) Test type.
         2) Test location.
         3) Test date.
         4) Cable number.
         5) Cable length.
         6) Certification that the cable meets or exceeds the specified standard.
      b. Furnish hard copy and electronic copy for all traces.

C. Manufacturers' testing procedures:
   1. Submit manufacturers' recommended testing procedures and acceptable test results for review by the Engineer prior to beginning testing.

D. Test report:
   1. Include the following:
      a. Summary of Project.
      b. Description of equipment tested.
      c. Description of tests performed.
      d. Test results.
      e. Conclusions and recommendations.
      f. Completed test forms.
      g. List of test equipment used and calibration dates.
      h. LAN cable test reports.

E. Test data records:
   1. Include the following:
      a. Identification of the testing organization.
      b. Equipment identification.
      c. Nameplate data.
      d. Humidity, temperature and or other conditions that may affect the results of the tests and or calibrations.
      e. Dates of inspections, tests, maintenance and or calibrations.
      f. Indication of the inspections, tests, maintenance, and or calibrations to be performed and recorded.
      g. Expected results when calibrations are to be performed.
      h. Indication of as-found and as-left results as applicable.
      i. Indication of all test results outside specified tolerances.

F. Testing laboratory qualifications:
   1. Submit a complete resume and statement of qualifications from the proposed testing laboratory detailing their experiences in performing the tests specified:
      a. This statement will be used to determine whether the laboratory is acceptable, and shall include:
         1) Corporate history and references.
         2) Resume of individual performing test.
         3) Equipment list and test calibration data.

G. Division of responsibilities:
   1. Submit a list identifying who is responsible for performing each portion of the testing.

1.06 QUALITY ASSURANCE

A. General quality assurance standards:
   1. As specified in Section 16050 - Common Work Results for Electrical.

B. Testing laboratory qualifications:
   1. The testing laboratory may be qualified testing personnel from the electrical subcontractor's staff or an independent testing company.
   2. NETA certification required.
   3. Selection of the testing laboratory and testing personnel is subject to approval by the Engineer based on testing experience and certifications of the individuals and testing capabilities of the organization.

1.07 DELIVERY, STORAGE, AND PROTECTION (NOT USED)

1.08 PROJECT OR SITE CONDITIONS

A. General site and project conditions:
   1. As specified in Section 16050 - Common Work Results for Electrical.

1.09 SEQUENCING

A. Prior to testing:
   1. At least 30 days before commencement of the acceptance tests, submit the manufacturer's complete field testing procedures to the Engineer and to the testing laboratory, complete with expected test results and tolerances for all equipment to be tested.

B. Perform testing in the following sequence:
   1. Perform routine tests as the equipment is installed including:
      a. Insulation-resistance tests.
      b. Continuity tests.
      c. Rotational tests.
   2. Adjusting and preliminary calibration.
   3. Acceptance tests.
   4. Demonstration.
   5. Commissioning and plant start-up.

1.10 SCHEDULING (NOT USED)

1.11 WARRANTY

A. General warranty requirements:
   1. As specified in Section 16050 - Common Work Results for Electrical.

1.12 SYSTEM START-UP (NOT USED)

1.13 OWNER'S INSTRUCTIONS (NOT USED)

1.14 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION

A. Test instrument calibration:
   1. Utilize a testing laboratory with a calibration program which maintains all applicable test instrumentation within rated accuracy.
      a. The calibrating standard shall be of better accuracy than that of the equipment tested.
   2. The accuracy shall be traceable to the NIST in an unbroken chain.
   3. Calibrate instruments in accordance with the following frequency schedule:
      a. Field instruments: 6 months maximum.
      b. Laboratory instruments: 12 months maximum.
      c. Leased specialty equipment where the accuracy is guaranteed by the lessor (such as Doble): 12 months maximum.
   4. Dated calibration labels shall be visible on all test equipment.
   5. Maintain an up-to-date instrument calibration record for each test instrument:
      a. The records shall show the date and results of each calibration or test.
   6. Maintain an up-to-date instrument calibration instruction and procedure for each test instrument.

B. Requirements prior to testing:
   1. Do not begin testing until the following conditions have been met:
      a. All instruments required are available and in proper operating condition.
      b. All required dispensable materials such as solvents, rags, and brushes are available.
      c. All equipment handling devices such as cranes, vehicles, chain falls and other lifting equipment are available or scheduled.
      d. All instruction books, calibration curves, or other printed material to cover the electrical devices are available.
      e. Data sheets to record all test results are available.

3.03 INSTALLATION

A. Test decal:
   1. The testing laboratory shall affix a test decal on the exterior of equipment or equipment enclosure of protective devices after performing electrical tests.
   2. The test decal shall be color coded to communicate the condition of maintenance of the protective. The color scheme for condition of maintenance of overcurrent protective devices shall be:
      a. White: electrically and mechanically acceptable.
      b. Yellow; minor deficiency not affecting fault detection and operation, but minor electrical or mechanical condition exists.
   3. The decal shall include the following information at a minimum:
      a. Testing organization.
      b. Project identifier.
      c. Test date.
      d. Technician identifier.

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 COMMISSIONING

A. General commissioning requirements:
   1. As specified in Section 01756 - Commissioning.

B. Testing and Training Phase: Installation Testing:
   1. Also called "Field Acceptance Testing".

C. Panelboards:
   1. Cleaning:
      a. Visually inspect panelboard for evidence of discoloration, abnormal dust accumulation, metal shards, or any other indication of overheating, wear, or other abnormal conditions prior to cleaning.
      b. Clean cabinet with a brush, vacuum cleaner, or clean, dry, lint-free rags to remove any accumulation of dust, dirt, or other foreign matter. Do not use liquids, solvents or detergents when cleaning panelboards or components.
      c. Avoid blowing dust into panelboards. Do not use a blower or compressed air.
      d. Clean Supports, terminals, and other major insulating surfaces with clean, dry, lint-free rags or soft bristled brushes.
      e. Remove dust, soot, grease, moisture, and foreign material from surface of circuit breakers.
   2. General:
      a. Compare equipment nameplate data with the Contract Documents.
      b. Check panelboard circuit schedule for accuracy.
      c. Verify appropriate anchorage, required area clearances, and correct alignment.
      d. Inspect overall general condition for physical damage. Check for broken studs and loose or damaged wires, connector, terminations, etc. Check all

bolts, nuts, washer, and pins for tightness. Tighten or use manufacture's replacement parts as required.

e. Inspect cabinets for signs of rust, corrosion, or deteriorating paint. Inspect cabinets for evidence of localized heat damage to the paint. Investigate sources of heat. Repair painted surfaces.
f. Check that covers are in place and fastened. Plug any open unused knockouts.
g. Inspect panelboard for moisture. Seal off any cracks or openings which have allowed moisture to enter the cabinet. Inspect all component devices. Replace any components that show evidence of damage from moisture.
h. Look for any recent changes in sprinklers or other plumbing that might expose indoor panelboards to a source of liquids. Eliminate sources of water, moisture, or liquids, or provide adequate barriers to protect panelboards from sources of water, moisture, or liquids.
i. Inspect panelboards and internal components for evidence of overheating, arc spatter, sooty deposits, and tracking. Investigate and correct sources of arcing or overheating. Consult the panelboard manufacturer for recommendations.
j. Verify that fuse and/or circuit breaker sizes and types correspond to record drawings, if available, as well as to the circuit breaker's address for microprocessor communications packages, if equipped.
k. Set adjustable circuit breakers in accordance with engineering coordination study supplied by Contractor.

3. Terminations, Connections, and Lugs:
   a. Inspect bolted electrical connections for high resistance using one of the following methods:
      1) Use of low-resistance ohmmeter.
         a) Compare bolted connection resistance values to values of similar connections:
            (1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
      2) Verify tightness of accessible bolted electrical connections by the calibrated torque wrench method:
         a) Refer to manufacturer's instructions for proper foot-pound levels or NETA ATS tables.
   b. Inspect terminations, connection, and lugs for alignment, physical damage, burns, corrosion, discoloration, flaking, heat damage, arcing, pitting, melting, deterioration, carbonization, cracks, chips, breaks, partial discharge, or moisture. Investigate and eliminate sources of any damage.
   c. Follow manufacturer recommendations for cleaning, repairing, and replacing damaged parts.
   d. Replace overheated connections. Tighten connections to proper torque levels as specified above.
4. Conductors and raceways:
   a. Inspect supply conductors and terminations for overheating, discoloration, and oxidation. Investigate and correct any deficiencies.
   b. Ensure the conductors are protected within their ampacities.
   c. Visually check panelboard, cables, and raceways for proper bonding and grounding. Correct improper bonding and grounding.

d. Inspect conductors for discoloration, arcing, pitting, melting, flaking of insulation and/or metal parts. Repair or replace damaged components in accordance with manufacturer's recommendations.
e. Inspect for frayed or broken wires. Replace or repair damaged components in accordance with manufacturer recommendations.
f. Inspect for frayed or broken wires. Replace or repair conductors as necessary.
g. Inspect conduits for moisture. Seal conduits which are a source of moisture and provide means to drain moisture away from the panelboard.

5. Circuit breakers:
   a. Breakers rated less than 100 A:
      1) Operate circuit breakers several times in order to exercise the mechanisms and the contacts, and to ensure smooth operation. Do not oil or grease parts of molded case circuit breakers.
      2) Visually check circuit breakers for evidence of overheating and thermal damage. Investigate and eliminate sources of overheating.
      3) Check circuit breakers for visual defects, chipping, cracks, breaks, burns, and deterioration. Replace damaged circuit breakers.
      4) Verify correct operation of any auxiliary features such as trip and pickup indicators, zone interlocking, electrical close and trip operation, trip-free, and antipump function.
      5) Inspect interchangeable trip-unit circuit breakers for tightness of trip units.
      6) Check circuit breaker terminals and connections for tightness as specified above.
   b. Breakers rated 100 A and higher:
      1) Perform visual and mechanical inspection as specified in this Section.
      2) Perform electrical tests as specified in this Section.

D. Dry type transformers:
   1. Visual and mechanical inspection:
      a. Compare equipment nameplate data with the Contract Documents.
      b. Inspect physical and mechanical condition.
      c. Inspect anchorage, alignment, and grounding.
      d. Verify that resilient mounts are free and that any shipping brackets have been removed.
      e. Inspect equipment for cleanliness.
      f. Inspect bolted electrical connections for high resistance using one of the following methods:
         1) Use of low-resistance ohmmeter.
         2) Verify tightness of accessible bolted electrical connections by the calibrated torque wrench method:
            a) Refer to manufacturer's instructions for proper foot-pound levels or NETA ATS tables.
      g. Verify that as-left tap connections are as specified.
   2. Electrical tests:
      a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter.

b. Perform insulation-resistance tests winding-to-winding and each winding-to-ground:
    1) Apply voltage in accordance with manufacturer's published data.
        a) Refer to NETA ATS tables in the absence of manufacturer's published data.
c. Calculate dielectric absorption ration or polarization index.
d. Perform turns ratio tests at all tap positions.
e. Verify correct secondary voltage, phase-to-phase and phase-to-neutral after energization and before loading.

3. Test values:
    a. Compare bolted connection resistance values to values of similar connections:
        1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
    b. Bolt-torque levels shall be in accordance with manufacturer's published data:
        1) Refer to NETA ATS tables in the absence of manufacturer's published data.
    c. Tap connections are left as found unless otherwise specified.
    d. Minimum insulation-resistance values of transformer insulation shall be in accordance with manufacturer's published data:
        1) Refer to NETA ATS tables in the absence of manufacturer's published data.
        2) Investigate insulation values less than the allowable minimum.
    e. The dielectric absorption ratio or polarization index shall not be less than 1.0.
    f. Turns-ratio results should not deviate more than 1/2 percent from either the adjacent coils or calculated ratio.
    g. Phase-to-phase and phase-to-neutral secondary voltages shall be in agreement with nameplate data.

E. Low voltage cables, 600 volt maximum:
1. Visual and mechanical inspection:
    a. Compare cable data with the Drawings and Specifications.
    b. Inspect exposed sections of cable for physical damage and correct connection as indicated on the Drawings.
    c. Inspect bolted electrical connections for high resistance by one of the following methods:
        1) Use of low-resistance ohmmeter.
        2) Verify tightness of accessible bolted electrical connections by the calibrated torque wrench method:
            a) Refer to manufacturer's instructions for proper foot-pound levels or NETA ATS tables.
    d. Inspect compression applied connectors for correct cable match and indentation.
    e. Inspect for correct identification and arrangement.
    f. Inspect cable jacket insulation and condition.
2. Electrical tests:
    a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter.

b. Perform insulation resistance test on each conductor sized #8 AWG or larger with respect to ground and adjacent conductors:
   1) Applied potential shall be 500 volts dc for 300 volt rated cable and 1,000 volts dc for 600 volt rated cable.
   2) Test duration shall be 1 minute.
c. Perform continuity tests on all power and control conductors to insure correct cable connection.
d. Verify uniform resistance of parallel conductors.

3. Test values:
   a. Compare bolted connection resistance values to values of similar connections:
      1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
   b. Insulation-resistance values shall be in accordance with manufacturer's published data:
      1) Refer to NETA ATS tables in the absence of manufacturer's published data.
      2) Investigate values of insulation-resistance less than the allowable minimum.
   c. Cable shall exhibit continuity.
   d. Deviations in resistance between parallel conductors shall be investigated.

F. Low voltage molded case, greater than 100 amps, and insulated case circuit breakers:
   1. Visual and mechanical inspection:
      a. Compare equipment nameplate data with the Contract Documents.
      b. Inspect physical and mechanical condition.
      c. Inspect anchorage and alignment.
      d. Verify the unit is clean.
      e. Operate the circuit breaker to ensure smooth operation.
      f. Inspect bolted electrical connections for high resistance by one of the following methods:
         1) Use of low-resistance ohmmeter.
         2) Verify tightness of accessible bolted electrical connections by the calibrated torque wrench method:
            a) Refer to manufacturer's instructions for proper foot-pound levels or NETA ATS tables.
      g. Perform adjustments for final protective device settings in accordance with the coordination study.
   2. Electrical tests:
      a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter.
      b. Perform insulation-resistance tests for 1 minute on each pole, phase-to-phase and phase-to-ground with the circuit breaker closed and across each open pole:
         1) Apply voltage in accordance with manufacturer's published data.
         2) Refer to NETA ATS tables in the absence of manufacturer's published data.
      c. Perform a contact/pole-resistance test.
      d. Determine long-time pickup and delay by primary current injection.
      e. Determine short-time pickup and delay by primary current injection.

f. Determine ground-fault pickup and delay by primary current injection.
g. Determine instantaneous pickup value by primary current injection.
h. Perform minimum pickup voltage tests on shunt trip and close coils in accordance with manufacturer's published data.
i. Verify correct operation of any auxiliary features such as trip and pickup indicators, zone interlocking, electrical close and trip operation, trip-free, anti-pump function and trip unit battery condition:
    1) Reset all trip logs and indicators.
j. Verify operation of charging mechanism.

3. Test values:
    a. Compare bolted connection resistance values to values of similar connections:
        1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
    b. Bolt-torque levels shall be in accordance with manufacturer's published data:
        1) Refer to NETA ATS tables in the absence of manufacturer's published data.
    c. Insulation-resistance values shall be in accordance with manufacturer's published data:
        1) Refer to NETA ATS tables in the absence of manufacturer's published data.
        2) Investigate values of insulation-resistance less than the allowable minimum.
    d. Microhm or dc millivolt drop values shall not exceed the high levels of the normal range as indicated in the manufacturer's published data:
        1) If manufacturer's data is not available, investigate any values which deviate from adjacent poles or similar breakers by more than 50 percent of the lowest value.
    e. Long-time pickup values shall be as specified, and the trip characteristic shall not exceed manufacturer's published time-current characteristic tolerance band including adjustment factors:
        1) If manufacturer's curves are not available, trip times shall not exceed the value shown in NETA ATS tables.
    f. Short-time pickup values shall be as specified, and the trip characteristic shall not exceed manufacturer's published time-current tolerance band.
    g. Ground fault pickup values shall be as specified, and the trip characteristic shall not exceed manufacturer's published time-current tolerance band.
    h. Instantaneous pickup values shall be as specified and within manufacturer's published tolerances:
        1) Refer to NETA ATS tables in the absence of manufacturer's published data.
    i. Pickup values and trip characteristics shall be within manufacturer's published tolerances.
    j. Determine energy reducing maintenance switch pickup value by primary current injection.
    k. Breaker open, close, trip, trip-free, anti-pump, and auxiliary features shall function as designed.
    l. The charging mechanism shall operate in accordance with manufacturer's published data.

G. Instrument transformers - current transformers:
    1. Visual and mechanical inspection:
        a. Compare equipment nameplate data with the Contract Documents.
        b. Inspect physical and mechanical condition.
        c. Verify correct connection of transformers with system requirements.
        d. Verify that adequate clearances exist between primary and secondary circuit wiring.
        e. Verify the unit is clean.
        f. Inspect bolted electrical connections for high resistance using one of the following methods:
            1) Use of low-resistance ohmmeter.
            2) Verify tightness of accessible bolted electrical connections by calibrated torque wrench method:
                a) Refer to manufacturer's instructions for proper foot-pound levels or NETA ATS tables.
        g. Verify that all required grounding and shorting connections provide contact.
        h. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
    2. Electrical tests:
        a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter.
        b. Perform insulation-resistance test of each current transformer and its secondary wiring with respect to ground at 1,000 VDC for 1 minute:
            1) For solid state devices that cannot tolerate the applied voltage, follow the manufacturer's recommendation.
        c. Perform a polarity test of each current transformer in accordance with IEEE C57.13.1.
        d. Perform a ratio verification test using the voltage or current method in accordance with IEEE C57.13.1.
        e. Perform an excitation test on current transformers used for relaying applications in with accordance with IEEE C57.13.1.
        f. Measure current circuit burdens at transformer terminals in accordance with IEEE C57.13.1.
        g. When applicable perform insulation-resistance tests on the primary winding with the secondary grounded:
            1) Test voltages shall be in accordance with NETA ATS tables.
        h. Perform power-factor or dissipation-factor tests in accordance with test equipment manufacturer's published data.
        i. Verify that current transformer secondary circuits are grounded and have only 1 grounding point in accordance with IEEE C57.13.3:
            1) That grounding point should be located as specified by the Engineer in the Contract Documents.
    3. Test values:
        a. Compare bolted connection resistance values to values of similar connections:
            1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
        b. Bolt-torque levels shall be in accordance with manufacturer's published data:
            1) Refer to NETA ATS tables in the absence of manufacturer's published data.

c. Insulation-resistance values of instrument transformers shall be in accordance with manufacturer's published data:
    1) Refer to NETA ATS tables in the absence of manufacturer's published data.
d. Polarity results shall agree with transformer markings.
e. Ratio errors shall be in accordance with IEEE C57.13.
f. Excitation results for current transformers shall match the curve supplied by the manufacturer or be in accordance with IEEE C57.13.1.
g. Measured burdens shall be compared to instrument transformer ratings.
h. If no evidence of distress or insulation failure is observed by the end of the total time of voltage application during the dielectric withstand test, the primary winding is considered to have passed the test.
i. Power-factor or dissipation-factor values shall be compared to manufacturer's published data:
    1) In the absence manufacturer's published data, use the test equipment manufacturer's published data.
j. Test results shall indicate that the circuits have only 1 grounding point.

H. Metering devices, microprocessor based:
1. Visual and mechanical inspection:
    a. Compare equipment nameplate data with the Contract Documents.
    b. Inspect meters and cases for physical damage.
    c. Clean front panel.
    d. Verify tightness of electrical connections.
    e. Record the following:
        1) Model number.
        2) Serial number.
        3) Firmware revision.
        4) Software revision.
        5) Rated control voltage.
    f. Verify operation of display and indicating devices.
    g. Record passwords.
    h. Verify the unit is grounded in accordance with the manufacturer's instructions.
    i. Set all required parameters including instrument transformer ratios, system type, frequency, power demand methods/intervals, and communications requirements.
2. Electrical tests:
    a. Apply voltage or current as appropriate to each analog input and verify correct measurement and indication.
    b. Confirm correct operation and setting of each auxiliary input/output feature including mechanical relay, digital and analog.
    c. After initial system energization, confirm measurements and indications are consistent with loads present.
3. Test values:
    a. Nameplate data shall match the Contract Documents.
    b. Tightness of electrical connections shall ensure a low resistance connection.
    c. Display and indicating devices shall operate per manufacturer's published data.
    d. Measurement and indication of applied voltages and currents shall be within the manufacturer's published tolerances for accuracy.

e. All auxiliary input/output features shall operate per settings and manufacturer's published data.
f. Measure and indications shall be consistent with energized system loads.

I. Grounding systems:
1. Visual and mechanical inspection:
a. Inspect ground system for compliance with the Contract Documents, and the NEC.
b. Inspect physical and mechanical condition.
c. Inspect bolted electrical connections for high resistance using one of the following methods:
1) Use of low-resistance ohmmeter.
2) Verify tightness of accessible bolted electrical connections by calibrated torque wrench method:
a) Refer to manufacturer’s instructions for proper foot-pound levels or NETA ATS tables.
d. Inspect anchorage.
2. Electrical tests:
a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter.
b. Perform fall of potential test or alternative test in accordance with IEEE 81 on the main grounding electrode or system.
c. Perform point-to-point tests to determine the resistance between the main grounding system and all major electrical equipment frames, the system neutral and any derived neutral points.
3. Test values:
a. Grounding system electrical and mechanical connections shall be free of corrosion.
b. Compare bolted connection resistance values to values of similar connections:
1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
c. Bolt-torque levels shall be in accordance with manufacturer’s published data:
1) Refer to NETA ATS tables in the absence of manufacturer’s published data.
d. The resistance between the main grounding electrode and ground shall be as specified in Section 16060 - Grounding and Bonding.
e. Investigate point-to-point resistance values that exceed 0.5 ohm.

J. Rotating machinery, ac induction motors:
1. Visual and mechanical inspection:
a. Compare equipment nameplate information with the Contract Documents.
b. Inspect physical and mechanical condition.
c. Inspect anchorage, alignment, and grounding.
d. Inspect air baffles, filter media, cooling fans, slip rings, brushes, and brush rigging
e. Inspect bolted electrical connections for high resistance using one or more of the following methods:
1) Use of low-resistance ohmmeter.

2) Verify tightness of accessible bolted electrical connections by calibrated torque wrench method:
a) Refer to manufacturer's instructions for proper foot-pound levels or NETA ATS tables.

f. Verify correct application of appropriate lubrication and lubrication systems.
g. Verify that resistance temperature detector (RTD) circuits conform to that indicated on the Drawings.

2. Electrical tests - AC Induction:
a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter.
b. Perform insulation-resistance test in accordance with IEEE 43:
1) On motors 200 horsepower and smaller, test duration shall be 1 minute. Calculate dielectric absorption ratio for 60/30 second periods.
2) On motors larger than 200 horsepower, test duration shall be 10 minutes. Calculate polarization index.
c. On machines rated at 2,300 volts and greater, perform dielectric withstand voltage tests in accordance with:
1) IEEE 95 for dc dielectric withstand voltage tests.
2) NEMA MG1 for ac dielectric withstand voltage tests.
d. Perform phase-to-phase stator resistance test on machines rated at 2,300 volts and greater.
e. Perform insulation-resistance test on insulated bearings in accordance with manufacturer's published data.
f. Test surge protection devices as specified in this Section.
g. Test motor starter as specified in this Section.
h. Perform resistance tests on resistance temperature detector (RTD) circuits.
i. Verify operation of motor space heater, if applicable.
j. Perform vibration test while machine is running under load.

3. Test values:
a. Inspection:
1) Air baffles shall be clean and installed in accordance with the manufacturer's published data.
2) Filter media shall be clean and installed in accordance with the manufacturer's published data.
3) Cooling fans shall operate.
4) Slip ring alignment shall be within manufacturer's published tolerances.
5) Brush alignment shall be within manufacturer's published tolerances.
6) Brush rigging shall be within manufacturer's published tolerances.
b. Compare bolted connection resistance values to values of similar connections:
1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
c. Bolt-torque levels shall be in accordance with manufacturer's published data:
1) Refer to NETA ATS tables in the absence of manufacturer's published data.
d. Air-gap spacing and machine alignment shall be in accordance with manufacturer's published data.

e. The recommended minimum insulation-resistance ($IR_{1\ min}$) test results in megohms shall be in accordance with NETA ATS tables.
   1) The polarization index value shall not be less than 2.0.
   2) The dielectric absorption ratio shall not be less than 1.4.
f. If no evidence of distress or insulation failure is observed by the end of the total time of voltage application during the dielectric withstand test, the test specimen is considered to have passed the test.
g. Investigate phase-to-phase stator resistance values that deviate by more than 5 percent.
h. Power factor or dissipation factor values shall be compared to manufacturer's published data:
   1) In the absence of manufacturer's published data, compare values of similar machines.
i. Tip-up values shall indicate no significant increase in power factor.
j. If no evidence of distress, insulation failure, or waveform nesting is observed by the end of the total time of voltage application during the surge comparison test, the test specimen is considered to have passed the test.
k. Bearing insulation-resistance measurements shall be within manufacturer's published tolerances:
   1) In the absence of manufacturer's published data, compare values of similar machines.
l. Test results of surge protection devices shall be as specified in this Section.
m. Test results of motor starter equipment shall be as specified in this Section.
n. RTD circuits shall conform to the design intent and machine protection device manufacturer's published data.
o. Heaters shall be operational.
p. Vibration amplitudes of the uncoupled and unloaded machine shall be in accordance with manufacturer's published data:
   1) In the absence of manufacturer's published data, vibration amplitudes shall not exceed values in NETA ATS tables.
   2) If values exceed those in the NETA ATS tables, perform a complete vibration analysis.

K. Motor starters, low voltage:
   1. Visual and mechanical inspection:
      a. Compare equipment nameplate information with the Contract Documents.
      b. Inspect physical and mechanical condition.
      c. Inspect anchorage, alignment, and grounding.
      d. Verify the unit is clean.
      e. Inspect contactors:
         1) Verify mechanical operation.
         2) Verify contact gap, wipe, alignment, and pressure is in accordance with manufacturer's published data.
      f. Motor-running protection:
         1) Verify overload element rating/motor protection settings are correct for its application.
         2) If motor running protection is provided by fuses, verify correct fuse rating.

g. Inspect bolted electrical connections for high resistance using one of the following methods:
    1) Use of low-resistance ohmmeter.
    2) Verify tightness of accessible bolted electrical connections by calibrated torque wrench method:
        a) Refer to manufacturer's instructions for proper foot-pound levels or NETA ATS tables.
h. Lubrication requirements:
    1) Verify appropriate lubrication on moving current-carrying parts.
    2) Verify appropriate lubrication on moving and sliding surfaces.

2. Electrical tests:
    a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter.
    b. Perform insulation-resistance tests for 1 minute on each pole, phase-to-phase and phase to ground with the starter closed, and across each open pole for 1 minute:
        1) Test voltage shall be in accordance with manufacturer's published data.
        2) Refer to NETA ATS tables in the absence of manufacturer's published data.
    c. Test motor protection devices in accordance with manufacturer's published data.
    d. Test circuit breakers as specified in this Section.
    e. Perform operational tests by initiating control devices.
3. Test values:
    a. Compare bolted connection resistance values to values of similar connections:
        1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
    b. Bolt-torque levels shall be in accordance with manufacturer's published data:
        1) Refer to NETA ATS tables in the absence of manufacturer's published data.
    c. Insulation-resistance values shall be in accordance with manufacturer's published data:
        1) Refer to NETA ATS tables in the absence of manufacturer's published data.
        2) Investigate values of insulation-resistance less than the allowable minimum.
    d. Motor protection parameters shall be in accordance with manufacturer's published data.
    e. Circuit breaker test results as specified in this Section.
    f. Control devices shall perform in accordance with system design requirements.

L. Motor control centers, low voltage:
1. Visual and mechanical inspection:
    a. Compare equipment nameplate data with the Contract Documents.
    b. Inspect physical and mechanical condition.
    c. Inspect anchorage, alignment, grounding and required clearances.
    d. Verify the unit is clean and all shipping bracing, loose parts, and documentation shipped inside cubicles have been removed.

e. Verify that circuit breaker/fuse sizes and types correspond to the approved submittals and the coordination study.
f. Verify that current and voltage transformer ratios correspond to those indicated on the Drawings.
g. Verify that wiring connections are tight and that wiring is secure to prevent damage during routine operation of moving parts.
h. Inspect bolted electrical connections for high resistance using one of the following methods:
    1) Use of low-resistance ohmmeter.
    2) Verify tightness of accessible bolted electrical connections by the calibrated torque wrench method:
        a) Refer to manufacturer's instructions for proper foot-pound levels or NETA ATS tables.
i. Verify operation and sequencing of interlocking systems:
    1) Attempt closure on locked-open devices.
    2) Attempt to open locked-closed devices.
    3) Make/attempt key-exchanges in all positions.
j. Lubrication requirements:
    1) Verify appropriate lubrication on moving current-carrying parts.
    2) Verify appropriate lubrication on moving and sliding surfaces.
k. Inspect insulators for evidence of physical damage or contaminated surfaces.
l. Verify correct barrier and shutter installation and operation.
m. Exercise all active components.
n. Inspect all indicating devices for correct operation.
o. Verify that filters are in place and/or vents are clear.
p. Perform visual and mechanical inspection of instrument transformers as specified in this Section.
q. Perform visual and mechanical inspection of surge arresters as specified in this Section.
r. Inspect control power transformers:
    1) Inspect for physical damage, cracked insulation, broken leads, and tightness of connections, defective wiring, and overall general condition.
    2) Verify that primary and secondary fuse/circuit breaker ratings match the submittal drawings.
    3) Verify correction functioning of grounding contacts.
s. Perform visual and mechanical inspection of all motor control center components as specified in this Section.

2. Electrical tests:
    a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter.
    b. Perform insulation-resistance tests on each bus section, phase-to-phase and phase-to-ground for 1 minute:
        1) Perform test in accordance with NETA ATS tables.
    c. Perform a dielectric withstand test on each bus section, each phase to ground with phases not under test grounded, in accordance with manufacturer's published data or NETA ATS tables. Apply the test voltage for 1 minute.

d. Perform ground-resistance tests:
    1) Perform point-to-point tests to determine the resistance between the main grounding system and all major electrical equipment frames, system neutral and derived neutral points.
e. Control power transformers:
    1) Perform insulation-resistance tests, winding-to-winding and winding-to-ground:
        a) Test voltages shall be in accordance with NETA ATS tables or as specified by the manufacturer.
    2) Perform secondary wiring integrity test:
        a) Disconnect transformer at secondary terminals and connect secondary wiring to a rated secondary voltage source:
            (1) Verify correct potential at all devices.
    3) Verify correct secondary voltage by energizing primary winding with system voltage:
        a) Measure secondary voltage with the secondary wiring disconnected.
f. Verify operation of space heaters.
g. Perform electrical tests of all motor control center components as specified in this Section.

3. Test values:
    a. Compare bolted connection resistance values to values of similar connections:
        1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
    b. Bolt-torque levels shall be in accordance with manufacturer's published data:
        1) Refer to NETA ATS tables in the absence of manufacturer's published data.
    c. Insulation-resistance values for bus and control power transformers shall be in accordance with manufacturer's published data:
        1) Refer to NETA ATS tables in the absence of manufacturer's published data.
        2) Investigate insulation values less than the allowable minimum.
        3) Do not proceed with dielectric withstand voltage tests until insulation-resistance values are above minimum values.
    d. Bus insulation shall withstand the over potential test voltage applied.
    e. Instrument transformer test values shall be as specified in this Section.
    f. Investigate grounding system point-to-point resistance values that exceed 0.5 ohm.
    g. Meter accuracy shall be in accordance with manufacturer's published data.
    h. Control power transformers:
        1) Insulation-resistance values of control power transformers shall be in accordance with manufacturer's published data:
            a) Refer to NETA ATS tables in the absence of manufacturer's published data.
            b) Investigate insulation values less than the allowable minimum.
            c) Do not proceed with dielectric withstand voltage tests until insulation-resistance values are above minimum values.

2) Secondary wiring shall be as indicated on the Drawings and specified in the Specifications.
3) Secondary voltage shall be as indicated on the Drawings.

i. Heaters shall be operational.
j. Test values for motor control center components shall be as specified in this Section.

M. Variable frequency drive systems:
1. Visual and mechanical inspection:
a. Compare equipment nameplate data with the Contract Documents.
b. Inspect physical and mechanical condition.
c. Inspect anchorage, alignment, and grounding.
d. Verify the unit is clean.
e. Ensure vent path openings are free from debris and that heat transfer surfaces are clean.
f. Verify correct connections of circuit boards, wiring, disconnects, and ribbon cables.
g. Motor running protection:
1) Verify drive overcurrent setpoints are correct for their application.
2) If drive is used to operate multiple motors, verify individual overload element ratings are correct for their application.
3) Apply minimum and maximum speed setpoints. Verify setpoints are within limitations of the load coupled to the motor.
h. Inspect bolted electrical connections for high resistance using one of the following methods:
1) Use of low-resistance ohmmeter.
2) Verify tightness of accessible bolted electrical connections by the calibrated torque wrench method:
a) Refer to manufacturer's instructions for proper foot-pound levels or NETA ATS tables.
i. Verify correct fuse sizing in accordance with manufacturer's published data.
j. Perform visual and mechanical inspection of input circuit breaker as specified in this Section.
2. Electrical tests:
a. Perform resistance measurements through bolted connections with low resistance ohmmeter.
b. Test the motor overload relay elements by injecting primary current through the overload circuit and monitoring trip time of the overload element.
c. Test for the following parameters in accordance with relay calibration procedures specified in NETA ATS or as recommended by the manufacturer:
1) Input phase loss protection.
2) Input overvoltage protection.
3) Output phase rotation.
4) Overtemperature protection.
5) Direct current overvoltage protection.
6) Overfrequency protection.
7) Drive overload protection.
8) Fault alarm outputs.

d. Perform continuity tests on bonding conductors as specified in accordance with NETA ATS.
e. Perform start-up of drive in accordance with manufacturer's published data. Calibrate drive to the system's minimum and maximum speed control signals.
f. Perform operational tests by initiating control devices:
1) Slowly vary drive speed between minimum and maximum. Observe motor and load for unusual noise or vibration.
2) Verify operation of drive from remote start/stop and speed control signals.
g. Perform electrical tests of input circuit breaker as specified in this Section.
h. Measure fuse resistance.

3. Test values:
a. Compare bolted connection resistance values to values of similar connections:
1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
b. Bolt-torque levels shall be in accordance with manufacturer's published data:
1) Refer to NETA ATS tables in the absence of manufacturer's published data.
c. Overload test trip times at 300 percent of overload element rating shall be in accordance with manufacturer's published time-current curve.
d. Test values for input circuit breaker shall be as specified in this Section.
e. Relay calibration results shall be as specified in this Section.
f. Continuity of bonding conductors shall be in accordance with NETA ATS.
g. Control devices shall perform in accordance with system requirements.
h. Operational tests shall conform to system design requirements.
i. Investigate fuse resistance values that deviate from each other by more than 15 percent.

N. Surge arresters, low-voltage:
1. Visual and mechanical inspection:
a. Compare equipment nameplate data with the Contract Documents.
b. Inspect physical and mechanical condition.
c. Inspect anchorage, alignment, grounding, and clearances.
d. Verify the arresters are clean.
e. Inspect bolted electrical connections for high resistance using one of the following methods:
1) Use of low-resistance ohmmeter.
2) Verify tightness of accessible bolted electrical connections by the calibrated torque wrench method:
a) Refer to manufacturer's instructions for proper foot-pound levels or NETA ATS tables.
f. Verify that the ground lead on each device is individually attached to a ground bus or ground electrode.
g. Verify that stroke counter is correctly mounted and electrically connected, if applicable.
h. Record stroke counter reading.
2. Electrical tests:
a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter.

b. Perform an insulation-resistance test on each arrester, phase terminal-to-ground:
    1) Apply voltage in accordance with manufacturers published data.
    2) Refer to NETA ATS tables in the absence of manufacturer's published data.
c. Test grounding connection as specified in this Section.

3. Test values:
    a. Compare bolted connection resistance values to values of similar connections:
        1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
    b. Bolt-torque levels shall be in accordance with manufacturer's published data:
        1) Refer to NETA ATS tables in the absence of manufacturer's published data.
    c. Insulation-resistance values shall be in accordance with manufacturer's published data:
        1) Refer to NETA ATS tables in the absence of manufacturer's published data.
        2) Investigate insulation values less than the allowable minimum.
    d. Resistance between the arrester ground terminal and the ground system shall be less than 0.5 ohm.

O. Uninterruptible power systems:
1. All testing and settings shall be conducted by the UPS manufacturer's field engineer:
    a. Test the complete operation of the static transfer system.
    b. Test the complete operation of the static bypass system.
    c. Test the complete operation of the maintenance bypass system.
2. Visual and mechanical inspection:
    a. Compare equipment nameplate data with the Contract Documents.
    b. Inspect physical and mechanical condition.
    c. Inspect anchorage, alignment, grounding, and required clearances.
    d. Verify that fuse sizes and types correspond to that indicated on the Drawings.
    e. Verify the unit is clean.
    f. Test all electrical and mechanical interlock systems for correct operation and sequencing.
    g. Inspect bolted electrical connections for high resistance using one of the following methods:
        1) Use of low-resistance ohmmeter.
        2) Verify tightness of accessible bolted electrical connections by calibrated torque wrench method:
            a) Refer to manufacturer's instructions for proper foot-pound levels or NETA ATS tables.
    h. Verify operation of forced ventilation.
    i. Verify that filters are in place and/or vents are clear.
3. Electrical tests:
    a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter.
    b. Test static transfer from inverter to bypass and back. Use normal load, if possible.

c. Set free running frequency of oscillator.
d. Test dc undervoltage trip level on inverter input breaker. Set according to manufacturer's published data.
e. Test alarm circuits.
f. Verify synchronizing indicators for static switch and bypass switches.
g. Perform electrical tests for UPS system breakers as specified in this Section.
h. Perform electrical tests for UPS system automatic transfer switches as specified in this Section.
i. Perform electrical tests for UPS system batteries as specified in this Section.
j. Perform electrical tests for UPS rotating machinery as specified in this Section.

4. Test values:
   a. Electrical and mechanical interlock systems shall operate in accordance with system design requirements.
   b. Compare bolted connection resistance values to values of similar connections:
      1) Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
   c. Bolt-torque levels shall be in accordance with manufacturer's published data:
      1) Refer to NETA ATS tables in the absence of manufacturer's published data.
   d. Static transfer shall function in accordance with manufacturer's published data.
   e. Oscillator free running frequency shall be within manufacturer's published tolerances.
   f. Direct current undervoltage shall trip inverter input breaker.
   g. Alarm circuits shall operate in accordance with design requirements.
   h. Synchronizing indicators shall operate in accordance with design requirements.
   i. Breaker performance shall be as specified in this Section.
   j. Automatic transfer switch performance shall be as specified in this Section.
   k. Battery test results shall be as specified in this Section.
   l. Rotating machinery performance shall be as specified in this Section.

P. Fiber-optic cables:
   1. Visual and mechanical inspection:
      a. Compare cable, connector, and splice data with the Contract Documents.
      b. Inspect cable and connections for physical and mechanical damage.
      c. Verify that all connectors and splices are correctly installed.
   2. Optical tests:
      a. Perform cable length measurement, fiber fracture inspection, and construction defect inspection using an optical time domain reflectometer (OTDR):
         1) OTDR test performed on fiber cables less than 100 meters shall be performed with the aid of a launch cable.
         2) Adjust OTDR pulse width settings to a maximum setting of 1/1,000th of the cable length or 10 nanoseconds.

b. Perform connector and splice integrity test using an optical time domain reflectometer.
c. Perform cable attenuation loss measurement with an optical power loss test set:
    1) Perform attenuation tests with an Optical Loss Test Set capable and calibrated to show anomalies of 0.1 dB as a minimum.
    2) Test multimode fibers at 850 nanometer and 1,300 nanometer.
    3) Test single mode fibers at 1,310 nanometer and 1,550 nanometer.
d. Perform connector and splice attenuation loss measurement from both ends of the optical cable with an optical power loss test set:
    1) At the conclusion of all outdoor splices at 1 location, and before they are enclosed and sealed, all splices shall be tested with OTDR at the optimal wavelengths (850 and 1,300 for multimode, 1,310 and 1,550 for single mode), in both directions. The splices shall be tested for integrity as well as attenuation.
e. Perform fiber links integrity and attenuation tests using each link shall be an OTDR and an Optical Loss Test Set:
    1) OTDR traces shall be from both directions on each fiber at the 2 optimal wavelengths, 850 nanometer, and 1,300 nanometer for multimode fibers.
    2) Optical loss testing shall be done with handheld test sets in 1 direction at the 2 optimal wavelengths for the appropriate fiber type. Test equipment shall equal or exceed the accuracy and resolution of Agilent/HP 8147 high performance OTDR.

3. Test values:
    a. Cable and connections shall not have been subjected to physical or mechanical damage.
    b. Connectors and splices shall be installed in accordance with industry standards.
    c. The optical time domain reflectometer signal should be analyzed for excessive connection, splice, or cable backscatter by viewing the reflected power/distance graph.
    d. Attenuation loss measurement shall be expressed in dB/km. Losses shall be within the manufacturer's recommendations when no local site specifications are available.
    e. Individual fusion splice losses shall not exceed 0.1 dB. Measurement results shall be recorded, validated by trace, and filed with the records of the respective cable runs.

Q. Copper Ethernet cable installation testing:
1. Pre-installation:
    a. Immediately prior to installation, verify that cable to be installed matches that which was submitted.
    b. Verify that no damage has been done to the cable during shipping or handling.
    c. Inspect cable for physical and mechanical damage.
    d. Engineer shall be notified if a cable fails to meet inspection and the cable shall not be installed unless otherwise directed by the Engineer.
2. Post-installation:
    a. Prior to copper Ethernet cable termination, perform cable end-to-end continuity validation testing on all installed cables, conductor pairs and

cable shields using toner and probe kit. Any cable that fails testing shall be removed and replaced.

b. Inspect equipment outlet connectors for damage and ensure connectors hold tightly in field device ports.

3. Test equipment:
   a. Certification equipment used for the testing shall be capable of verifying twisted pair cable installation with end-to-end continuity testing.
   b. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
   c. Manufacturers: The following or equal:
      1) Fluke Networks, IntelliTone Pro 200 Toner and Probe Kit, MT-8200-60-KIT.
   d. Refer to Section 17950(40_80_01) - Commissioning for Instrumentation and Controls for Permanent Link testing requirements.

3.08 FIELD QUALITY CONTROL (NOT USED)

3.09 ADJUSTING (NOT USED)

3.10 CLEANING

A. General cleaning requirements:
   1. As specified in Section 16050 - Common Work Results for Electrical.
   2. After the acceptance tests have been completed, dispose of all testing expendables, vacuum all cabinets, and sweep clean all surrounding areas.

3.11 PROTECTION

A. General protection requirements:
   1. As specified in Section 16050 - Common Work Results for Electrical.

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 17100

CONTROL STRATEGIES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Contractor-developed loop description submittal requirements.
   2. General programming requirements.
   3. Common control functions:
      a. General control and monitoring functions to be provided throughout the PCS system.
         1) These requirements apply to all systems, and supplement the specific loop descriptions in Section 17101 - Specific Control Strategies and information indicated on the Drawings.

1.02 REFERENCES

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.03 DEFINITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Hardwired control: Control circuitry that does not utilize software to initiate functionality.

C. Hardwired interlocks: A safety or protective feature that will interrupt operation of the equipment in all operating modes with no required operator intervention.

D. Software interlocks: A safety or protective feature that will interrupt operation of the equipment when the PLC has control.

E. Slew rate: Rate of change in respect to time.

F. Clamp: Imposed upper and lower limits on setpoints to eliminate entries outside the allowable control parameters.

G. Watchdog timer: Timers imposed to test components such as discrete I/O to verify the health of the card.

1.04 SYSTEM DESCRIPTION (NOT USED)

1.05 SUBMITTALS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.06 QUALITY ASSURANCE (NOT USED)

1.07 DELIVERY, STORAGE, AND HANDLING (NOT USED)

1.08 PROJECT OR SITE CONDITIONS (NOT USED)

1.09 SEQUENCING (NOT USED)

1.10 SCHEDULING (NOT USED)

1.11 WARRANTY

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.12 SYSTEM START-UP (NOT USED)

1.13 OWNER'S INSTRUCTIONS (NOT USED)

1.14 COMMISSIONING (NOT USED)

1.15 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURERS (NOT USED)

2.02 EXISTING PRODUCTS (NOT USED)

2.03 MATERIALS (NOT USED)

2.04 MANUFACTURED UNITS (NOT USED)

2.05 EQUIPMENT (NOT USED)

2.06 COMPONENTS (NOT USED)

2.07 ACCESSORIES (NOT USED)

2.08 MIXES (NOT USED)

2.09 FABRICATION (NOT USED)

2.10 FINISHES (NOT USED)

2.11 SOURCE QUALITY CONTROL (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION (NOT USED)

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. General programming requirements:
   1. Use variable names or aliases derived from tag and loop identification on the P&IDs for all process values.
      a. Submit names for Owner approval.
      b. Unless otherwise noted, utilize floating-point format for all PLC algorithms and calculations.
      c. Provide PLC logic to convert raw input values into engineering units in a floating-point format.
   2. Store all adjustable parameters in the PLC, and configure so that an operator with sufficient security access can change the parameters from the LOI or HMI. Update and display the current value at all locations, regardless of where the last change was made.
   3. Reusable PLC code blocks:
      a. Owner will provide standard user defined function blocks (UDFBs) and user-defined types (UDTs) for PLC programming. Utilize these standards wherever possible in PLC programming.
      b. Develop and use new custom user defined function blocks (UDFBs) and user defined types (UDTs) where appropriate. One instance of each standard code block shall reside in each PLC and shall be referenced in main routines and subroutines.
      c. New code blocks that the Contractor would like to use as a standard shall be submitted to Owner for review and approval.
      d. Provide complete library of custom code blocks to Owner as part of O&M documentation.
   4. Documentation:
      a. All control logic shall be completely annotated including all rungs, instructions, and tags.
      b. Each routine shall have a title and a detailed description of the control strategy represented by the control logic. Where parameters are passed to the routine, all parameters shall be defined in the routine description.
      c. Analog tag descriptions representing process variables shall include the engineering unit range of the analog variable.
      d. Digital tag descriptions shall include the On and Off state labels.
      e. Complete, grammatically correct sentences and terminology, consistent with water treatment processes, shall be utilized in the development of rung and routine descriptions.
      f. All equations developed in the process logic shall be fully documented in the rung or routine description. A description of each constant and variable utilized in the equation shall be defined including engineering units.
   5. Program slew rates for setpoints as needed to limit the effect of updated setpoints on the process:
      a. Provide for control setpoints and manual speed and position selections.

b. Store new setpoints in one register, and gradually ramp the actual setpoint register at the slew rate until it reaches the new value.
c. Provide operator access to change slew rates from the HMI.

6. Saved setpoints:
   a. Provide an operator selection to save all setpoint values.
   b. Where possible use a DFB or AOI to provide an operator selection to restore all setpoints to the initial start-up value.
   c. Provide an operator selection to restore all setpoints to the last saved value.
7. Store a copy of all adjustable parameters and accumulated and integrated totals in PCS:
   a. Upon re-loading of the PLC program, re-load these values to the PLC from PCS or processor memory card.
   b. PLCs provide a minimum 2 week data storage to provide for data accumulation and later communication to the Historian in the event of a network interruption.
8. Calculated values:
   a. Program calculations such that division by zero errors cannot occur.
   b. Prevent calculations from generating values that exceed the limits of the equipment or data type structures (integers) internal to the PLC.
   c. Configure counting functions (start counts and operation counts) to allow a minimum of 10,000 counts, and to roll-over to zero at an even decimal interval (1 followed by 4 or more zeros).
   d. Configure integrating functions to accurately accumulate the maximum rate from the instrument/equipment (totalizers, run time meters) for 30 years. Utilize manufacturer AOI/DFBs etc. where possible.
9. Timers:
   a. Provide programmable settling and proving timers in control sequences as required for starting and stopping of equipment to allow the process to settle down before proceeding with any additional control functions.
      1) The settling timers may be overridden by setting the timer to 0 seconds.
10. Control Panel status:
    a. Design the PLC system to function as a stand-alone unit that performs all of the control functions described in this Section completely independent from the functions of the PCS system PC-based operator interfaces:
       1) Failure of the PCS system shall not impact data acquisition, control, scaling, alarm checking, or communication functions of the PLC.
    b. Furnish a minimum of 1 screen that depicts the status of all enclosures containing PLCs, communication equipment, UPS or I/O in the control system, including but not limited to the following:
       1) PLC cabinet over-temperatures from high temperature switch.
       2) Intrusion status on all enclosures equipped with intrusion switches.
       3) AC power failure:
          a) Monitor ahead of UPS.
       4) DC power supply failure:
          a) For redundant power supplies, alarm when either power supply or the diode bridge fails.
       5) UPS failure signal.
       6) UPS Low Battery signal.
       7) Digital bus network Coupler and or Gateway failure signal.
       8) Ethernet Switch failure signal.

11. PLC system communication status:
    a. Furnish a minimum of 1 screen to display all communication errors and status within the PCS:
        1) Communication between PCS and PLCs, PLC to PLC, PLC to RIO and PLC and or PCS to VCP.
        2) 4-20 mA HART interface cards.
        3) Digital bus network status:
            a) Profibus scanners.
        4) Modbus Gateway modules.
        5) Display status of each node, and summary of failures over the past 60 minutes.
    b. Generate a communications alarm if any communication fault is detected or there is no response from a node for more than a user specified time.
    c. In the event of communications loss:
        1) Continue normal operation at each PLC.
        2) Where control parameters are received over a communications link:
            a) If a link fails where process elements use the remote value for closed-loop control, hold operating status, speed and position, of the process elements at their last state before the communication alarm, unless other I/O local to that PLC indicates shutdown or over-ride conditions:
                (1) Ensure that the operator can control the process using PCI\S HAND mode at the local LOI.
            b) If a link fails where process elements use the remote value to determine setpoints, continue to operate using the last value received:
                (1) Provide a manual over-ride entry at the local LOI to allow an operator to enter a different value for any such remote signal.
                (2) Generate an alarm whenever an over-ride value is in use.

C. Common control functions:
    1. Incorporate common control functions into all control loops and devices and into the control programming, whether or not specifically shown in the specific control descriptions or elsewhere in the Contract Documents.
    2. Alarms:
        a. Generate alarms within the PLC logic.
        b. Indicate alarms at the LOI and HMI. Enable acknowledgement from either the HMI or the LOI.
        c. Generate high, high-high, low, and low-low level alarms where indicated:
            1) Provide an alarm reset deadband for each analog value to prevent excessive repeated alarms.
            2) Provide logic and timers to inhibit analog alarms based on process events. For example, inhibit low flow alarms when a pump is stopped, or has not been running long enough to establish flow.
        d. Flash all alarm and fail conditions and their respective indicators on the PCS graphic screens and local indicating lights until the condition is acknowledged by the operator, even if the alarm condition is no longer present.
        e. Once the alarm is acknowledged by an operator, display alarm conditions in a steady state (not flashing) while the alarm condition is still present:
            1) Flash with a cycle rate of 1/2 second on and 1/2 second off.

f. Once the alarm has been cleared and the operator has acknowledged the alarm or fail condition, turn the graphic alarm indicator off.
g. For all alarms that do not have inherent timers, provide an operator-adjustable proving timer to limit nuisance alarms, continuously adjustable from zero seconds to 100 minutes. The initial setting of proving timers shall be zero seconds:
    1) The PLC shall start the timer when it first detects an alarm condition, and shall only activate the alarm after the timer has expired.
    2) If the alarm condition clears while the timer is running, the timer shall reset, and the alarm shall not be activated.
h. Use interlocks and proving timers to prevent alarms from operating due to power loss, except for loss of power alarms.
i. Furnish an alarm silence pushbutton at each PCM, LOI, or LCP with an audible alarm to signal the PLC to turn off the audible alarm until the next alarm occurs.
j. Lamp test: Furnish lamp test pushbuttons at each control panel with more than 10 pilot lights, that illuminates all pilot lights on the panel:
    1) The lamp test may sequence through blocks of lights.
    2) Minimum on time for each lamp during lamp test 15 seconds.
k. Horns and Beacons:
    1) Activate PCM horn and beacon on all critical alarms and on other alarms as defined by the Facility Alarm Philosophy.
    2) Deactivate PCM horn and beacon when PCM reset pushbutton is activated.
    3) Silence PCM horn when PCM silence pushbutton is activated.
l. Dual analog instruments:
    1) For applications where 2 or more analog instruments are measuring the same process variable:
        a) Generate an operator adjustable percent deviation alarm.
        b) Allow operator to take each instrument out of service when an instrument is out of service.

3. Where a reset is shown for counts, totals and times maintained in the PLC:
    a. Provide a reset selection on the HMI screen that displays the value.
    b. Provide a preset function on the HMI to allow an operator-entered value to become the current accumulated total.
    c. Limit access to the reset and preset functions to operators with suitable security level.
    d. Log the value before reset, operator, time, and date of reset in the PCS archive.
    e. Log the value before preset, preset value, operator, time, and date of preset in the PCS archive.
4. Where start counts are indicated on the Drawings, or required in this Section, count starts for each piece of equipment (off to on transitions of running status) in the PLC:
    a. Display total starts on PCS screens, and provide a reset function.
    b. Where indicated, calculate number of starts for each day:
        1) Display current day and previous day starts on PCS displays.
        2) Do not reset daily start count when overall count is reset.
        3) Archive starts for each day through PCS.

5. Where run time accumulation is indicated on the Drawings, or required in this Section, integrate accumulated run time to the nearest 0.1 hour whenever the running status input indicates that the equipment is running:
    a. Display total run time in hours on PCS screens.
    b. Where indicated, calculate total run time for each day:
        1) Display current day and previous day run time on the HMI to the nearest 0.1 hour.
        2) Do not reset daily run time when overall time is reset.
        3) Archive run time for each day through PCS.
6. For all monitored analog values:
    a. Convert all values to engineering units in floating-point format within the PLC.
    b. Maintain trends in PCS.
    c. Flows and Weights:
        1) Totalize flows in the PLC logic.
        2) Where totalized flows are input to a discrete input, count input pulses and multiply by the volume per pulse.
        3) Where no totalizer input is shown, integrate the analog input over time.
        4) Display totals on the HMI and LOI.
        5) Archive totals to the historical database through PCS.
    d. Generate an alarm whenever an over-ride value is in use.
7. Analog data processing:
    a. Engineering units conversion:
        1) Use engineering units for all analog point values. Convert analog inputs to engineering units.
    b. Analog magnitude checking:
        1) Provide upper and lower limits to prevent operator-entered values (setpoints, etc.) from falling outside acceptable limits.
    c. Analog value quality:
        1) Monitor analog values received at each PLC from analog inputs or communications from another PLC or RIO specific to critical analog values, and generate alarms for the following conditions:
            a) Rate of change in excess of acceptable limit:
                (1) Provide a separate rate limit for each value.
            b) Stale value:
                (1) For analog signals that come from analog inputs or calculations using analog inputs, which are expected to have some variation each time the input is read, alarm when there is no change in the value for 10 times the normal expected scan or communication update.
8. Tank and vessel levels:
    a. Display all tank and vessel levels as both a level (typically in feet) and a volume (typically in gallons):
        1) Some individual displays may be only level or volume, when agreed to by the Owner and Engineer during screen meetings.
    b. Monitor rate of change of volume on all tanks and vessels:
        1) Establish the maximum withdraw rate at which the volume should decrease (all pumps or feeders operating at maximum output). Generate an alarm whenever the volume decreases faster than this rate.

2) Establish the minimum fill rate at which the volume should increase when filling. Generate an alarm whenever the volume increases faster than this rate. Verify tank and vessel level is fluctuating to verify the validity of the IO register. If it is determined the register is not active or failed in a manner that leaves a stagnant value generate an alarm.

9. I/O filtering and processing:
   a. Analog input filtering:
      1) For each analog input provide an adjustable first order filter, for the purpose of smoothing out spikes and other noise for analog transmitter input signals. By default, configure analog inputs with no filtering affect.
      2) Monitor analog input signal quality:
         a) Over range: The input value is above the normal range (typically over 21 mA).
         b) Under range: The input value is below the normal range (typically under 3 mA, indicating a probable broken connection).
         c) Generate alarms for over or under range inputs.
         d) Do not use over or under range values for control or calculation purposes:
            (1) Where a second instrument is provided to monitor the same condition (a redundant instrument, or additional instruments furnished for averaging or different operating modes), and has a valid signal, use that input for control.
      3) Digital input filtering (proving timer):
         a) Provide an adjustable time delay function (0-10 seconds) on discrete input for the purpose of de-bouncing.
         b) By default, discrete inputs shall be configured with de-bounce timers set to zero seconds.
10. Instrument scaling (HMI/LOI):
   a. Provide 1 or more maintenance screens to display ranges and trigger points for all field instruments:
      1) For analog instruments, use input scaling values in the PLC to determine minimum and maximum calibration points.
      2) For discrete instruments, display calibrated pick-up and drop-out values.
11. PCS HAND-OFF-AUTO:
   a. Where indicated, provide HAND-OFF-AUTO and START-STOP selections in the PCS, accessed from an LOI or HMI for operators with sufficient security, to provide the following operating modes:
      1) PCS AUTO: The normal, automatic control mode of the strategy which allows full PLC control in response to process conditions and programmed sequences.
      2) PCS HAND: Enables PCS Manual control where control decisions are made by an operator through the PCS START-STOP, OPEN/CLOSE, or other selections as indicated.
      3) PCS OFF: Automated PCS control is disabled and PLC calls for all associated equipment to stop and valves to close or go to their identified safe state.
      4) Program the PLC so that switching a strategy between AUTO and HAND (either direction) occurs with a smooth transition. Keep running or position status unchanged when control is switched to

HAND until a change is requested using the operator selections (START, STOP, OPEN, CLOSE). Keep running and position status unchanged when control is switched to AUTO until the control logic determines a change is required.

12. Display the current status of all operator selections (PCS HAND/AUTO, PCS START/STOP, etc.) on LOI and HMI.
13. Interlocks:
    a. Implement software interlocks where indicated to place equipment in a safe condition in response to impending hazardous process conditions. Apply software interlocks when equipment is operating in PCS AUTO or PCS HAND:
14. Permissives:
    a. Implement software permissives where indicated to prevent equipment from starting in an unsafe condition.
    b. Apply software permissives when equipment is operating in PCS AUTO or PCS HAND.
15. Process control algorithms:
    a. Jog and hold: Unless otherwise indicated, use jog and hold control algorithms where possible:
        1) When the error between process variable and setpoint is beyond a setpoint deadband:
            a) Jog valve or ramp speed in the required direction for a preset "Jog Time" or until the process variable reaches or passes the setpoint.
            b) Then hold speed or position through a setpoint "Hold Time."
            c) Continue alternating jog and hold until the error is less than the deadband.
        2) Provide operator access to Jog Time and Hold Time setpoints from the HMI.
    b. PID algorithms: Use where indicated, or where necessary to provide fast response:
        1) Provide a PID faceplate with the following displays and functions for each PID control algorithm:
            a) Display Output, CV.
            b) Display Setpoint, SP.
            c) Display Process Variable, PV.
            d) Allow for operator selection of Automatic or Manual control of the output.
            e) Under Manual control of output allow the operator to enter the desired output value.
            f) Allow for input of the 3 Proportional, Integral, and Derivative tuning parameters.
            g) Configure PID loops to prevent reset windup when controlled equipment is operating in Manual (local or PCS), or when the equipment has reached a physical limit.
            h) When controlled equipment is being operated in remote PCS HAND, configure the PID function to track the process variable to provide a smooth transfer between Manual and Automatic modes.
            i) Provide selectable slew rates with adjustable setpoints to allow the PID algorithm to slowly ramp to its final value to minimize system disturbance.

16. Equipment alternating and sequencing:
    a. Distribute number of starts and run time equally between identical equipment.
17. Motor control:
    a. Monitor the device's LOCAL-OFF-REMOTE (LOR) switch (the hard-wired switch at the MCC, drive or equipment) to determine when the PLC has control of the associated equipment:
        1) Display current REMOTE status on the PCS screens.
    b. Monitor the device's running status from the starter auxiliary or run status input:
        1) Display the current status (running or stopped) on the PCS screens.
        2) Use status to calculate total run time and daily run time, and to count total starts and daily starts.
        3) Provide time stamp for each start.
        4) For motors 200 HP and greater, provide software to prevent exceeding the manufacturer's recommended maximum starts per hour.
    c. When equipment control has been given to the PLC as reported by the LOCAL-OFF-REMOTE switch, allow selection of PCS AUTO or PCS HAND control modes based upon operator selection using the PCS screens.
    d. Starting, stopping and running when the device LOR is in LOCAL:
        1) With the LOR switch in the LOCAL position, the motor is controlled by the START and STOP pushbuttons.
        2) With the LOR switch in the OFF position, the motor is prohibited from running.
        3) With the LOR switch in the REMOTE position, the motor is controlled remotely.
    e. Starting, stopping and running when the device LOR is in REMOTE:
        1) When the motor is expected to be running (PLC has issued a START or RUN due to process conditions or operator selection), LOR is in REMOTE, and the device is not reported to be running, start an operator adjustable "Control Activation" timer:
            a) Provide "Control Activation" timers for each piece of controlled equipment:
                (1) If the LOR and required running status do not change, and the PLC does not receive running status within the "Control Activation" time period:
                    (a) De-activate the output.
                    (b) Place the device in a "Failed" state.
                    (c) Generate a "Failed to Respond" alarm.
        2) When the motor is not expected to be running (PLC has issued a STOP or removed the RUN output), LOR is in REMOTE, and the device is reported to be running, start the "Control Activation" timer:
            a) If the LOR and required stopped status do not change, and the PLC does not lose the running status within the "Control Activation" time period:
                (1) Keep the RUN output off or the STOP output on.
                (2) Place the device in a "Failed" state.
                (3) Generate a "Failed to Respond" alarm.

3) Re-establish PLC control of a device in a "Failed" state only after the following:
    a) An operator turns the device's LOR switch out of REMOTE, and back to REMOTE (i.e., REMOTE input to the PLC cycles off and back on).

f. Where motor winding high temperature switches or RTD temperature elements are shown, generate an alarm when high temperature is sensed (contact opens or temperature above the high alarm setpoint), but do not stop the motor unless otherwise indicated.

g. Motor equipped with current detection shall shut down and report a "failed" status on detection of high current.

h. Control two-speed motors similar to other motors, except as listed below:
    1) Motor states are RUN-FAST, RUN-SLOW, and STOP.
    2) Start all two-speed motors in the RUN-SLOW state. If or when the high speed is required (RUN-FAST operator selection or process conditions), transition to RUN-FAST after a designated time.
    3) When transitioning from RUN-FAST to RUN-SLOW, remove the RUN-FAST output or issue a STOP, then wait for a "Fast to Slow" time delay before energizing the RUN-SLOW or START-SLOW output.

i. Speed control:
    1) Modulate speed on VFD-driven motors using jog and hold, or PID control algorithms to maintain process conditions as described in the specific loop descriptions.
    2) Operate speed control within a pre-defined range:
        a) Minimum speed as determined by equipment manufacturer. The higher of:
            (1) Minimum motor speed to maintain adequate cooling for the type of load driven (constant or variable torque).
            (2) Minimum equipment speed, such as minimum speed to deliver flow or to deliver minimum flow for equipment cooling or lubrication.
        b) Maximum speed 100 percent (60 hertz) or as identified by equipment manufacturer.
    3) Where multiple equipment may operate together to maintain the same process condition:
        a) Provide an operator selection for starting sequence.
        b) Start the first equipment at a preset starting speed.
        c) When one or more equipment is running and the speed control algorithm reaches a preset "Start Next" speed value (initially 95 percent of speed range) through a preset time delay:
            (1) Start the next available equipment at the preset starting speed.
            (2) Ramp up the started equipment and ramp down the previously running equipment to the mid operating speed (adjustable in the PLC). Determine preset values for each condition based on equipment and system characteristics to provide approximately the same total flow or process condition with the new load running at the mid speed (for example if one pump is running and the second pump will be added, then the total flow of both pumps running at mid

operating speed should be approximately the same as flow of one pump at Start Next speed).

(3) Once both equipment reach the mid operating speed, resume the speed control algorithm for those equipment.

(4) Operate all equipment at the same speed following the output of the speed control algorithm.

d) When two or more pieces of equipment are running, monitor for a "Stop Next" condition:

(1) Where flow rate is monitored, use a preset "Stop Next" flow rate for each possible number and combination of equipment:

(a) Determine initial "Stop Next" speed based on the flow that can be provided with one fewer piece of equipment running at a speed slightly below the "Start Next" speed.

(2) When the "Stop Next" condition exists through a preset time delay:

(a) Ramp speed of running equipment except for the equipment to be stopped up to a preset value based on the number of items running. Determine preset values for each condition based on equipment and system characteristics to provide approximately the same total flow or process condition with one fewer load running (typically slightly below the preset "Start Next" speed) while ramping speed of equipment to be stopped down to the preset minimum speed.

(b) Operate all remaining equipment at the same speed following the output of the speed control algorithm. Stop the load once it reaches minimum speed.

18. Gate and valve control:

a. Monitor the device's LOCAL-STOP-REMOTE (LSR) switch(es) (the integral switch in the actuator or hard-wired switch at the local control station):

1) Display current REMOTE status on PCS screens.

b. Start an "Open Activation" timer whenever the device is expected to be open (PLC has issued an OPEN command in PCS AUTO, or OPEN was selected in PCS HAND):

1) Initially set "Open Activation" time to twice the normal opening time.

2) If the LSR position and open command do not change, and the PLC does not receive fully open status feedback within the "Open Activation" time period:

a) De-activate the open output.

b) Place the device in a "Failed" state.

c) Generate a "Failed to Open" alarm.

c. Start a "Close Activation" timer whenever the device is expected to be closed (PLC has issued a CLOSE command in PCS AUTO, or CLOSE was selected in PCS HAND):

1) Initially set "Close Activation" time to twice the normal closing time.

2) If the LSR position and close command do not change, and the PLC does not receive fully closed status feedback within the "Close Activation" time period:

a) De-activate the close output.

b) Place the device in a “Failed” state.
c) Generate a “Failed to Close” alarm.

d. Limit the number of open/close /commands so that it does not exceed the manufacturer requirements.
e. For modulating valves (valves controlled from either a 4-20 mA signal or digital communications command) with position feedback, start a “Position Error” timer whenever the position feedback differs from the required position command by more than a setpoint error when the LSR is in REMOTE:
   1) For analog modulating devices, error is determined by position feedback differing from position command by more than the setpoint error.
   2) For discrete modulating devices, error is determined by feedback not changing in the correct direction, or changing at less than a setpoint rate, when the OPEN or CLOSE PLC output is active.
   3) Initially set the “Position Error” time to 60 seconds.
   4) If the LSR position does not change, and position error stays outside of the setpoint error through the “Position Error” time period:
      a) Place the device in a “Failed” state.
      b) Generate a “Position Fail” alarm.
f. Provide separate time delay settings for each function and for each device.
g. If the valve position inputs indicate an invalid state (i.e., valve open and closed at the same time), place the device in a “Failed” state and generate an “Invalid State” alarm.
h. Re-establish PLC control of a device in a “Failed” state only after one of the following:
   1) An operator turns the device’s LSR switch out of REMOTE and back to REMOTE (i.e., REMOTE input to the PLC cycles off and back on).
   2) An operator acknowledges the fault from PCS.
i. For all alarm conditions, control other devices (as stopping pumps, etc.) as stated in the individual loop descriptions to make the system safe.
j. For discrete modulating valves (valves positioned to intermediate positions to control process values through discrete OPEN and CLOSE outputs), count the number of actuations (OPEN or CLOSE commands) per hour in the PLC:
   1) Display count on the HMI.

19. Chemical systems (LOI/HMI):
    a. Provide the following chemical system screens:
       1) Where one LOI manages more than one chemical system, a main menu screen that will allow the operator to access the individual chemical system screens using software keys.
       2) One or more screens for each individual chemical system controlled at that location, containing:
          a) All status displays (running, failed, etc.).
          b) Selections (lead/lag, which process flow to pace to, etc.).
          c) Setpoint entry and display.
          d) Calculated feed requirement (result of flow pacing calculation) in engineering units (typically milligrams of chemical per minute).
          e) Output signal to feeder in percent of full span.

f) Actual chemical flow rate from flowmeter (where shown).
g) Process flow rate(s) used to pace each chemical on the individual chemical screens (PROC FLOW):
(1) Where different process flows can be selected for flow pacing, display and identify the selected source.

b. Chemical system calculations: Perform calculations as indicated on the Drawings and in the individual loop descriptions. Use the following assumptions, unless otherwise noted:
1) Where chemical flow feedback is not used, assume feeder output is linear in response to control signal.
2) Zero signal (typically 4 milliamperes) produces zero flow.
3) Perform flow-pacing calculations using as indicated on the Drawings or described in the individual loop descriptions.

c. Provide the setpoints and selections indicated on the Drawings and in the individual loop descriptions. Typical setpoints include:
1) QMAX: Maximum calibration value:
a) Chemical flow rate measured from calibration column at maximum feeder output (typically in gallons of solution per hour or milliliters of solution per minute).
2) CONC: Chemical concentration:
a) The concentration of the chemical in the solution to be fed, in engineering units (typically milligrams of chemical per liter of chemical solution).
3) DENSITY:
a) Density of the chemical solution to be fed in engineering units or as a specific gravity.
b) Used to calculate the concentration of the chemical in the solution.
4) DOSE: Desired dosage:
a) Desired chemical concentration in the process stream in engineering units (typically milligrams of chemical per liter of process fluid).
5) FLOW SEL: Selection of process stream(s) for flow pacing.
6) OPEN/CLOSED LOOP:
a) Selection of method of controlling chemical flow-paced feed rate.
b) OPEN LOOP: Signal to feeder is based on feeder calibration (QMAX) to deliver calculated chemical solution feed rate. Chemical solution flowmeter is not used for control.
c) CLOSED LOOP: Chemical feed rate is directly controlled using the calculated chemical solution feed rate as the setpoint, and the flow rate from the chemical solution flowmeter as the process variable.
7) TRIM FACTOR: Adjusts the desired impact of the trim multiplier. Adjustable from 0 to 1.
8) QAH: Desired setpoint for top of band for analyzer trim control.
a) QAL: Desired setpoint for bottom of band for analyzer trim control.

d. Chemical control algorithms:
1) Flow pacing with closed loop and analyzer trim algorithm: Operator selects a desired dose and desired analyzer setpoint band and the control system adjusts the speed of the chemical feeder through a

speed control signal to match the measured chemical feed rate to a flow rate setpoint. An additional control algorithm is used in the calculation to fine-tune the feed based on an analytical measurement as measured by the process analyzer.

$$\boldsymbol{PRE\ TRIM\ FLOW\ (gph)} = \frac{\boldsymbol{34,897 * DOSE\left(\frac{mg}{L}\right) * PROCESS\ FLOW(MGD)}}{\boldsymbol{CONC(\%)\ * DENSITY\left(\frac{lb}{gal}\right)}}$$

$$\boldsymbol{TRIM\ MULTIPLIER} = \frac{\boldsymbol{AI - \frac{1}{2}(QAH + QAL)}}{\boldsymbol{-\frac{1}{2}(QAH - QAL)}}$$

CLAMP THE TRIM MULTIPLIER OUTPUT TO A MAXIMUM OF 1 AND MINIMUM OF -1.

$$\boldsymbol{TRIM\ ADDER(gph) = TRIM\ FACTOR * \ TRIM\ MULTIPLIER * PRE\ TRIM\ FLOW(gph)}$$

$$\boldsymbol{FEEDER\ FLOW(gph) = PRE\ TRIM\ FLOW(gph) + TRIM\ ADDER(gph)}$$

a) Adjust the speed of the chemical feeder using a PID control algorithm to maintain the calculated FEEDER FLOW:
   (1) SP = Calculated FEEDER FLOW.
   (2) PV = Chemical Flow.
   (3) CV = Speed of the Chemical Feeder.

20. Breaker status:
    a. Display the following data to the extent it is available from the specified device:
       1) Open.
       2) Closed.
       3) Tripped.
       4) Ground fault.
       5) Settings.
       6) Racked out.
21. Power Data:
    a. Retrieve data from:
       1) Power Quality Meters (PQMs) at 480V.
       2) Main Breaker Protective Relays on 12.47 kV Switchgear.
       3) Generator Master Control Panel.
       4) Digital bus networks, as indicated.
       5) Where available, use EtherNet IP communications.
    b. Display the following data (to the extent it is available) from the specified device.
       1) Current XXXX.X A:
          a) A-Phase.

b) B-Phase.
c) C-Phase.
2) Volts: XXXX.X V:
a) A-Phase.
b) B-Phase.
c) C-Phase.
3) Reactive power: XXXX.X kVAR.
4) Real power: XXXX.X kW.
5) Apparent power: XXXX.X kVA.
6) Power factor: 0.XX.
7) Energy: XXXXXXX kW*hr.
8) Demand peak: XXXX Amp.
9) Demand peak: XXXX kW.

c. For engine/generator system monitoring, also display percent of rated output.

22. Power Supply and Distribution displays Power Quality Meters display:
a. In addition to the Power Data listed above, display the following (where available) from PQMs, Protective Relays, and Generator Master Control Panel:
1) Frequency: Hertz.
2) THD (current and voltage): up to 31st harmonic.
b. Calculate, indicate, historize, and trend data in a 12.47 kV Meter Table that lists measurements from the following Protection Relays:
1) Protection Relay on 52-G1.
2) Protection Relay on 52-G2.
3) Protection Relay on 52-M1.
4) Protection Relay on 52-M2.
5) Protection Relay on 52-M3.
6) Display calculated values for "Load At 12.47 kV", which sums the current, kW, and kW-hr values for all five Protection Relays.
7) Display calculated values for "Load At 480V", which sums the current, kW, and kW-hr values for all PQM meters.
8) Display calculated values for "Transformer and Line Losses", which subtracts "Load at 480V" from "Load At 12.47 kV" for current, kW, and kW-hr values for all PQM meters.
c. Display the data in a 480V Meter Table that lists measurements from all power quality meters on the plant.

23. Digital bus Starters, RVSS and VFDs equipped with EtherNet IP communications:
a. Communicate and display all values listed in the equipment specifications, indicated on the Drawings, or listed below.
b. Communicate start and stop commands, and receive running feedback over the fieldbus network.
c. Provide data entry screen for the cost of electricity in dollars per (kw*hr), which will be used in calculations for display.
d. Monitor the following additional values, and display on the HMI:
1) Motor current, phase A, B, and C.
2) Over current alarm.
3) Under current alarm.
4) Running status.
5) Phase loss.
6) Stall.

7) Number of starts.
8) History of past 5 trips.

e. Calculate, indicate, historize, and trend, the following additional values:
1) Full Load Amps (static value, Engineer will provide).
2) Average Motor Operating Current.
3) Run Time (Hours).
4) Operating Hours (Hours/Year).
5) Average Load Factor (equals Average Motor Current Operating Current/Full Load Amps) - display as a percentage.
6) Annual Energy Use (kW*hr).
7) Annual Operating Cost (dollars).
8) Percent of Site Electric Use (equals Annual Energy Use/Sum of Annual Energy (kW*hr) values for all PQM meters).

f. For Variable Frequency Drives:
1) Speed command.
2) Speed feedback.

g. For RVSS, Variable Frequency Drives, and where otherwise shown or available, monitor the following over the digital bus network:
1) Line voltage.
2) Power.
3) Power factor.
4) Over voltage alarm.
5) Under voltage alarm.
6) Over current alarm.
7) Under current alarm.
8) Indicate, historize, trend, and alarm data as indicated in the ACS I/O Tables on the Drawings.

24. Calculate, indicate, historize, and trend plant-wide calculated values for kW by the following Groups.
a. Calculated values (summed from starter data for all equipment within the Groups identified below):
1) Demand peak: XXXX Amp.
2) Demand peak: XXXX kW.
3) Electric Power Consumption, by Process Group (kW): XXXX kW.
4) Electric Power Consumption, by Process Group (percent): XX.XX percent (equals Electric Power Consumption, by Process Group (kW)/Sum of Electric Power Consumption on all 480V Meters).
5) Electric Energy Consumption, by Process Group (kW*hr): XXXX kW*hr.
6) Electric Energy Consumption, by Process Group (percent): XX.XX percent (equals Electric Energy Consumption, by Process Group (kW)/Sum of Electric Energy Consumption on all 480V Meters).

b. Groups - Engineer to provide lists of starters (FVNR, RVSS, VFD, and monitored feeder breaker) associated with each of the following treatment processes:

c. Display a Process Energy Consumption Table that lists the calculated values for each of the identified Groups.

d. Display a Process Energy Pie Graph that portions wedges according to the values calculated in Electric Energy Consumption, by Process Group (5). Label wedges, (with numeric percentage), for Groups to cover

at least 90 percent of the Pie Graph. The remainder wedge of Pie Graph area can be labelled as "Other" (with numeric percentage).

25. Power failure:
    a. Retain all operating setpoints during power failure.
    b. Restore plant operation to the state it was before the power loss:
        1) Store the operating state of all major equipment and systems in the PLC, and retain the last state during a power loss.
    c. Provide an operator selection to permit the plant to re-start. Once re-start is selected:
        1) Allow plant loads to re-start, and allow loads to sequence on and ramp up following normal control logic. Where loads were operating in PCS HAND, restore their operation to the state before the power loss.
        2) Use the logic described above for preventing concurrent starts to provide necessary delays between each start.
    d. Operating on generator power:
        1) Include running and starting kW and kVA requirements for each major equipment and system in registers in the PLC:
            a) Where running load can vary due to speed, valve position, etc., use the normal starting value plus 25 percent of the difference between the maximum and minimum values.
        2) Inhibit starting of loads from process control logic and from operator selection (in PCS HAND) that will exceed generator capability.
        3) Generate the following alarms:
            a) Generator near capacity: When measured kW or kVA reaches 90 percent of the rating of the generator.
            b) Generator at capacity: When measured kW or kVA reaches 95 percent of the rating of the generator.
            c) Unable to start: When an operator selects a load that would exceed generator starting or running capacity.
            d) Insufficient capacity: When the control system needs to start a load, but is inhibited due to generator capacity.
        4) Whenever the Generator at Capacity alarm is active, inhibit starting of any loads, and inhibit increase in speed of all control loops, and other changes that would increase electrical load.
        5) Display the following power system data on the HMI and LOI in numerical and graphical formats:
            a) Available power.
            b) Current power demand.
            c) Capacity of the generator.
            d) Current power demand load as a percentage of capacity.
            e) Generator frequency.

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 FIELD QUALITY CONTROL (NOT USED)

3.08 ADJUSTING (NOT USED)

3.09 CLEANING (NOT USED)

3.10 DEMONSTRATION AND TRAINING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.11 PROTECTION (NOT USED)

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 17101

SPECIFIC CONTROL STRATEGIES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Loop descriptions:
      a. Specific control requirements and functional descriptions for individual control loops.

1.02 REFERENCES

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.03 DEFINITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.04 SYSTEM DESCRIPTION (NOT USED)

1.05 SUBMITTALS

A. Develop detailed loop descriptions based on the information in the Contract Documents, and submit as specified in Sections 01330 - Submittal Procedures and 17050 - Common Work Results for Process Control and Instrumentation Systems.
   1. For each control loop, provide a detailed functional description of the operation of the equipment, signals, and controls shown on the P&IDs:
      a. Include all functions depicted or described in the Contract Documents.
      b. Include the following within each loop description:
         1) All requirements specific to that loop.
         2) Common control requirements applicable to that loop.
         3) List of all ranges, setpoints, timers, values, counters, etc.
   2. Where there are similar loops with identical control, such as multiple loops for individual raw water pumps, only 1 loop description need be developed and the remaining loops may reference that loop description.
   3. Loop description format: As specified in this Section.

B. Loop number and title.
   1. References:
      a. List P&IDs that are specifically referenced.
   2. Abstract:
      a. General description of how the loop works, what devices are involved, and how the process will be controlled.
      b. Process values, setpoints, and limits, including units and ranges:
         1) Show span and range values for analog inputs and outputs, and operating point and deadband for discrete inputs.

3. Hardwired control:
    a. Detailed description of the control functions at the local level.
    b. Function of local operator interfaces.
    c. Operation of hardwired field pilot controls:
        1) Pushbuttons.
        2) Selector switches.
        3) Potentiometers.
        4) Pilot lights, indicators, and other displays.
4. Hardwired interlocks:
    a. Explanation of the operation of system interlocks and hardwired permissive conditions.
5. PLC control:
    a. Detailed description of the control functions that are under control of the PLC.
    b. Operator controls and automatic controls.
    c. Setpoints, alarms, etc.:
        1) Include units and ranges for analog values.
        2) Include span and range for analog inputs and outputs.
        3) Include operating point and deadband for discrete inputs, and identify conditions where contacts are open, and when they close.
    d. Control sequences.
    e. Software interlocks:
        1) Operation of system software interlocks.
6. PCS/LOI/HMI control:
    a. Detailed description of the operator controls.
    b. Setpoints, alarms, etc.
7. Indicators and alarms:
    a. List any indicators and alarms specific to the loop that are not covered in the common control strategies.
8. Failure modes:
    a. List any failure modes specific to the loop that are not covered in the common control strategies.

1.06 QUALITY ASSURANCE (NOT USED)

1.07 DELIVERY, STORAGE, AND HANDLING (NOT USED)

1.08 PROJECT OR SITE CONDITIONS (NOT USED)

1.09 SEQUENCING (NOT USED)

1.10 SCHEDULING (NOT USED)

1.11 WARRANTY (NOT USED)

1.12 SYSTEM START-UP (NOT USED)

1.13 OWNER'S INSTRUCTIONS (NOT USED)

1.14 COMMISSIONING (NOT USED)

1.15 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION (NOT USED)

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION

A. Recharge Operation:
   1. References:
      a. P&ID N-001.
      b. P&ID N-002.
   2. Abstract:
      a. Recharge operating mode consists of directing the flow of water into the well or recharging the well using water from the Roseville distribution system for storage in the aquifer. The operational sequence during recharge is designed to vent any air that may be in the recharge piping to atmosphere and to prevent the air from being forced into the ASR well which could result in well air binding and clogging which would hinder ASR operations.
      b. The recharge mode is used to store excess of water from the Roseville system for later use. The rate of flow will be measured by the discharge magmeter, and integrated over time by the PLC to determine the volume during the recharge period. (The magmeter is located in a drop-loop section of piping in order to keep the unit full of water during periods when the piping may otherwise drain down when not in the recharge mode. If allowed to drain there would be a lag in reliable flow information from the magmeter during start-up operation.) The instantaneous flowrate and totalized quantity recharged shall be added to the total quantity stored information which will be displayed on the local OIT and transmitted from the PLC to the centralized historian system via the SCADA interface. Below are the steps the PLC is programmed to do to complete a Recharge cycle: (all set-points, unless noted, are specified in the set-points screen).
      c. During Recharge the system uses two (2) flow control valves in series to control the flow of water during recharge. 1) The purpose of the downhole control valve is to create enough backpressure to keep the ASR pump vertical column pipe full so as to prevent cascading and possible air entrainment during recharge. The pump assembly below the downhole control valve has its own check valve that will prevent flow backwards through the pump. 2) The rate of recharge flow will be controlled by the modulating Recharge Flow Control Valve located on the surface piping downstream of the pressure reducing valve on the incoming recharge pipe from the system.

3. Hardwired control:
    a. The following valves required for Recharge have LOCAL-STOP-REMOTE mode, when placed in LOCAL mode each valve can be either fully opened, fully closed or somewhere in between:
        1) WD34-FCVX-28150, Recharge flow control valve.
        2) WD34-MOVX-28130, Pump Column Recharge Valve.
        3) WD34-MOVX-28120, Well Annulus Recharge Valve.
        4) WD34-MOVX-28160, Waste Valve.
4. Hardwired interlocks/Overload Programmed Interlocks:
    a. None.
5. PLC Control:
    a. Step 1 – Initiate.
        1) The operator selects the Recharge button on the local OIT.
    b. Step 2 – Maintenance Check.
        1) If the ASR system is transitioning from flushing or recovery mode, it will automatically go to maintenance mode to close every valve. If not, the sequence will continue to step 3.
    c. Step 3 – Preliminary Flow.
        1) The pump column recharge valve and the downhole recharge valve shall be closed when this step begins. This allows water to enter the surface piping through the modulating flow control valve and to force any air in the above ground piping to vent through air release valves. The above-ground modulating Recharge Flow Control Valve shall open to a specific pre-determined percent open for a specific time. After a preset time-delay sufficient to vent the air from the piping the next downstream recharge valve for pump column recharge can be opened; however, the downhole recharge valve shall remain closed.
    d. Step 4 – Auto Control (Flow).
        1) Once the air is purged from the above ground piping the Pump Colum Recharge Valve will slowly open to allow recharge flow to begin down the pump column. As the pump column fills the air is vented out through the air release valve on the pump discharge pipe. The system recharge flow control is switched to auto control and begins modulating based on a flow set-point. The flow will stabilize after the air is vented, the pressure will rise and the PLC will monitor the value until the predetermined set-point is reached to progress to the next recharge step.
        2) The downhole flow control valve located in the pump column above the bowl assembly will open to allow flow into the well casing. (The ASR pump is OFF and the non-reverse ratchet is in place to prevent any backspin. There is also a check valve on the suction of the bowl assembly to prevent reverse flow through the bowls.) As the recharge continues down the pump column and the recharge water enters the well through the downhole control valve, the water level in the well casing annulus will rise if the aquifer response requires additional head to force the water through the well screen and gravel pack into the aquifer.
        3) If the system pressure reaches a maximum pressure set-point, and well casing water level is less than a well level set-point, the

sequence will continue to step 5 and alarm the OIT/HMI that the maximum pressure has been reached.

4) If the well casing water level is greater than the well level set-point and the system pressure has not reached the set-point, the PLC starts a pre-set time delay to account for fluctuations in the level transducer. When the timer is done, the control sequence will continue to step 6 skipping step 5.

e. Step 5 – Auto Control (Pressure).
   1) The recharge flow control valve is switched to auto control based on pressure. This step is an "in between" step where the valve is control based on a maximum pressure set-point in the event that the well level didn't reach the set-point before the pressure went to high. This step will last until the well casing water level is greater than the set-point.

f. Step 6 – Opening Annulus Recharge Valve.
   1) The annulus recharge valve opens when is safe to recharge the well at high flow rates (when the well level set-point is met). After the valve is opened, the sequence will continue to step 7.

g. Step 7 – Recharge into the well / Done.
   1) This is the last step of recharge. In this step, the PLC will maintain a steady flow based on a flow rate set-point using the Modulating Flow Control Valve. Water flows down the pump column, and if needed to achieve the flowrate set-point, down the annular column allowing greater flows. The following actions will take the system out of recharge mode:
   2) Operator putting the system in Maintenance mode.
   3) The PLC is constantly monitoring the well empty level. If it gets below the level set-point, a 20 second time delay will start. After the timer finishes, it will close the well annulus recharge valve and return to step 5 to control the flow based on pressure to wait for optimal conditions where the annular valve can be opened again.

6. Indicators and alarms:
   a. As mentioned in A.5 and as indicated on the Drawings and specified in Section 17100 - Control Strategies.
7. Failure modes:
   a. As mentioned in A.5 and as indicated on the Drawings and specified in Section 17100 - Control Strategies.

B. Storage Operation:
1. References:
   a. P&ID N-001.
   b. P&ID N-002.
2. Abstract:
   a. During the storage mode no significant quantities is directed to the well for aquifer storage. During this mode a small quantity of chlorinated water from the distribution system is directed into the well to maintain the health of the well and to inhibit bacteriological growth that would occur in the well if it were totally stagnate. The low flow, termed "Trickle Flow" will inhibit bacteria grown within the inactive well casing during storage. The rate of flow will be measured by flowmeter, and integrated over time by the PLC to determine the volume during the storage period. The instantaneous flowrate and totalized trickle flow quantity shall be added to

the total quantity stored information which will be displayed on the local OIT and transmitted from the PLC to the centralized historian system via the SCADA interface. The following steps in B.5 shall be included in the PLC is programming for the Storage mode of operation.

3. Hardwired control:
   a. The following valves required for Recharge have LOCAL-STOP-REMOTE mode, when placed in LOCAL mode each valve can be either fully opened, fully closed or somewhere in between:
      1) WD34-FCVX-28150, Recharge flow control valve.
      2) WD34-MOVX-28130, Pump Column Recharge Valve.
      3) WD34-MOVX-28120, Well Annulus Recharge Valve.
      4) WD34-MOVX-28160, Waste Valve.
4. Hardwired interlocks/Overload Programmed Interlocks:
   a. None.
5. PLC Control:
   a. Step 1 – Initiate.
      1) The operator hits the Storage button on the local OIT.
   b. Step 2 – Pump OFF.
      1) This step makes sure the pump/VFD is set to OFF and ZERO speed. When the VFD for ASR Pump gives confirmation of not running, the sequence will continue to step 3.
   c. Step 3 – Chemicals OFF.
      1) This step makes sure the chemical pumps are set to OFF and ZERO speed. When the pumps give confirmation of not running, the sequence will continue to step 4.
   d. Step 4 – Chlorine Solenoid OFF.
      1) This step makes sure the chemical metering pumps (both for NaOCl and NaF) set to OFF and ZERO speed. When the pumps give confirmation of not running, the sequence will continue to step 5.
   e. Step 5 – Recharge Valve CLOSED.
      1) This step confirms that the flow control valve is in the fully CLOSED position and ZERO percent opening. When the valve gives confirmation of closed, the sequence will continue to step 6.
   f. Step 6 –Aquifer Flush Valve CLOSED.
      1) This step makes sure the Aquifer Flush valve is set to CLOSED. When the valve gives confirmation of closed, the sequence will continue to step 7.
   g. Step 7 – Recovery Valve CLOSED.
      1) This step makes sure the Recovery valve is set to CLOSED. When the valve gives confirmation of closed, it will continue to step 8.
   h. Step 8 – Well Annulus Recharge Valve CLOSED.
      1) This step makes sure the Recharge valve is set to CLOSED. When the valve gives confirmation of closed, the sequence will continue to step 9.
   i. Step 9 – Trickle Flow Valve OPEN.
      1) The trickle flow valve allows a small quantity of chlorinated water from the potable distribution system at a flowrate of 3 to 5 gpm to flow into the well to inhibit biological growth and maintain well health, continue to step 10.
   j. Step 10 – Completion.
      1) The system stays in this step and waits for the operator to finish the Storage mode by selecting another mode of operation at the OIT.

6. Indicators and alarms:
    a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.
7. Failure modes:
    a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.

C. Flushing Operation:
1. References:
    a. P&ID N-001.
    b. P&ID N-002.
    c. P&ID N-006.
2. Abstract:
    a. Flushing operating mode consists of flushing water out of the aquifer through the well casing, pump and piping. This is after recovery or after prolonged inactivity during recovery season. The rate of flow will be measured by magmeter, and integrated over time by the PLC to determine the volume during the flushing period. The instantaneous flowrate and totalized flush quantity shall be deducted from the stored quantity information will be displayed on the local OIT and transmitted from the PLC to the centralized historian system via the SCADA interface. Below in C.5 are the steps the PLC is programmed to do to complete a Flushing cycle.
3. Hardwired control:
    a. The following valves required for Recharge have LOCAL-STOP-REMOTE mode, when placed in LOCAL mode each valve can be either fully opened, fully closed or somewhere in between:
        1) WD34-FCVX-28150, Recharge flow control valve.
        2) WD34-MOVX-28130, Pump Column Recharge Valve.
        3) WD34-MOVX-28120, Well Annulus Recharge Valve.
        4) WD34-MOVX-28160, Waste Valve.
    b. In LOCAL mode, VFD can be operatored via the VFD HIM.
4. Hardwired interlocks/Overload Programmed Interlocks:
    a. Well Pump discharge HiHi Pressure Switch.
    b. Well Pump seal Water Lo Flow Switch.
    c. Well Pump motors HiHi Temperature Switch.
    d. Well Pump VFD Fault.
5. PLC Control:
    a. Step 1 – Initiate.
        1) The operator hits the Flushing button on the local OIT.
    b. Step 2 – Maintenance Check.
        1) If the ASR system is coming from recharge mode or recovery mode, it will automatically go to maintenance mode to close every valve. If all valves are closed, the sequence will continue to step 3.
    c. Step 3 – Open the Aquifer Flush Valve.
        1) The aquifer flush valve is commanded to open to start flowing water from the well to well to waste airgap structure. When the valve gives confirmation of being opened, the sequence will continue to step 4.
    d. Step 4 – Auto Control (Flow).
        1) The pump is set to control the flow of water based on a flow set-point. After the pump starts running, it will continue to step 5.

e. Step 5 – Auto Flush / Done.
1) The flushing mode continues to flush for a user adjustable amount of time. When the timer is done, it will take the system into Maintenance mode to close and stop everything.

6. Indicators and alarms:
a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.

7. Failure modes:
a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.

D. Recovery Operation:
1. References:
a. P&ID N-001.
b. P&ID N-002.
c. P&ID N-003.
d. P&ID N-004.
e. P&ID N-005.
f. P&ID N-006.

2. Abstract:
a. Recovery operating mode consists on pumping water out of the aquifer to the Roseville distribution system. As the water flows out of the ASR well is disinfected with NaOCl and fluorinated with NaF as the water is being returned to the distribution system. The instantaneous flowrate and totalized quantity recovered shall be deducted to the total quantity stored information which will be displayed on the local OIT and transmitted from the PLC to the centralized historian system via the SCADA interface. Below in D.5 are the steps the PLC is programmed to do to complete a Recovery cycle.

3. Hardwired control:
a. The following valves required for Recharge have LOCAL-STOP-REMOTE mode, when placed in LOCAL mode each valve can be either fully opened, fully closed or somewhere in between:
1) WD34-FCVX-28150, Recharge flow control valve.
2) WD34-MOVX-28130, Pump Column Recharge Valve.
3) WD34-MOVX-28120, Well Annulus Recharge Valve.
4) WD34-MOVX-28160, Waste Valve.
b. In LOCAL mode, VFD can be operated via the VFD HIM.

4. Hardwired interlocks/Overload Programmed Interlocks:
a. Well Pump discharge HiHi Pressure Switch.
b. Well Pump seal Water Lo Flow Switch.
c. Well Pump motors HiHi Temperature Switch.
d. Well Pump VFD Fault.

5. PLC Control:
a. Step 1 – Initiate.
1) The operator selects the Recovery Mode on the local OIT. The HMI will record the date and time when this mode is initiated.
b. Step 2 – Maintenance Check.
1) If the ASR system is coming from recharge mode, it will automatically go to maintenance mode to close every valve. If not, the sequence will continue to step 3.

c. Step 3 – Preliminary Flow.
    1) The pump is started to a specific initial speed set-point for a specific time. After the time has passed, it will continue to step 4. At the same time, the primary chemical pumps are started, supply the chemicals based on dosage set-points. When the timer is done, the sequence will continue to step 4.
d. Step 4 – Opening Recovery Valve.
    1) The recovery valve is commanded to open to start flowing water to the distribution system. When the valve gives confirmation of being opened, the sequence will continue to. step 5.
e. Step 5 – Flowing to Distribution / Done.
    1) The pump is set to control the flow of water based on a flow set-point. The system will remain in this step, flowing water at a specific set-point until maintenance mode is initiated by the operator at the OIT.

6. Indicators and alarms:
    a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.
7. Failure modes:
    a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.

E. Maintenance Operation:
1. References:
    a. P&ID N-001.
    b. P&ID N-002.
    c. P&ID N-003.
    d. P&ID N-004.
    e. P&ID N-005.
    f. P&ID N-006.
2. Abstract:
    a. Maintenance mode consists of closing all valves and stopping all pumps. This mode puts the system in “stand-by” mode. The operator should take the system into Maintenance mode after finishing with every other mode. Below in E.5 are the steps the PLC is programmed to do to complete a Maintenance cycle.
3. Hardwired control:
    a. The following valves required for Recharge have LOCAL-STOP-REMOTE mode, when placed in LOCAL mode each valve can be either fully opened, fully closed or somewhere in between,
        1) WD34-FCVX-28150, Recharge flow control valve.
        2) WD34-MOVX-28130, Pump Column Recharge Valve.
        3) WD34-MOVX-28120, Well Annulus Recharge Valve.
        4) WD34-MOVX-28160, Waste Valve.
    b. In LOCAL mode, VFD can be operated via the VFD HIM.
4. Hardwired interlocks/Overload Programmed Interlocks:
    a. None.
5. PLC Control:
    a. Step 1 – Initiate.
        1) The operator hits the Maintenance button on the local OIT.

b. Step 2 – Pump OFF.
    1) This step makes sure the pump/VFD is set to OFF and ZERO speed. This step also resets internal PLC bits and internal modes. When the VFD gives confirmation of not running, the sequence will continue to step 3.
c. Step 3 – Chemicals OFF.
    1) This step makes sure the chemical pumps are set to OFF and ZERO speed. When the pumps give confirmation of not running, the sequence will continue to step 4.
d. Step 4 – Trickle Flow OFF.
    1) This step makes sure the trickle flow solenoid is CLOSED. There's no confirmation in this step, so the sequence continues to step 5 immediately.
e. Step 5 – Recharge Valve CLOSED.
    1) This step makes sure the flow control valve is set to OFF and ZERO percent opening. When the valve gives confirmation of closed, the sequence will continue to step 6.
f. Step 6 – Aquifer Flush Valve CLOSED.
    1) This step makes sure the Aquifer Flush valve is set to CLOSED. When the valve gives confirmation of closed, the sequence will continue to step 7.
g. Step 7 – Recovery Valve CLOSED.
    1) This step makes sure the Recovery valve is set to CLOSED. When the valve gives confirmation of closed, the sequence will continue to step 8.
h. Step 8 –Well Annulus Recharge Valve CLOSED.
    1) This step makes sure the Well Annulus Recharge valve is set to CLOSED. When the valve gives confirmation of closed, the sequence will continue to step 9.
i. Step 9 – Done.
    1) The system stays in this step until an operator input.

6. Indicators and alarms:
    a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.
7. Failure modes:
    a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.

F. Sodium Hypochlorite Feed System:
1. References:
    a. P&ID N-001.
    b. P&ID N-003.
    c. P&ID N-005.
2. Abstract:
    a. During Recovery operations the chlorine residual will be restored for the recovered water via feeding a liquid Sodium Hypochlorite solution. The feed pump rate per stroke shall be operator adjustable. Below in F.5 are the steps the PLC is programmed to control the chemical feed system.
3. Hardwired control:
    a. **[TBD]**.
4. Hardwired interlocks/Overload Programmed Interlocks:
    a. **[TBD]**.

5. PLC Control:
    a. Step 1 – Initiate.
        1) The selected active feed pump will start when the Recovery mode is selected.
    b. Step 2 – Flow Pacing with Closed Loop and Analyzer Trim, reference Section 17100 – Control Strategies.
        1) The feed rate shall be paced with the recovery flowrate to achieve the desired disinfection level.
    c. Step 3 – Done.
        1) Once the Recovery mode is deselected the operation of the selected feed pump shall stop.
6. Indicators and alarms:
    a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.
7. Failure modes:
    a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.

G. Sodium Fluoride Feed System:
1. References:
    a. P&ID N-001.
    b. P&ID N-004.
    c. P&ID N-005.
2. Abstract:
    a. During Recovery operations, if necessary, the fluoride residual will be restored for the recovered water via feeding liquid Sodium Fluoride solution. The feed pump rate per stroke shall be operator adjustable. Below in G.5 are the steps the PLC is programmed to control the chemical feed system.
3. Hardwired control:
    a. **[TBD]**.
4. Hardwired interlocks/Overload Programmed Interlocks:
    a. **[TBD]**.
5. PLC Control:
    a. Step 1 – Initiate.
        1) The selected active feed pump will start when the Recovery mode is selected.
    b. Step 2 – Flow Pacing with Closed loop and Analyzer Trim, reference Section 17100 – Control Strategies.
        1) The feed rate shall be paced with the recovery flowrate to achieve the desired disinfection level.
    c. Step 3 – Done.
        1) Once the Recovery mode is deselected the operation of the selected feed pump shall stop.
6. Indicators and alarms:
    a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.
7. Failure modes:
    a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.

H. Monitoring Well 1:
   1. References:
      a. P&ID N-005.
   2. Abstract:
      a. Water from the monitoring well will be sampled by the conductivity analyzer. A sump pump will deliver the monitoring well water to the analzyer.
   3. Hardwired control:
      a. In LOCAL mode, VFD can be operatored via the VFD HIM.
   4. Hardwired interlocks/Overload Programmed Interlocks:
      a. Well Pump VFD Fault.
   5. PLC Control:
      a. Sampling will be done at the end of a timer interval or when initiated by the operator at the VFD or via the OIT.
      b. When initiated either automatically or manually, the timer will reset when the pump is confirmed not running.
      c. The automatic duty cycle of the sump pump is TBD.
      d. The speed profile of the VFD is TBD.
   6. Indicators and alarms:
      a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.
   7. Failure modes:
      a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.

I. Monitoring Well 2 and 3:
   1. References:
      a. P&ID N-005.
   2. Abstract:
      The water level in monitoring well 2 and well 3 will be continuously monitored separately.
   3. Hardwired control:
      a. None.
   4. Hardwired interlocks/Overload Programmed Interlocks:
      a. None.
   5. PLC Control:
      a. None.
   6. Indicators and alarms:
      a. As indicated on the Drawings and specified in Section 17100 - Control Strategies.
   7. Failure modes:
      a. As specified in Section 17100 - Control Strategies.

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 FIELD QUALITY CONTROL (NOT USED)

3.08 ADJUSTING (NOT USED)

3.09 CLEANING (NOT USED)

3.10 DEMONSTRATION AND TRAINING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.11 PROTECTION (NOT USED)

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 17302

FLOW MEASUREMENT: MAGNETIC FLOWMETERS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Full-body magnetic flowmeters.

B. Provide all instruments identified in the Contract Drawings.

1.02 REFERENCES

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. International Organization for Standardization (ISO):
   1. 9000 - Quality management systems -- Fundamentals and vocabulary.
   2. 17025 - General requirements for the competence of testing and calibration laboratories.

C. National Institute of Standards and Technology (NIST).

D. NSF International (NSF).

1.03 DEFINITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.04 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Include sizing information from the manufacturer that includes:
   1. Chart of the measurement error from zero to maximum measured volumetric flow range indicated in data sheets.
   2. Indication of all input parameters and their values used in the calculations.

1.05 QUALITY ASSURANCE

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Examine the complete set of Contract Documents and verify that the instruments are compatible with the installed conditions including:
   1. Process conditions: Fluids, pressures, temperatures, flows, materials, etc.
   2. Physical conditions:
      a. Installation and mounting requirements.
      b. Location within the process.
      c. Accessories: Verify that all required accessories are provided and are compatible with the process conditions and physical installation.

C. Notify the Engineer if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

1.06 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems

1.07 PROJECT OR SITE CONDITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.08 WARRANTY

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.09 MAINTENANCE

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. One of the following, no equal:
   1. Endress+Hauser:
      a. Promag W flowtube with 500 series transmitter.
      b. Promag H flowtube with 500 series transmitter.

2.02 MANUFACTURED UNITS

A. As specified in this Section including Attachment A - ISA Data Sheet - Flow Measurement: Magnetic Flowmeters.

B. Magnetic flowmeter:
   1. General:
      a. Magnetic flowmeters obtain the flow velocity by measuring the changes of induced voltage of the conductive fluid passing across a controlled magnetic field.

b. Complete zero stability shall be an inherent characteristic of the flowmeter system.
c. Include for each magnetic flow metering system:
    1) A metering tube with electrodes (sensor).
    2) Signal cable.
    3) Transmitter integral or remote as indicated on the Drawings.
    4) Flowmeter grounding rings.

2. Performance requirements:
    a. Accuracy:
        1) 0.25 percent of flow rate from 10 to 100 percent of full-scale for velocities ranging between 1.9 to 10 feet per second.
    b. Repeatability:
        1) 0.25 percent of rate.
3. Element:
    a. Metering tube:
        1) Constructed of carbon steel or Type 304 stainless steel (unless specifically noted otherwise in Attachment A - ISA Data Sheet - Flow Measurement: Magnetic Flowmeters) with flanged connections to match with piping material.
        2) Liner material in conformance with:
            a) Manufacturer's recommendations for the intended service.
            b) NSF certified for all drinking water applications.
        3) Electrodes type and material in conformance with:
            a) Manufacturer's recommendations for the intended service.
            b) Utilize a minimum of 2, self-cleaning electrodes.
        4) Meter terminal housing NEMA Type 4X, unless installed in locations such as vaults that will experience submergence. In those applications NEMA 6P is required.
            a) Unless specifically noted otherwise in Attachment A - ISA Data Sheet - Flow Measurement: Magnetic Flowmeters.
        5) Meter coating consisting of epoxy painted finish.
        6) Components:
            a) 2 grounding rings:
                (1) Which are in conformance with the manufacturer's bore and material recommendation for the meter's intended service.
4. Transmitter:
    a. Power supply:
        1) As indicated in the data sheets.
        2) Power consumption: 60 VA maximum.
    b. Outputs:
        1) As noted in Attachment A - ISA Data Sheet - Flow Measurement: Magnetic Flowmeters.
        2) For all instruments with 4 to 20 mA HART or digital bus protocol, provide a Device Type Manager (DTM) certification by FDT group.
    c. Microprocessor-based signal converter/transmitter.
    d. Utilize DC pulse technique to drive flux-producing coils.
    e. Contain a 6-digit display for flow rate, percent of span, and totalizer.
    f. Operator keypad interface.
    g. Integral zero return to provide consistent zero output signals in response to an external dry contact closure.
    h. Integral low flow cut-off zero return.

i. Programmable parameters including:
   1) Meter size.
   2) Full-scale flow rate.
   3) Magnetic field frequency.
   4) Time constant.
j. Data retention for a minimum of 5 years without auxiliary main or battery power.
k. Self-diagnostics and automatic data checking.
l. Protected terminals and fuses in a separate compartment which isolates field connection from electronics.
m. Ambient operating temperature limits of -5 to 140 degrees Fahrenheit (-20 to 60 degrees Celsius).
n. Enclosure:
   1) Non-hazardous area:
      a) NEMA Type 4X.
   2) For more information, see Attachment A - ISA Data Sheet - Flow Measurement: Magnetic Flowmeters.
o. The transmitter should support commissioning options via a service interface or via an internal web server accessible through an RJ-45 Ethernet port.
p. The transmitter should retain all setup parameters and accumulated measurements internally in non-volatile memory in the event of power failure.

2.03 ACCESSORIES

A. Provide stainless steel tags for each instrument. Tags shall be labeled as specified in the Contract Documents.

B. Provide sunshades for all transmitters located outdoors.

C. Provide galvanic isolation gaskets, nylon/Teflon™ flange bolt insulation bushings and nylon washers on all meters installed on pipes with cathodic protection.

D. Furnish 1 spool piece for every size of magnetic flow tube being provided.

2.04 SOURCE QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Factory calibrate each flow metering system at a facility that is traceable to the NIST. ISO-17025 accredited test facility with certified accuracy traceable to NIST.

C. Evidence of accreditation shall originate from a national verification agency such as A2LA.

D. FM approval certification or equal when installed in classified areas.

E. A real-time computer generated printout of the actual calibration date indication actual velocities and as read values of the flow tube.
   1. Flow calibration report of the manufacturers flow lab calibration procedure shall be shipped with the meter system.

2. Minimum calibration shall be a 3 point calibration including 1, 3, and 10 feet per second velocities for every meter and transmitter system.
3. Manufacturer shall archive all calibration reports for future reference.

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. For instruments located outdoors or where instrument elements and transmitters are separated by conduit located outside the building envelope, provide surge protection devices at the transmitters.

3.04 FIELD QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide manufacturer's services to perform installation inspection.

3.05 ADJUSTING

A. Field Verification:
1. Verify factory calibration of all instruments in accordance with the manufacturer's instructions.
2. The transmitter and sensor to include a method to verify flow meter performance to the original manufacturer specifications.
3. Verification should be traceable to factory calibration using a third party, attested onboard system pursuant to ISO standards.
4. The verification report should be compliant to common quality systems such as ISO 9000 to prove reliability of the meter specified accuracy.
5. Return factory calibrated devices to the factory if they do not meet the field verification requirements for calibration.

3.06 CLEANING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.07 DEMONSTRATION AND TRAINING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Demonstrate performance of all instruments to the Engineer before commissioning.

3.08 PROTECTION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.09 SCHEDULES

A. Instrument Data Sheets included in this Section.

B. The provided information does not necessarily include all required instruments.

C. Provide all instruments identified in the Contract Documents:
   1. Instruments may be indicated on the Drawings, specified in the Specifications, or both.

END OF SECTION

SECTION 17505

ANALYZERS: RESIDUAL CHLORINE

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Residual chlorine analyzers.

B. Provide all instruments identified in the Contract Documents.

1.02 REFERENCES

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.03 DEFINITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.04 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide complete documentation covering the traceability of all calibration instruments.

1.05 QUALITY ASSURANCE

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Examine the complete set of Contract Documents and verify that the instruments are compatible with the installed conditions including:
   1. Process conditions: Fluids, pressures, temperatures, flows, materials, etc.
   2. Physical conditions:
      a. Installation and mounting requirements.
      b. Location within the process.
      c. Accessories: Verify that all required accessories are provided and are compatible with the process conditions and physical installation.

C. Notify the Engineer if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

1.06 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.07 PROJECT OR SITE CONDITIONS

A. Project environmental conditions as specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.
   1. Provide instruments suitable for the installed site conditions including, but not limited to, material compatibility, site altitude, site seismic conditions, humidity, and process and ambient temperatures.

1.08 WARRANTY

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.09 MAINTENANCE

A. Furnish all parts, materials, fluids, etc. necessary for operation, maintenance, and calibration purposes throughout the warranty period. Deliver all of these supplies before project substantial completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Colorimetric residual analyzers:
   1. The following or equal:
      a. Wallace & Tiernan, Deplox 3.

2.02 MANUFACTURED UNITS

A. As specified in this Section including Attachment A - ISA Data Sheet - Analyzers: Residual Chlorine.

B. Colorimetric residual analyzers:
   1. General:
      a. Residual chlorine analyzer utilizing the DPD colorimetric method to provide accurate measurements independent of swings in pH or alkalinity levels in the sample source.
      b. Convert from free to total chlorine by changing reagents:
         1) Measure a sample blank before each sample measurement to provide zero reference compensation for sample color and turbidity, changes in light intensity due to voltage fluctuations, or light intensity.
   2. Performance requirements:
      a. Complete analysis every 2.5 minutes for free or total chlorine residual.
      b. Designed for 30 days of unattended operation, with less than 500 milliliters of reagent used per month.
      c. Accuracy:
         1) Within 5 percent of reading or within 0.035 milligrams per liters.

d. Range:
1) 0 to 5 milligrams per liters free or total residual.
e. Repeatability:
1) Within 5 percent or 0.05 milligrams per liters.

3. Transmitter:
a. Microprocessor-based signal converter/transmitter:
1) Self-diagnostic functions available via the alphanumeric, menu-driven keyboard.
b. Power supply:
1) 120 VAC.
2) Power consumption: 95 VA maximum.
c. Outputs:
1) Isolated 4 to 20 milliamperes DC.
2) As indicated on the instrument data sheets.
3) Relay outputs:
a) SPST relay contacts: 2.
b) Selectable to activate on the following conditions:
(1) High or low sample concentration.
(2) Analyzer system warning.
(3) Analyzer system shutdown.
d. Enclosure:
1) Rating: NEMA 12 (IP62).
2) ABS plastic with 2 clear polycarbonate windows.
3) Wall mounted.
e. Display:
1) LCD, 3-digit readout, and 6-character alphanumeric scrolling text line.
f. Light source:
1) Class I LED (light emitting diode), with peak wavelength of 520 nanometer; 50,000 hours estimated minimum life.

C. Amperometric residual analyzers:
1. General:
a. Residual chlorine analyzer utilizing amperometric technology for continuous monitoring of the free chlorine residual in solution.
2. Performance requirements:
a. Continuous on-line analysis for free or total chlorine residual.
b. Minimum detection: 0.040 milligrams per liters.
c. Accuracy:
1) Within 5 percent of reading or within 0.035 milligrams per liters.
d. Range:
1) 0 to 5 milligrams per liters free or total residual.
e. Repeatability:
1) Within 5 percent or 0.05 milligrams per liters.
3. Components:
a. Flow through sensors, including flow rate control, multiple probes.
4. Transmitter:
a. Power supply:
1) 120 VAC.
2) Power consumption: 95 VA maximum.

b. Outputs:
    1) 4 to 20 milliamperes isolated output with span programmable over any portion of the chlorine residual range.
    2) As indicated on the instrument datasheets.
    3) Relay outputs:
        a) SPST relay contacts: 2.
        b) Selectable to activate on the following conditions:
            (1) High or low sample concentration.
            (2) Analyzer system warning.
            (3) Analyzer system shutdown.
    4) Components:
        a) Manufacturer's cables.
c. Microprocessor-based signal converter/transmitter.
d. Display:
    1) LCD, 2-line minimum.
e. Enclosure:
    1) NEMA Type 4X.

2.03 ACCESSORIES

A. Air purge (where shown to be utilized):
    1. 0.1 CFM instrument quality air at 20 pounds per square inch gauge maximum.
    2. Connection: 1/4-inch OD tube, quick disconnect fitting.
    3. Power sourced by instruments transmitter.

B. Provide sun shades for outdoor installations.

C. Provide surge suppression for outdoor installations.

2.04 SOURCE QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Factory calibrate each instrument with a minimum 3-point calibration or according to Manufacturer's standard at a facility that is traceable to the NIST.
    1. Submit calibration data sheets to the Engineer at least 30 days before shipment of the instruments to the project site.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the installation location for the instrument and verify that the instrument will work properly when installed.
    1. Notify the Engineer promptly if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.04 FIELD QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide manufacturer's services to perform installation inspection, start-up and calibration/verification.

3.05 ADJUSTING

A. As specified in Section 17950 - Commissioning for Instrumentation and Controls.

3.06 CLEANING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.07 DEMONSTRATION AND TRAINING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.08 PROTECTION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.09 SCHEDULES

A. The provided information does not necessarily include all required instruments. Provide all instruments identified in the Contract Documents:
   1. Instruments may be indicated on the Drawings, specified in the Specifications, or both.

END OF SECTION

SECTION 17509

ANALYZERS: TURBIDITY

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Turbidity analyzers (turbidimeters).

B. Provide all instruments identified in the Contract Documents.

1.02 REFERENCES

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. CSA International (CSA).

C. United States Environmental Protection Agency (USEPA):
   1. Federal Register Vol 67 No. 209 - Analytical Method and an Associated Minimum Reporting Level (MRL) to Support the Unregulated Contaminant Monitoring Regulation's (UCMR) List 2 Aeromonas Monitoring.
   2. Federal Register Vol. 82 No. 143:
      a. 40 CFR Part 141 - National Primary Drinking Water Regulations.
   3. Method 180.1 - Determination of Turbidity by 360-degree Nephelometry.

1.03 DEFINITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.04 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide complete documentation covering the traceability of all calibration instruments.

1.05 QUALITY ASSURANCE

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Examine the complete set of Contract Documents and verify that the instruments are compatible with the installed conditions including:
   1. Process conditions: Fluids, pressures, temperatures, flows, materials etc.
   2. Physical conditions:
      a. Installation and mounting requirements.

b. Location within the process.
c. Accessories: Verify that all required accessories are provided and are compatible with the process conditions and physical installation.

C. Notify the Engineer if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

D. Provide instruments manufactured at facilities certified to the quality standards of ISO 9001.

1.06 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.07 PROJECT OR SITE CONDITIONS

A. Project environmental conditions as specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems:
1. Provide instruments suitable for the installed site conditions including, but not limited to, material compatibility, site altitude, site seismic conditions, humidity, and process and ambient temperatures.

1.08 WARRANTY

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.09 MAINTENANCE

A. Furnish all parts, materials, fluids, etc. necessary for operation, maintenance, and calibration purposes throughout the warranty period. Deliver all of these supplies before project substantial completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Low range turbidimeters:
1. HACH - TU5300 with SC200 or SC1000 controller.

2.02 MANUFACTURED UNITS

A. As specified in this Section including Attachment A - ISA Data Sheet - Analyzers: Turbidity.

B. Low range turbidimeters:
1. General:
a. The turbidimeter shall be a microprocessor-based, continuous-reading, on-line nephelometric instrument utilizing a 4-beam radiometric measurement. Each turbidity system shall consist of a 1 sensor and 1 transmitter.

2. Performance requirements:
    a. Accuracy:
        1) Within 2 percent of reading or Within 0.012 NTU (whichever is greater) over the range of regulation.
    b. Resolution:
        1) 0.0001 NTU.
    c. Repeatability:
        1) Better than 1 percent at 1 NTU.
    d. Response time:
        1) Initial response in 30 seconds.
        2) 9.5 seconds with internal bubble trap.
    e. Sample flow:
        1) Required flow: 30 to 500 milliliter per minute (0.5 to 8 gallon per hour).
        2) Optimal flow: 50 to 80 ml/min.
    f. Storage temperature:
        1) -20 degrees Celsius to 60 degrees Celsius.
    g. Operating temperature:
        1) 0 degrees Celsius to 50 degrees Celsius.
    h. Operating humidity:
        1) 5 to 95 percent non-condensing.
3. Element:
    a. Light sources shall be emitted by a LED source.
    b. The method of measuring turbidity will be nephelometric.
    c. Light will be directed into the sample in the turbidimeter body.
    d. The light scattered at 90 degrees will be sensed by a submerged detector in the measuring chamber.
4. Transmitter:
    a. The transmitter unit shall be a microprocessor-based device capable of functioning with a single sensor.
    b. Interface module:
        1) The interface unit shall allow operators to control sensor and network functions with user-friendly, menu-driven software, and shall provide data logging of measurement data, and the capability to transfer data to a computer or printer via an RS232 serial input/output device.
        2) The interface unit and power supply shall be housed in NEMA Type 4X industrial plastic enclosures.
    c. Power supply:
        1) 120 VAC.
        2) Power consumption: 40 VA maximum.
    d. Outputs:
        1) 2 Isolated 4 to 20 milliamperes DC.
        2) MODBUS TCP.
        3) Relay outputs:
            a) 3 Form C contact.
            b) Rated 5 amps at 100-240 V.
            c) Programmable.
        4) Output span programmable over any portion of the range.
    e. Piping connections:
        1) Sample inlet fitting 1/2-inch NPT female, adaptable to 3/8-inch or 1/4-inch barb or tube fittings.
        2) Drain fitting 1/2-inch NPT female.

f. Enclosures NEMA Type 4X/IP66.
g. Certification:
    1) Certified in accordance with CSA type 4.
    2) CE compliant.
    3) Class I Division 2 Groups A, B, C and D.
    4) Class II Division 2 Groups E, F and G.

2.03 ACCESSORIES

A. Mounting brackets.

B. Flushing solenoids for cleaning the probe as recommended by the manufacturer.

C. **[Low pressure kit: 0 to 50 pounds per square inch gauge at 68 degrees Fahrenheit.][High pressure kit - 0 to 150 pounds per square inch gauge at 68 degrees Fahrenheit.]**

2.04 SOURCE QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Factory calibrate each instrument with a minimum 3-point calibration or according to manufacturer's standard at a facility that is traceable to the NIST.
    1. Submit calibration data sheets to the Engineer at least 30 days before shipment of the instruments to the project site.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the installation location for the instrument and verify that the instrument will work properly when installed.
    1. Notify the Engineer promptly if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Coordinate the installation with all trades to ensure that the mechanical system has all necessary appurtenances including weld-o-lets, valves, etc. for proper installation of instruments.

3.04 FIELD QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide manufacturer's services to perform installation inspection, start-up and calibration/verification.

3.05 ADJUSTING

A. As specified in Section 17950 - Commissioning for Instrumentation and Controls.

3.06 CLEANING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.07 DEMONSTRATION AND TRAINING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.08 PROTECTION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.09 SCHEDULES

A. The provided information does not necessarily include all required instruments. Provide all instruments identified in the Contract Documents:
   1. Instruments may be indicated on the Drawings, specified in the Specifications, or both.

END OF SECTION

SECTION 17511

ANALYZERS: CONDUCTIVITY

PART 1 GENERAL

1.01 SUMMARY

A. Provide all instruments identified in the Contract Documents.

B. Section includes:
   1. Conductivity instruments.

1.02 REFERENCES

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.03 DEFINITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.04 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide complete documentation covering the traceability of all calibration instruments.

1.05 QUALITY ASSURANCE

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Examine the complete set of Contract Documents and verify that the instruments are compatible with the installed conditions including:
   1. Process conditions: Fluids, pressures, temperatures, flows, materials etc.
   2. Physical conditions:
      a. Installation and mounting requirements.
      b. Location within the process.
      c. Accessories: Verify that all required accessories are provided and are compatible with the process conditions and physical installation.

C. Notify the Engineer if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

D. Provide instruments manufactured at facilities certified to the quality standards of ISO 9001.

1.06 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.07 PROJECT OR SITE CONDITIONS

A. Project environmental conditions as specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.
   1. Provide instruments suitable for the installed site conditions including, but not limited to, material compatibility, site altitude, site seismic conditions, humidity, and process and ambient temperatures.

1.08 WARRANTY

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.09 MAINTENANCE

A. Furnish all parts, materials, fluids, etc. necessary for operation, maintenance, and calibration purposes throughout the warranty period. Deliver all of these supplies before project substantial completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. One of the following, no equal:
   1. Endress+Hauser:
      a. Sensor model: ConduMax W CLS 15.
      b. Transmitter model: Liquisys M CLM 223/253.
   2. Emerson, Rosemount:
      a. Sensor model:
         1) Endurance 400 Series.
         2) 200 Series (Toroidal).
      b. Transmitter model:
         1) 1056.
         2) XMT Series.
   3. ABB:
      a. Sensor model:
         1) TB4 Series.
         2) TB4042 Series.
      b. Transmitter model:
         1) AX400 Series.
         2) TB80 Series.

B. All instruments of similar nature must be furnished by the same manufacturer.

2.02 MANUFACTURED UNITS

A. As specified in this Section including Attachment A - ISA Data Sheet - Analyzers: Conductivity.

B. Conductivity analyzers:
   1. General:
      a. Analyzers shall determine the conductivity of the liquid by measuring the output from the alternating current flowing through measuring electrodes and medium.
   2. Performance requirements:
      a. Accuracy: Within 0.01 percent of span from 0 to 100µS/cm, within 1.0 percent of span from 0 to 10,000µS/cm.
      b. Stability: 0.05 percent of reading/month.
      c. Ambient conditions:
         1) Operating -20 degrees Celsius to 60 degrees Celsius.
         2) Relative humidity 0 to 95 percent non-condensing.
   3. Element:
      a. Shall be the 2 electrode measuring cell type:
         1) Conductivity measuring process electrode.
         2) Reference or standard electrode.
      b. Electrodes shall be supplied with alternating measuring voltage from the transmitter.
      c. The probe assembly shall be constructed of non-corrosive materials.
      d. Electrode material:
         1) Titanium or Graphite in a molded reinforced polypropylene body threaded for insertion, submersion, or flow-through installation.
      e. Temperature compensated to reference temperature of 25 degrees Celsius via an integral temperature compensation element.
      f. Conductivity measuring range: 1.0 to 2000 µS/cm.
      g. Temperature range: 0 to 100 degrees Celsius.
      h. Pressure range: 100 psig max.
      i. Sensor cable: Provide watertight sensor-to-cable connector that prevents cable twisting and eliminates rewiring when replacing the sensor.
      j. Cable length: As required to connect sensor to transmitter and allow suitable length for proper and convenient servicing of probe assembly.
      k. All wetted materials shall be compatible with process fluid.
   4. Transmitter:
      a. Power supply:
         1) 120 VAC.
         2) Power consumption: 10 VA maximum.
      b. Outputs:
         1) 2 Isolated 4-20 mA DC with HART communication protocol.
         2) Relay outputs:
            a) 3 Form C contact.
            b) Rated 5 amps at 250 VAC.
            c) Programmable.
         3) Display:
            a) Backlit LCD digital display.
   5. Mechanical:
      a. Enclosure rating: NEMA Type 4X and IP65.

b. Mounting: As indicated in the Contract Documents.
    1) Panel mount suitable for door mounting on enclosures. Include gaskets to maintain weather rating of the panel.
    2) Surface mount enclosures.
    3) Pipe mounting accessories shall be included for mounting enclosures to a 2-inch pipe.
c. Provide all mounting hardware for proper installation and servicing of the probe assembly.

2.03 ACCESSORIES

A. Probe:
    1. Junction box:
        a. Shall be used with extension cable for direct connection to transmitter.
        b. NEMA Type 4X.

B. Transmitter:
    1. Stainless steel tag:
        a. Marking specified on Instrument Data Sheets.

C. Provide sunshades for outdoor installations.

2.04 SOURCE QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Factory calibrate each instrument with a minimum 3-point calibration or according to Manufacturer's standard at a facility that is traceable to the NIST.
    1. Submit calibration data sheets to the Engineer at least 30 days before shipment of the instruments to the project site.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the installation location for the instrument and verify that the instrument will work properly when installed.
    1. Notify the Engineer promptly if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.04 FIELD QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide manufacturer's services to perform installation inspection, start-up and calibration/verification.

3.05 ADJUSTING

A. As specified in Section 17950 - Commissioning for Instrumentation and Controls.

3.06 CLEANING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.07 DEMONSTRATION AND TRAINING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.08 PROTECTION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.09 SCHEDULES

A. The provided information does not necessarily include all required instruments. Provide all instruments identified in the Contract Documents:
   1. Instruments may be indicated on the Drawings, specified in the Specifications, or both.

END OF SECTION

SECTION 17529

ANALYZERS: FLUORIDE

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Fluoride analyzers.

B. Provide all instruments as identified in the Contract Documents.

1.02 REFERENCES

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.03 DEFINITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.04 SUBMITTALS

A. Furnish submittals as specified in Section 01330 - Submittal Procedures and Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide complete documentation covering the traceability of all calibration instruments.

1.05 QUALITY ASSURANCE

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Examine the complete set of Contract Documents and verify that the instruments are compatible with the installed conditions including:
   1. Process conditions: Fluids, pressures, temperatures, flows, materials, etc.
   2. Physical conditions:
      a. Installation and mounting requirements.
      b. Location within the process.
      c. Accessories: Verify that all required accessories are provided and are compatible with the process conditions and physical installation.

C. Notify the Engineer if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

D. Provide instruments manufactured at facilities certified to the quality standards of ISO 9001.

1.06 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.07 PROJECT OR SITE CONDITIONS

A. Project environmental conditions as specified in Section 17050 - Common Work Results for Process Control and Instrumentation.
   1. Provide instruments suitable for the installed site conditions including, but not limited to, material compatibility, site altitude, site seismic conditions, humidity, and process and ambient temperatures.

1.08 WARRANTY

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.09 MAINTENANCE

A. Furnish all parts, materials, fluids, etc. necessary for operation, maintenance, and calibration purposes throughout the warranty period. Deliver all of these supplies before project substantial completion.

B. Furnish the following spare parts:
   1. Spare pump.
   2. Spare sensor.
   3. 3 Pump tubes.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. One of the following, no equal:
   1. ABB, model AFM631, Aztec 600.
   2. ATI, Model A15/82.
   3. Tytronics, Sentinel.

2.02 MANUFACTURED UNITS

A. As specified in this Section including Attachment A - ISA Data Sheet - Analyzers: Fluoride.

B. Fluoride analyzer:
   1. General:
      a. Provide a fluoride analyzer for continuous monitoring of the fluoride ion in solution. Analyzer includes the following:
         1) An electronic monitor.
         2) Chemistry module containing a fluoride sensor.
         3) A reference sensor.
         4) Chemical pump.
         5) Associated accessories described below.

2. Performance requirements:
    a. Sample flow rate: 2 - 10 GPH at inlet overflow assembly.
    b. Operating temperature range: 0.0 degrees Celsius - 40.0 degrees Celsius (32.0 degrees Fahrenheit - 104.0 degrees Fahrenheit).
    c. Accuracy: Within 5 percent of span.
    d. Repeatability: Within 5 percent of span.
    e. Selectable range:
        1) 0.0 - 1.0 PPM minimum.
        2) **[0.0 - 100 PPM maximum.]**
        3) 0.0 - 1,000 PPM maximum.
3. Element:
    a. Housed in a NEMA Type 4X enclosure with hinged door to allow tool-less access to reagents and sampling equipment.
    b. A separate enclosure from the fluoride monitor.
    c. Contain an ion selective fluoride electrode.
    d. A refillable chloride reference electrode.
    e. A sample and buffer pump.
    f. Cast acrylic measuring chamber.
    g. Sample drawn from a sample overflow chamber at a fixed rate. Overflow shall be discharged to a drain line.
    h. Provide a three-way hand valve shall be provided to bypass the process sample to provide a zero solution.
    i. Sample inlet: 1/4-inch I.D. hose barb.
    j. Sample drain: 1/2-inch I.D. hose barb.
4. Transmitter:
    a. Microprocessor-based signal converter/transmitter.
    b. Provide a minimum of three independently programmed alarm/control relays adjustable over the entire range of the instrument.
    c. Provide backlit digital display in a numeric or graphical format:
        1) The display shall be alphanumeric LCD and capable of indicating fluoride concentration up to 1,000 PPM.
        2) The display shall indicate control and alarm conditions and setpoints, temperature, and all configuration information programmed through the front keypad.
    d. Self-diagnostics and automatic data checking.
    e. Automatic calibration, cleaning and be self-priming.
    f. Ambient operating temperature limits of 5 degrees Celsius to 50 degrees Celsius (41 degrees Fahrenheit to 122 degrees Fahrenheit).
    g. Housed in a NEMA Type 4X (IP66) enclosure with hinged door to allow tool-less access to controls and for viewing the LCD display.
    h. Keypad: protected with a software lock and all programming information protected by an access code.
    i. Power supply:
        1) 120 VAC.
        2) Power consumption: 150 VA maximum.
    j. Outputs:
        1) Isolated 4-20 mA DC with HART communication protocol.
        2) Relay outputs:
            a) 3 Form C contact.
            b) Rated 5 amps at 120 VAC.
            c) Programmable.

2.03 ACCESSORIES

A. Provide sunshades for outdoor installations.

2.04 SOURCE QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Factory calibrate each instrument with a minimum 3-point calibration or according to Manufacturer's standard at a facility that is traceable to the NIST.
   1. Submit calibration data sheets to the Engineer at least 30 days before shipment of the instruments to the project site.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the installation location for the instrument and verify that the instrument will work properly when installed.
   1. Notify the Engineer promptly if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.04 FIELD QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide manufacturer's services to perform installation inspection, start-up and calibration/verification.

3.05 ADJUSTING

A. As specified in Section 17950 - Commissioning for Instrumentation and Controls.

3.06 CLEANING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.07 DEMONSTRATION AND TRAINING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.08 PROTECTION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.09 SCHEDULES

A. The provided information does not necessarily include all required instruments. Provide all instruments identified in the Contract Documents:
   1. Instruments may be indicated on the Drawings, specified in the Specifications, or both.

END OF SECTION

SECTION 17710

CONTROL SYSTEMS: PANELS, ENCLOSURES, AND PANEL COMPONENTS

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PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Design, fabrication and assembly of all instrumentation enclosures, control panels and components provided under this contract, including but not limited to:
      a. Custom built instrumentation and control panels, including all enclosures for hand stations controllers, low voltage power distribution and marshalling panels.
      b. Control panels furnished as part of equipment systems specified in other Divisions, such as vendor control panels (VCPs) and chemical feed panels.
      c. Control components.
      d. Control panel installation.

B. Provide all control panels identified in Contract Documents.

1.02 REFERENCES

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Institute of Electrical and Electronics Engineers (IEEE):
   1. C62.41.1 - Guide on the Surge Environment in Low-Voltage (1000 V and less) AC Power Circuits.
   2. 802.3af - Standard for Information Technology Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications.
   3. 802.3at - Standard for Information Technology -- Local and Metropolitan area networks -- Specific requirements -- Part 3: CSMA/CD Access Method and Physical Layer Specifications Amendment 3: Data Terminal Equipment (DTE) Power via the Media Dependent Interface (MDI) Enhancements.

C. International Electrotechnical Commission (IEC):
   1. 61643-11 - Low-Voltage Surge Protective Devices - Part 11: Surge Protective Devices Connected to Low-Voltage Power Systems - Requirements and test methods.
   2. 61643-21 - Low-Voltage Surge Protective Devices - Part 21: Surge Protective Devices Connected to Telecommunications and Signaling Networks - Performance Requirements and Testing Methods.

D. Underwriters Laboratories Inc. (UL):
   1. 248-14 - Low-Voltage Fuses - Part 14: Supplemental Fuses.
   2. 497B - Standard for Protectors for Data Communications and Fire-Alarm Circuits.
   3. 508 - Standard for Industrial Control Equipment.
   4. 508A - Standard for Industrial Control Panel.
   5. 1077 - Standard for Supplementary Protectors for Use in Electrical Equipment.

6. 1283 - Standard for Electromagnetic Interference Filters.
7. 1449 - Standard for Surge Protective Devices.

1.03 DEFINITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Specific definitions:
   1. The term "panel" in this Section is interchangeable with the term "enclosure."

1.04 SUBMITTALS

A. Provide submittals as specified in Section 01330 - Submittal Procedures and Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide a control panel hardware submittal for each control panel/enclosure being provided on this project, including but not limited to:
   1. Product data:
      a. Enclosure construction details and NEMA type.
      b. Manufacturer's literature and specification data sheets for each type of equipment to be installed within or on the panel or enclosure.
   2. Shop drawings:
      a. Scaled, detailed exterior panel (front and side views) and interior panel layout showing equipment arrangement and dimensional information:
         1) Provide draft for review and approval by Engineer. The Engineer has the authority to substantially alter initial panel layouts.
      b. Complete nameplate engraving schedule.
      c. Structural details of fabricated panels.
   3. Calculations:
      a. Provide installation details based on calculated shear and tension forces:
         1) Calculations shall be signed and sealed by a Professional Engineer licensed in the state where the cabinets and panels will be installed.
      b. For assembled enclosures and other equipment with a weight of 200 pounds or more, provide calculations for:
         1) Weight including panel internal components.
         2) Seismic forces and overturning moments.
         3) Shear and tension forces in connections.
      c. Cooling calculations, including but not limited to:
         1) Highest expected ambient temperature for the enclosure's location.
         2) Internal heat load.
         3) Exposure to direct sunlight.
         4) Dimensions of the enclosure in inches.
         5) Maximum allowable temperature inside the enclosure, based on the lowest operating temperature limit of the installed components.

C. Seismic design:
   1. Seismic panel construction:
      a. Seismic anchorage: Provide seismic design calculations and installation details for anchorage of all panels, enclosures, consoles, etc. to meet seismic requirements in Section 01612 - Seismic Design Criteria:
         1) Stamped by a Professional Engineer registered in the state where the project is being constructed.
      b. For floor-mounted freestanding panels weighing 200 pounds or more (assembled, including contents), submit calculations, data sheets, and other information to substantiate that panel, base, and framing meet minimum design strength requirements and seismic requirements as specified in Section 01612 - Seismic Design Criteria. Calculations shall be signed and sealed by a Professional Engineer licensed in the state where the cabinets and panels will be installed.

1.05 QUALITY ASSURANCE

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Assemble panels, enclosures, and rack systems along with all internal and external devices, wiring, equipment, and materials in a facility that is recognized by UL to assemble and certify UL-labeled control panels:
   1. Provide all components and equipment with UL 508 listing.
   2. All control panels shall be UL 508A labeled, unless the equipment in the panel and the design in the contract documents cannot be reasonably modified to meet the requirements for UL 508A labeling:
   3. Provide fuses for all equipment that is not UL or UR listed.
   4. Install all intrinsically safe circuits and equipment in accordance with UL698A.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Project environmental conditions as specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.
   1. Provide instruments suitable for the installed site conditions including, but not limited to, material compatibility, site altitude, site seismic conditions, humidity, and process and ambient temperatures.

1.07 PROJECT OR SITE CONDITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation.

1.08 SEQUENCING (NOT USED)

1.09 SCHEDULING (NOT USED)

1.10 WARRANTY

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.11 SYSTEM START-UP (NOT USED)

1.12 OWNER'S INSTRUCTIONS (NOT USED)

1.13 COMMISSIONING (NOT USED)

1.14 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. As listed below in the individual component paragraphs.

B. Provide instruments and other components performing similar functions of the same type, model, or class, and from 1 manufacturer.

2.02 SYSTEM DESCRIPTION

A. Panel dimensions:
   1. Minimum dimensions are scalable and are based upon manufacturer's non-certified information. It is the responsibility of the Contractor or manufacturer to design and size all panels:
      a. Size panels to provide space for all equipment, wiring, terminations, and other items in the panel, including space for future build out.
      b. Panel sizes that substantially deviate (within 3 inches in any dimension) from the sizes must be approved by the Engineer.
      c. Maximum panel depth for PLC panels: 16 inches, unless otherwise indicated.
      d. Maximum panel depth for non-PLC panels: 18 inches, unless otherwise indicated.

B. Structural design:
   1. Completed and installed panel work shall safely withstand seismic requirements at the project site as specified in Section 16050 - Common Work Results for Electrical. Enclosures and internal equipment shall be braced to prevent damage from specified forces.

2.03 EXISTING PRODUCTS (NOT USED)

2.04 MATERIALS

A. Construct and finish enclosures using materials capable of withstanding the mechanical, electrical, and thermal stresses, as well as the effects of humidity and corrosion that are likely to be encountered in normal service:
   1. Enclosures shall have the following properties:
      a. NEMA Type 4X: Type 316 stainless steel (unless Type 304 is indicated on the Drawings).
      b. NEMA Type 12: Steel with gasketed door, dusttight.

B. Bolting material:
   1. Commercial quality 1/2-inch diameter, stainless steel hex-head Grade 5 bolts, nuts, and washers, with unified coarse (UNC) threads.

2. Carriage bolts for attaching end plates.
3. All other bolted joints shall have S.A.E. standard lock washers.

2.05 MANUFACTURED UNITS

A. Panels/enclosures:
   1. Manufacturers: One of the following:
      a. nVent/Hoffman.
      b. Saginaw Control & Engineering.
      c. Rittal.
   2. Panel assembly:
      a. General guidelines for panel fabrication include:
         1) Continuous welds ground smooth.
         2) Exposed surfaces free of burrs and sharp edges.
         3) Base formed of heavy channel iron, either galvanized or powder coated, minimum 1/2-inch holes at 12-inch spacing to accommodate anchoring of freestanding enclosures to floor.
      b. Construct enclosure and mounting panel using stretcher-level quality sheet metal having minimum thickness not less than the following sizes (U.S. Standard Gauge):

Enclosure Height (inches)	Minimum Enclosure Steel Thickness (gauge)	Minimum Back Mounting Panel Thickness (gauge)
Wall-mounted up to 48	14	14
Up to 57	12	12
57 - 69	12	10
69 - 82	12, except 10 on back	10
82 or more	10	10

         1) Use heavier sheet metal to meet seismic requirements at the project site or when required due to equipment requirements.
      c. For Rittal or engineer approved equal free-standing modular enclosure, construct enclosure and mounting panel using stretcher-level quality sheet metal having minimum thickness not less than the following sizes (U.S. Standard Gauge):

Enclosure Height (inches)	Minimum Enclosure Steel Thickness (gauge)	Minimum Back Mounting Panel Thickness (gauge)
57 - 82 or more	16	11

      d. Construct supporting frame structure with angled, channeled, or folded rigid section of sheet metal, rigidly attached to and having essentially the same outer dimensions as the enclosure surface and having sufficient torsional rigidity to resist the bending moments applied via the enclosure surface when it is deflected.
      e. Provide stiffeners for back mounting or C folded back panels in enclosures larger than 4 feet. In addition, secure the panels in place by collar studs welded to the enclosure.

f. Door construction:
    1) Turned-back edges suitably braced and supported to maintain alignment and rigidity without sagging.
    2) Sufficient width to permit door opening without interference with rear projection of flush-mounted instruments.
    3) Heavy-gauge stainless steel hinges.
    4) For NEMA Type 12, Type 4, and Type 4X, provide oil-resistant neoprene sealing gasket and adhesive to seal cover to enclosure.
    5) Gasket installed to seal against roll lip on the enclosure opening.
g. Latches:
    1) For panels, provide each door with an oil tight 3-point latching mechanism and locking handle with rollers on the ends of the latch rods. Latch rods shall be connected to a common door handle, hold doors securely, and form a compressed seal between door and gasket, at the top, side, and bottom.
        a) Provide padlock for each enclosure with padlock provisions.
        b) Provide 2 keys per panel.
        c) All locks keyed alike.
    2) For Rittal or engineer approved equal free-standing modular enclosure, provide each door with a 2-point latching mechanism.
    3) For cabinets not available with 3-point latching hardware, provide multiple clips and padlock hasps.
h. Panel cut-outs:
    1) Cut, punch, or drill cutouts for instruments, devices, and windows. Smoothly finish with rounded edges.
    2) Allow a minimum of 3-inch envelope around all displays, controllers, and monitors.
    3) Reinforce around cut-outs with steel angles or flat bars for the following:
        a) Large panel cutouts; for example, openings for local operator interfaces.
        b) Pilot device groupings, where the removed metal exceeds 50 percent of the available metal.
i. NEMA Type 4X powder-coated stainless steel enclosures are not an acceptable substitute for stainless steel.

3. Outdoor panels. Supplementary requirements for panels located outdoors are as follows:
    a. All enclosures located outdoors shall be explicitly designed and rated for outdoor service by the manufacturer.
    b. Door hardware: Stainless steel.
    c. Provide factory installed rain canopy and sun shield for all enclosures with operator interface panels.
    d. Bases: Heavy channel, gasketed stainless steel bases, flanges up, for anchoring to pad.

B. Arrangement of components:
    1. Arrange panel internal components for external conduit and piping to enter into panel either from above or below.
    2. Arrange panel instruments and control devices in a logical configuration, associating pushbutton and selector switches with related readout devices.

3. Mount internal control components on an internal back panel. Devices may be mounted on the side panel only by special permission from the Engineer.
4. All control panel mounted operator interface devices shall be mounted between 42 inches and 60 inches above finished floor.

C. Overcurrent protection:
   1. Main overcurrent device:
      a. Where the electrical power supply voltage to the control panel is more than 120 VAC, provide the panel with a flange-mounted disconnect handle operating a molded-case circuit breaker and provide a control power transformer for 120-VAC circuits:
         1) Door-mounted disconnect handles are not acceptable.
         2) Mechanically interlock the disconnect switch with the control enclosure doors so that no door can be opened unless the power is disconnected, and the disconnect switch cannot be closed until all doors are closed.
         3) Provide means to defeat the interlock.
         4) Lockable in the off position.
      b. Control panels supplied with 120 VAC:
         1) Provide an internal breaker with the line side terminals covered by a barrier.
         2) Provide a nameplate prominently positioned on the control panel identifying the location of the power source and a warning statement requiring the source to be disconnected before opening the door to the enclosure.
         3) Provide a nameplate prominently positioned on the control panel stating "CAUTION Risk of Electric Shock – UPS equipment outputs remain energized with main disconnect in off position" for any panel containing a UPS.
   2. Provide circuit breakers as specified in Section 16412 - Low Voltage Molded Case Circuit Breakers.
   3. Selection and ratings of protective devices:
      a. Interrupting ratings: Not less than the system maximum available fault current at the point of application.
      b. Voltage rating: Not less than the voltage of the application.
      c. Select current rating and trip characteristics to be suitable for:
         1) Maximum normal operating current.
         2) Inrush characteristics.
         3) Coordination of the protective devices to each other and to the source breaker feeding the panel.
      d. Circuit breakers, fuses, and motor overcurrent protection devices used for branch circuit protection must be UL 508A compliant.
         1) Circuit breakers listed under UL 1077 Standard for Supplementary Protectors that do not comply with UL 508A requirements are not acceptable.
         2) Miscellaneous, miniature, and micro fuses listed under UL 248 Part 14 that do not comply with UL 508A requirements are not acceptable.
         3) Manual motor controllers provided with an instantaneous-trip overcurrent mechanism listed under UL 508 that do not comply with UL 508A requirements are not acceptable.

4. Provide a separate protective device for each powered electrical device:
    a. An individual circuit breaker for each 120-VAC instrument installed within its respective control panel and clearly identified for function.
    b. An individual fuse for each PLC discrete output. Provide with individual blown fuse indication external of the I/O card:
        1) Size external fuse to open before any I/O-card-mounted fuses.
    c. Individual discrete inputs shall use a 1/2-ampere fuse.
    d. Install protective devices on the back mounting panel and identify by a service nameplate in accordance with the wiring diagrams.
5. Fuses for 4 to 20 milliamperes signals:
    a. Provide durable, readily visible label for each fuse, clearly indicating the correct type, size, and ratings of replacement fuse:
        1) Label shall not cover or interfere with equipment manufacturer's instructions.
    b. An individual 1/2-ampere fuse for each 4-to-20 milliamperes analog loop powered from the control panel.
    c. Provide fuses rated for the voltage and available short-circuit current at which they are applied.
    d. Manufacturers: One of the following:
        1) Ferraz Shawmut.
        2) Littelfuse.
        3) Bussmann.
6. Fuse holders:
    a. Modular type:
        1) DIN rail mounting on 35-millimeter rail.
        2) Touch-safe design: All connection terminals to be protected against accidental touch.
        3) Incorporates blown-fuse indicator.
        4) Plug-in style fuse terminals and fuse plugs are not acceptable.
    b. Provide nameplate identifying each fuse:
        1) As specified in Section 16075 - Identification for Electrical Systems.
    c. Manufacturers: One of the following:
        1) Phoenix Contact, UT4-HESI Series.
        2) Allen-Bradley, 1492-FB Series B.
7. Control circuit breakers:
    a. DIN rail mounting on 35-millimeter rail.
    b. Manual OPEN-CLOSE toggle switch.
    c. Rated for 250 VAC.
    d. Interrupting rating: 10 kiloampere (kA) or available fault current at the line terminal, whichever is higher.
    e. Current ratings: As required for the application.
    f. Provide nameplate identifying each circuit breaker:
        1) As specified in Section 16075 - Identification for Electrical Systems.
    g. Manufacturers: One of the following:
        1) Phoenix Contact, TMC Series.
        2) ABB.
        3) Allen-Bradley.
        4) Square D.
8. Electronic circuit protectors:
    a. Used where a NEC Class 2/SELV power.
    b. DIN rail mounting on 35-millimeter rail.

c. Power source:
    1) Rated for 24 VDC.
    2) Maximum nameplate rating: 100VA.
d. 4 channels to feed 4 independent power feeds to separate devices.
e. Output current ratings: As required for the application.
f. LED input status indication.
g. LED failure status of each channel indication.
h. Fail contacts.
i. Provide nameplate identifying each circuit electronic circuit protector module:
    1) As specified in Section 16075 - Identification for Electrical Systems.
j. Manufacturers: One of the following:
    1) Rockwell Automation 1692-TD014.
    2) Puls PISA11 series.

D. Conductors and cables:
1. Power and control wiring:
    a. Materials: Stranded, soft annealed copper.
    b. Insulation: 600 volts type MTW.
    c. Minimum sizes:
        1) Primary power distribution: 12 AWG.
        2) Secondary power distribution: 14 AWG.
        3) Control: 16 AWG.
    d. Color:
        1) AC power (line and load): Black.
        2) AC power (neutral): White.
        3) AC control: Violet.
        4) AC control: Orange for foreign voltages.
        5) DC power and control (ungrounded): Red.
        6) DC power and control (grounded): Red with White stripe.
        7) Ground: Green.
2. Signal cables:
    a. Materials: Stranded, soft annealed copper.
    b. Insulation: 600 volts, PVC outer jacket.
    c. Minimum size: 18 AWG paired triad.
    d. Overall aluminum shield (tape).
    e. Copper drain wire.
    f. Color:
        1) 2-Conductor:
            a) Positive (+): Black.
            b) Negative (-): Clear.
        2) 3-Conductor:
            a) Positive (+): Black.
            b) Negative (-): Clear.
            c) Signal: White.
    g. Insulate the foil shielding and exposed drain wire for each signal cable with heat-shrink tubing.

E. Conductor identification:
1. Identify each conductor and cable with unique wire numbers as specified in Section 16075 - Identification for Electrical Systems.
2. Readily identified without twisting the conductor.

F. General wiring requirements:
   1. Wiring methods: Wiring methods and materials for panels shall be in accordance with the NEC requirements for General Purpose (no open wiring) unless otherwise specified.
   2. Install all components in accordance with the manufacturer's instructions included in the listing and labeling.
   3. Provide a nameplate on the cover of the control panel identifying all sources of power supply and foreign voltages within the control panel.
   4. Provide transformers, protective devices, and power supplies required to convert the supply voltage to the needed utilization voltage.
   5. Provide power surge protection for all control panels.
   6. Provide signal surge protection within control panels for each analog I/O, discrete I/O, and data line (Copper Ethernet, Coax, Fieldbus signals) that originates from outdoor devices.
   7. Provide non-metallic ducts for routing and organization of conductors and cables:
      a. Provide wiring separation plan.
      b. Size ducts for ultimate build-out of the panel, or for 20-percent spare, whichever is greater.
      c. Provide separate ducts for signal and low-voltage wiring from power and 120-VAC control wiring:
         1) 120 VAC: Grey colored ducts.
         2) 24 VDC: White colored ducts.
   8. Cables shall be fastened with cable-mounting clamps or with cable ties supported by any of the following methods:
      a. Screw-on cable tie mounts.
      b. Hammer-on cable-tie mounting clips.
      c. Fingers of the nonmetallic duct.
   9. Wire ties:
      a. No wire ties inside wire duct.
      b. Use Panduit Cable tie installation tool, with tension control/cutoff.
      c. Verify cut ends are cut flush filed smooth after installed.
   10. Provide supports at the ends of cables to prevent mechanical stresses at the termination of conductors.
   11. Support panel conductors where necessary to keep them in place.
   12. Wiring to rear terminals on panel-mount instruments shall be run in nonmetallic duct secured to horizontal brackets run adjacent to the instruments.
   13. Conductors and cables shall be run from terminal to terminal without splice or joints. Exceptions:
      a. Factory-applied connectors molded onto cables shall be permitted. Such connectors shall not be considered as splices or joints.
   14. The control panel shall be the source of power for all 120-VAC devices interconnected with the control panel including, but not limited to:
      a. Solenoid valves.
      b. Instruments both mounted in the control panel and remotely connected to the control panel.

G. Provide power circuits for all Contractor and Vendor-furnished PLC cabinets in accordance with the PLC and Instrument Power wiring diagrams Indicated on the Drawings or as specified.

2.06 EQUIPMENT (NOT USED)

2.07 COMPONENTS

A. Thermal management:
   1. Provide heating, cooling, and dehumidifying devices in order to maintain all instrumentation and control devices to within a range as specified in Section 17050 - Common Work Results for Process Control and Instrumentation.
   2. Air conditioner:
      a. Provide solid-state cabinet coolers or air conditioning units on all outdoor panels containing electronic components such as local operator interfaces, panel instruments, programmable logic controllers, or remote I/O.
      b. Provide filters on intake and exhaust openings.
      c. Increase panel sizes as needed to accommodate cooling units.
      d. Enclosure rating: NEMA Type 12.
      e. Closed-loop design.
      f. Power supply: 120 VAC.
      g. Manufacturers: The following:
         1) Kooltronic, Guardian DP Series.
         2) ICEqube, Blade series or IECEx/ATEX for Zones 1 and 2.
   3. Enclosure temperature sensor as indicated on the Drawings:
      a. Provide wall-mounted RTD transmitter (to measure internal cabinet temperature) in all enclosures containing electrical components such as PLCs, RTUs, RIO, and VFDs.
      b. Platinum RTD.
      c. 4-20 mA DC output.
      d. Sensor and electronic enclosure.
      e. Accuracy: Within 2 degrees Fahrenheit.
      f. Manufacturers: One of the following:
         1) Omega, EWS Series.
         2) TCS Basys Controls, TS Series as indicated on the Drawings.

B. Pilot devices:
   1. General:
      a. Provide operator pushbuttons, switches, and pilot lights, from a single manufacturer.
      b. Size:
         1) 30.5 millimeters.
      c. Heavy duty.
      d. Pushbuttons:
         1) Contacts rated:
            a) NEMA Type A600.
         2) Furnish 1 spare normally open contact and normally closed contact with each switch.
      e. Selector switches:
         1) Contacts rated:
            a) NEMA Type A600.
            b) Knob type.
         2) Furnish 1 spare normally open contact and normally closed contact with each switch.
         3) Provisions for locking in the OFF position where lockout provisions are indicated on the Drawings.

f. Pilot lights:
1) Type:
a) LED for interior installations.
2) Push to test.
3) Lamp color:
a) On/Running/Start: Red.
b) Off/Stop: Green.
c) Power: White.
d) Alarm: Amber.
e) Status or normal condition: White.
f) Opened: Red.
g) Closed: Green.
h) Failure: Red.

2. Indoor and outdoor areas:
a. NEMA Type 4/13.
b. Manufacturers: One of the following:
1) Allen-Bradley, Type 800T.
2) Schneider Electric, Class 9001, Type K.
3) General Electric, Type CR104P.
4) IDEC, TWTD Series.

C. Signal isolators and converters:
1. Furnish signal isolators that provide complete isolation of input, output, and power input:
a. Minimum isolation level: 1.0 kilovolts AC/50 hertz for at least 1 minute.
b. Adjustable span and zero.
c. Accuracy: Within 1.0 percent of span.
d. Ambient temperature range: -4 degrees to 149 degrees Fahrenheit.
2. Manufacturers: One of the following:
a. Phoenix Contact, Mini Analog Pro.
b. Acromag, 1500, 600T, 800T, Flat Pack, or ACR Series.
c. Action Instruments, Q500 Series or Ultra SlimPakII.
d. AGM Electronics, Model TA-4000.
e. Moore Industries, MIT 4-Channel.

D. Relays:
1. General:
a. For all types of 120-VAC relays, provide surge protection across the coil of each relay.
b. For all types of 24-VDC relays, provide a free-wheeling diode across the coil of each relay.
c. For plug in type relays, provide a relay base from the same manufacturer as the relay manufacturer.
2. General purpose:
a. Magnetic control relays.
b. NEMA ratings:
1) 300 volts.
2) 10 Amps thermal continuous test current.
3) 60 Amps make.
4) 6 Amps break.
c. Plug-in type.
d. LED indication for energization status.

e. Coil voltages: As required for the application.
f. Minimum poles: DPDT.
g. Touch-safe design: All connection terminals to be protected against accidental touch.
h. Enclose each relay in a clear plastic heat and shock-resistant dust cover.
i. Relays with screw-type socket terminals.
j. Provide additional (slave/interposing) relays when the following occurs:
    1) The number or type of contacts shown exceeds the contact capacity of the specified relays.
    2) Higher contact rating is required in order to interface with starter circuits or other equipment.
k. DIN rail mounting on 35-millimeter rail.
l. Ice-cube-type relays with retainer clips to secure relay in socket.
m. Integrated label holder for device labeling.
n. Manufacturers: One of the following:
    1) Potter and Brumfield: Type KRP or KUP.
    2) IDEC: R* Series (* = H, J, R, S, U).
    3) Allen-Bradley: Type 700 HC.
    4) Square D: Type K.

3. Terminal block relays:
    a. Magnetic control relays.
    b. For use as an interposing relay for PLC based discrete I/O signals.
    c. NEMA ratings:
        1) 250 volts.
        2) 6 Amps continuous.
        3) 1,500 volt-amperes make.
    d. Plug-in type.
    e. LED indication for energization status.
    f. Coil voltages: As required for the application.
    g. Minimum poles: SPDT.
    h. Touch-safe design: All connection terminals to be protected against accidental touch.
    i. Quantity and type of contact shall be as indicated on the Drawings or as needed for system compatibility.
    j. Relays with screw-type socket terminals.
    k. DIN rail mounting on 35-millimeter rail.
    l. Integrated label holder for device labeling.
    m. Manufacturer: One of the following:
        1) Phoenix Contact PLC Series.
        2) Eaton XR TBR Series.
        3) IDEC RV8H Series.
        4) Allen-Bradley Type 700 HL TBR Series.
4. Latching:
    a. Magnetic-latching control relays.
    b. NEMA ratings:
        1) 300 volts.
        2) 5 Amps continuous.
        3) 360 volt-amperes make.
        4) 320 volt-amperes break.
    c. Plug-in type.
    d. DIN rail mounting on 35-millimeter rail.
    e. Coil voltage: As required for the application.

f. Minimum poles: 2 PDT; as required for the application. Plus 1 spare pole.
g. Touch-safe design: All connection terminals to be protected against accidental touch.
h. Clear cover for visual inspection.
i. Provide retainer clip to secure relay in socket.
j. Manufacturers: One of the following:
1) Square D, 8501, Type K.
2) IDEC, RR2KP Series.

5. Time delay:
a. Provide time-delay relays to control contact transition time.
b. Contact rating:
1) 240 volts.
2) 10 Amps continuous.
3) 3,600 volt-amperes make.
4) 360 volt-amperes break.
c. Coil voltage: As required for the application.
d. Provide pneumatic or electronic type with on-delay, off-delay, and on/off-delay:
1) For off-delay, use true power-off time-delay relays. Where the required timing range exceeds capability of the off-delay relay use, signal off-delay where power loss will not cause undesirable operation or pneumatic time-delay relays.
e. Minimum poles: 2 PDT.
f. Units include adjustable dial with graduated scale covering the time range in each case.
g. Minimum timing range: 0.1 seconds to 10 minutes, or as required for the application.
h. Manufacturers: One of the following:
1) IDEC, RTE Series.
2) Tyco Electronics, Agastat 7000 Series (pneumatic).
3) Allen-Bradley, Type 700-HR.

E. Terminal blocks:
1. DIN rail mounting on 35-millimeter rail.
2. Rated for 15 amperes at 600 volts.
3. Spring-Clamp type.
4. Provide mechanism to prevent wire connection from loosening in environments where vibration is present. This mechanism shall not cause permanent deformation to the metal body.
5. Finger-safe protection for all terminals for conductors.
6. Construction: Polyamide insulation material capable of withstanding temperature extremes from -40 degrees to 221 degrees Fahrenheit.
7. Terminals: Plainly identified to correspond with markings on the diagrams:
a. Permanent machine-printed terminal identification.
8. Disconnect-type field signal conductor terminals with socket/screw for testing.
9. Identify terminals suitable for use with more than 1 conductor.
10. Position:
a. So that the internal and external wiring does not cross.
b. To provide unobstructed access to the terminals and their conductors.

11. Provide minimum 25-percent spare terminals.
12. Manufacturers: One of the following:
    a. Phoenix Contact, ST4 Series.
    b. Allen-Bradley, 1492-L Series.

F. DIN rail grounding:
1. Grounding terminal blocks used exclusively for bonding each DIN rail section to panel grounding busbar shall:
    a. Mount to DIN rail via grounding foot with mounting screw.
    b. Connect to the panel grounding busbar shall be via a green insulated conductor sized in accordance with NEC.
    c. Not be used for grounding signal cable shields.
2. Screw terminal type.
3. DIN rail mounting on 35-millimeter rail.
4. Provide mechanism to prevent wire connection from loosening in environments where vibration is present. This mechanism shall not cause permanent deformation to the metal body.
5. Finger-safe protection for all terminals for conductors.
6. Terminals: Plainly identified to correspond with markings on the diagrams:
    a. Permanent machine-printed terminal identification.
7. Manufacturers: One of the following:
    a. Phoenix Contact, ST 4-PE Series.
    b. Allen-Bradley, 1492-LG Series.

G. Wire duct:
1. Provide flame retardant plastic wiring duct, slotted with dust cover.
2. Type:
    a. Wide slot.
    b. Narrow slot.
    c. Round hole.
3. Manufacturers: The following:
    a. Panduit.
    b. Phoenix Contact.
    c. Thomas & Betts.
    d. Iboco.

H. DIN rail:
1. Perforated steel.
2. 35 mm width.
3. 15 mm deep.
4. Provide 2-inch offset using one of the following:
    a. Offset brackets.
    b. Preformed standoff DIN Rail Channel.

I. Surge protection devices (SPD):
1. 120 VAC control panel power SPD:
    a. Provide SPD for panel 120 VAC power entrances:
        1) Non-faulting and non-interrupting design.
        2) Provide line to neutral and neutral to ground surge protection.

b. Provide surge protection at secondary of main circuit breaker:
    1) Surge protection is not required for 120 VAC circuits that are only used for panel lights and receptacles.
    2) For panels receiving power at 480 VAC, provide surge protection on the 120 VAC control power transformer secondary.
c. DIN rail mounting.
d. Attach wiring to the SPD by means of a screw-type cable-clamping terminal block:
    1) Gastight connections.
    2) Visual status indication of MOV status on the input and output circuits.
    3) Dry contact rated for remote status indication.
e. Approvals:
    1) Tested in accordance with IEC 61643-11.
    2) Tested in accordance with UL 1283.
    3) Tested in accordance with UL 1449.
    4) Surge protection minimum requirements: Withstand a minimum 10-kA test current of an 8/20 µs waveform in accordance with IEEE C62.41.1 Category C Area.
f. Manufacturers: One of the following:
    1) Phoenix Contact, Type SFP Filter.
    2) Sola HD, STFE Elite series.
    3) Rockwell, 4983-DC series.
    4) ASCO, Model 277.

2. 24 VDC control panel power SPD:
    a. Provide SPD for 24VDC power circuits.
    b. Provide surge protection at DC power supply output.
    c. DIN rail mounting.
    d. Attach wiring to the SPD by means of a screw-type cable clamping terminal block:
        1) Optical status indicator.
        2) Dry contact rated for remote status indication.
    e. Approvals:
        1) Tested in accordance with IEC 61643-11.
    f. Manufacturers: One of the following:
        1) Field instruments that require auxiliary power:
            a) Emerson, Model 265 (SLAC) series.
            b) Phoenix Contact, Plugtrab PLT--SEC-T3-24-FM-UT.
        2) Loop powered field instruments:
            a) Emerson/Edco, Model SS65-036-2.

3. Panel mounted control, signal, and data line SPD:
    a. General:
        1) This section applies to SPD located in a control panel, field panel, network junction box, or marshalling panel.
        2) Approvals:
            a) Tested in accordance with IEC 61643-21.
            b) Tested in accordance with UL 497B.
        3) SPD shall consist of 2 parts:
            a) Base module:
                (1) DIN rail mounting.
                    (a) Grounded to DIN rail via mounting rail foot.

b) Plug protection module:
(1) Replacing a plug shall not require the removal of any wires nor interrupt the signal.
4) Provide indirect shield ground style SPD unless otherwise noted.
5) Provide ability to locally identify and indicate SPD health.
6) SPD shall be provided with controller module with dry contact for remote status monitoring of SPD device health.
7) SPD modules shall be compatible with signal, communication bus type, data type, or control power being protected.
8) Provide dedicated SPD for each signal, communication bus type, or data line being protected.
b. Manufacturers: One of the following:
1) Phoenix Contact, Plugtrab PT-IQ Series.
2) Dehn, Blitzductor XTU Series.

J. Power supplies:
1. Design power supply system so that either the primary or backup supply can be removed, repaired or replaced, and returned to service without disrupting the system operation.
2. Convert 120 VAC to 24-volt DC or other DC voltages required or as required for the application.
3. Provide redundant backup 24 VDC power supply units to automatically supply the load upon failure of the primary supply.
4. Provide power supply arrangement that is configured with several modules to supply adequate power in the event of a single module failure in either a 1+1 or N+1 configuration as required:
a. Provide automatic switchover upon module failure.
b. Alarm contacts monitored by the PLC.
5. Provide protective isolation between power supply units either by means of Diodes, Diode Modules, MOSFET Modules, or use power supplies with built in redundancy. Power supplies with built in redundancy must actively isolate each power supply and be designed as such.
6. Sized to provide 40-percent excess rated capacity.
7. UL 508C listed to allow full-rated output without de-rating.
8. Provide fuse or short-circuit protection.
9. Provide a minimum of 1 set of dry contacts for each power supply configured to change state on failure for monitoring and signaling purposes.
10. Output regulation: Within 0.05 percent for a 10-percent line change or a 50-percent load change.
11. Operating temperature range: 32 degrees to 140 degrees Fahrenheit.
12. Touch-safe design: All connection terminals to be protected against accidental touch.
13. DIN rail mounting on 35-millimeter rail:
a. Mount the power supply in the proper orientation as recommended by the manufacturer to ensure adequate thermal dispersion without derating the power supply.
14. Provide self-protecting power supplies with a means of limiting DC current in case of short circuit.
15. Manufacturers: One of the following:
a. Fully redundant:
1) Phoenix Contact, Quint Power Supply with SFB technology.
a) Phoenix Contact, Quint.

2) IDEC, PS5R Series.
3) Sola.
4) PULS.

b. Redundancy module:
1) Phoenix contact, o-ring redundancy module.

K. Limit switches:
1. NEMA Type 4X.
2. AC contact rating 120 volts, 10 A.
3. DC contact rating 125 volts, 0.4 A.
4. Provide robust actuation mechanism not prone to degradation.
5. Provide complete actuator mechanism with all required hardware.
6. Allows for contact opening even during contact weld condition.
7. UL approved.
8. Operating temperature range: 0 degrees to 230 degrees Fahrenheit).
9. Manufacturers: One of the following:
a. Allen-Bradley, 802 Series.
b. Honeywell, HDLS Series.
c. Omron, D4 Series.
d. Eaton, E47, E49, E50.
e. ABB.

2.08 ACCESSORIES

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide panels with an inside protective pocket to hold the panel drawings. Ship panels with 1 copy of accepted Shop Drawings including, but not limited to, schematic diagram, connection diagram, and layout drawing of control wiring and components in a sealed plastic bag stored in the panel drawing pocket.

C. Provide floor stands or legs with a minimum height of 12 inches where needed or as indicated on the Drawings.

D. Provide a folding shelf for enclosures that contain programmable controllers. The shelf shall be mounted on the inside surface of the door, capable of supporting a laptop computer.

E. Provide nameplate to each panel as indicated on the Drawings:
1. Provide as specified in Section 16075 - Identification for Electrical Systems on all internal and external instruments and devices.
2. Provide a nameplate with the following markings that is plainly visible after installation:
a. Manufacturer’s name, trademark, or other descriptive marking by which the organization responsible for the panel can be identified.
b. Supply voltage, phase, frequency, and full-load current.
c. Power source or circuit ID.
d. Short-circuit current rating of the panel based on one of the following:
1) Short-circuit current rating of a listed and labeled assembly.
2) Short-circuit current rating established utilizing an approved method.

F. Provide a window kit where indicated on the Drawings or where a transmitter with display is mounted inside a control panel. The window shall meet the following requirements:
   1. Safety plate glass.
   2. Secured by rubber locking seal.
   3. Allow full viewing of devices issuing visual process data or diagnostics.

G. Lighting:
   1. Provide 1 luminaire for each section, on the interior of the panel, spaced evenly along the top-front of the enclosure door opening(s):
      a. Covered or guarded.
      b. Provide On-Off door-activated switches where indicated on the Drawings.
      c. 120-volt, single-phase, 15-amp style plug.
      d. Provide 4,000 K, 900 Lumens LED fixture.
         1) Provide additional fixtures for every 36 inches of width.

H. Receptacles:
   1. Provide 1 duplex receptacle located every 6 feet of enclosure width, spaced evenly along the back mounting panels.
   2. GFCI, 120-volt, single-phase, 15-amp style plug.
   3. Provide circuit breaker or fuse to limit receptacle draw to 5 amperes.

I. Grounding:
   1. Provide the following:
      a. Grounding strap between enclosure doors and the enclosure.
      b. Equipment grounding conductor terminals.
      c. Provide equipment grounding busbar with lugs for connection of all equipment grounding wires.
      d. Bond multi-section panels together with an equipment grounding conductor or an equivalent grounding busbar.
   2. Identify equipment grounding conductor terminals with the word "GROUND," the letters "GND", the letter "G", or the color green.
   3. Signal cable shields shall only be grounded at a single point in the loop. Unless otherwise noted, ground signal cable shields at control panel.
   4. Ensure the continuity of the equipment grounding system by effective connections through conductors or structural members.
   5. Design so that removing a device does not interrupt the continuity of the equipment-grounding circuit.
   6. Provide an equipment-grounding terminal for each incoming power circuit, near the phase conductor terminal.
   7. Size ground wires in accordance with NEC and UL Standards, unless noted otherwise.
   8. Unless otherwise noted, connect all exposed, noncurrent-carrying conductive parts, devices, and equipment to the equipment-grounding circuit.
   9. Connect the door stud on the enclosures to an equipment-grounding terminal within the enclosure using an equipment-bonding jumper.

J. Provide sunshades and insulation for all outdoor installations.

2.09 MIXES (NOT USED)

2.10 FABRICATION (NOT USED)

2.11 FINISHES

A. Finishes:
   1. Stainless steel:
      a. Stainless enclosures shall be provided with a Number 4 brushed finish - not painted.

2.12 SOURCE QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine the installation location for the instrument and verify that the instrument will work properly when installed.
   1. Notify the Engineer promptly if any installation condition does not meet the instrument manufacturer's recommendations or specifications.

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. Install enclosures so that their surfaces are plumb and level within 1/8-inch over the entire surface of the panel; anchor securely to wall and structural supports at each corner, minimum. Direct attachment to drywall is not permitted.

B. Install the enclosure per guidelines and submitted installation instructions to meet the seismic requirements at the project site.

C. Provide floor stand kits for wall-mounted enclosures larger than 48 inches high.

D. Provide concrete housekeeping pads for freestanding enclosures.
   1. Refer to the structural typical details.

E. Install gasket and sealing material under panels with floor slab cutouts for conduit:
   1. Undercoat floor-mounted panels.

F. Provide a full-size equipment-grounding conductor in accordance with NEC included with the power feeder. Terminate to the incoming power circuit-grounding terminal.

G. All holes for field conduits, etc. shall be cut in the field. There shall be no additional holes, factory cut holes, or hole closers allowed. Incorrect holes, additional holes, or miscut holes shall require that the entire enclosure be replaced.

H. Protect all wiring from sharp edges and corners.

I. Control panels that are adjacent to motor control centers shall be fully wired to the motor control centers using wireways integral to the motor control center or

additional conduits as needed. These interconnections are not shown or reflected on the Conduit Schedule but shall be shown on the Loop Drawings prepared by the Contractor.

J. Provide individually fused analog input module points with blown-fuse indicator lights, mounted external of the module on the output terminal strip.

K. Side panels:
   1. Side panels shall be kept free off all control equipment and devices. Any deviation must be sent to the engineer in writing asking for a deviation.

3.04 ERECTION, INSTALLATION, APPLICATION, AND CONSTRUCTION (NOT USED)

3.05 REPAIRS/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 FIELD QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.08 ADJUSTING (NOT USED)

3.09 CLEANING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.10 DEMONSTRATION AND TRAINING (NOT USED)

3.11 PROTECTION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 17720

CONTROL SYSTEMS: PROGRAMMABLE LOGIC CONTROLLERS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Programmable logic controller (PLC) based control systems hardware.
   2. Development software to be used with the specified PLC hardware.

1.02 REFERENCES

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Institute of Electrical and Electronics Engineers (IEEE).

1.03 DEFINITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Specific definitions:
   1. CPU: Central processing unit.
   2. I/O: Input/Output.

C. Specific definitions:
   1. Development operating software: The software provided by the PLC manufacturer for use in programming the PLC.
   2. Application software: The software that is programmed specifically for the Project.

1.04 SYSTEM DESCRIPTION

A. Provide all PLC hardware as indicated on the Drawings and as specified in this Section.

1.05 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Product data:
   1. CPU:
      a. Processor type.
      b. Processor speed.

c. Memory.
d. Internal processor battery backup time.

2. I/O modules:
   a. Type.
   b. Standard wiring diagram.

C. Calculations:
1. Submit calculations or documented estimate to verify that memory requirements of this Section are met, including spare requirements. If possible, use PLC manufacturer's calculation or estimating worksheet.
2. Submit calculations to verify that spare I/O requirements of this Section are met.
3. Submit calculations to verify that PLC power supply requirements of this Section are met.

D. Product data:
1. Programming languages.
2. Operating system requirements.

E. Control logic:
1. Fully annotated copy of programmed PLC logic.
2. Cross-referenced index of all PLC registers or points.

F. Provide application software for the specific Project process requirements.
1. Fully annotated copy of programmed PLC logic in its native format.
2. Cross-referenced index of all PLC registers or points.

1.06 QUALITY ASSURANCE

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide PLC hardware manufactured at facilities certified to the quality standards of ISO 9001.

C. Additional requirements:
1. Provide PLC system components by a single manufacturer:
   a. Third-party communication modules may be used only for communication or network media functions not provided by the PLC manufacturer.
2. Use PLC manufacturer approved hardware, such as cable, mounting hardware, connectors, enclosures, racks, communication cable, splitters, terminators, and taps.
3. All PLC hardware, CPUs, I/O devices, and communication devices shall be new, free from defects, and produced by manufacturers regularly engaged in the manufacture of these products.

1.07 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.08 PROJECT OR SITE CONDITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.09 SEQUENCING (NOT USED)

1.10 SCHEDULING (NOT USED)

1.11 WARRANTY

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.12 SYSTEM START-UP (NOT USED)

1.13 OWNER'S INSTRUCTIONS (NOT USED)

1.14 COMMISSIONING (NOT USED)

1.15 MAINTENANCE

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. In addition to the spare parts requirements specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems
   1. CPU: 1 spare for each type of CPU in the system.
   2. I/O cards: 1 spares for each type of I/O card in the system.
   3. Power supplies: 1 spares for every power supply in the system.
   4. Network/communications cards: 1 spare for every network or communications card in the system.
   5. Communication cable: 1 spare for each type of cable used in the system.

C. Installed spare requirements:
   1. I/O points:
      a. Provide total of 25 percent spare I/O capacity for each type of I/O at every PLC and remote inputs and outputs (RIO).
      b. Wire all spare I/O points to field terminal blocks in the same enclosure the PLC resides in.
   2. PLC backplane capacity:
      a. Provide 25-percent or 3 spare backplane slots, whichever is greater, in all racks containing I/O.
   3. PLC memory:
      a. Provide 50-percent spare program volatile memory.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The following, no equal:
   1. Schneider Electric.

B. The PLC programming software system shall be manufactured by PLC hardware manufacturer.

2.02 EXISTING PRODUCTS (NOT USED)

2.03 MATERIALS (NOT USED)

2.04 MANUFACTURED UNITS

A. Programmable logic controller:
   1. Model: Modicon, M340 PAC, BMX P34 20x0.
      a. 4096 KB Internal User RAM.
      b. Backup Memory: 8 MB Flash Memory Card.
      c. Word Length: 16 bits.
      d. User program memory: 3584 KB for Program, constants and symbols, 256 KB for located/unlocated data. Provide enough user memory to program the PLC per P&IDs and control strategies, plus 50 percent spare.
      e. Local I/O: 1024 discrete I/O points, 256 analog I/O points.
      f. Distributed I/O: 63 Devices via network module, using the I/O scanning function.
      g. LED status indicators: Run, ERR, I/O, SER COMM, CARD ERR, ETH ACT, ETH STS, ETH 100.
      h. Communications: 1 USB Programming Port, 1 RJ-45 Ethernet Port, 1 RJ-45 Modbus Port.
   2. PLC power supply:
      a. Model: BMXCPS – Standalone.
      b. Input: 120 VAC.
      c. Mounted in the PLC rack.
      d. Sized to power all modules mounted in that housing including an average module load for any empty housing slots plus 50 percent above that total.
   3. PLC input/output, I/O modules:
      a. General:
         1) Compatible with all of the PLCs being furnished under the contract and by the same manufacturer as the PLCs.
         2) Provide I/O modules that:
            a) Isolate in accordance with IEEE Surge Withstand Standards and NEMA Noise Immunity Standards.
            b) Provide A/D and D/A converters with optically or galvanically isolated inputs and outputs.
            c) Accept dual-ended inputs.
         3) The use of common grounds between I/O points is not acceptable.
         4) Provide modules that are removable without having to disconnect wiring terminals:
            a) Utilize a swing-arm or plug-in wiring connector.

5) Provide at each PLC the I/O modules for the following:
   a) Designated future I/O points contained in the I/O Lists and/or shown on the P&IDs, control schematics, or described in the control strategies.
   b) Installed spare capacity in accordance with the requirements of this Section.
   c) Wire all spares provided to the field terminal strip.
6) Condition, filter, and check input signals for instrument limit conditions.
7) Filter, scale, and linearize the raw signal into an engineering-units-based measurement.
8) Alarm measurements for high, low, rate-of-change limits, and alarm trends.
9) Provide external fuses mounted on the field connection terminal block for all discrete input, discrete output, and analog input I/O points.
10) When multiple cards of the same I/O type are provided and parallel equipment, instrumentation, or redundant processes exist, distribute I/O among cards to ensure that a single card failure will not render an entire process unavailable.

b. Discrete input modules:
   1) Model: BMX-DAI-1604.
   2) 120VAC.
   3) Isolated channels.
   4) 20 pin terminal block.

c. Discrete output modules:
   1) Model: BMX-DDO-0815.
   2) 120VAC.
   3) 8 insulated channels.
   4) 20 pin terminal block.

d. Analog input modules:
   1) Model: BMX-AMI-0810.
   2) Signal type: Provide 4-20 mA for most applications; other levels are acceptable to interface to vendor control panels.
   3) Analog-to-digital conversion: Minimum 12-bit precision with the digital result entered into the processor.
   4) The analog-to-digital conversion updated with each scan of the processor.
   5) Individually isolated each input.
   6) Coordinate the size of the external fuse with the protection located on the module, so that the external fuse opens first under a fault condition.

e. Analog output modules:
   1) Model: BMX-AMO-0802.
   2) Signal type: Provide 4-20 mA for most applications; other levels are acceptable to interface to vendor control panels.
   3) Individual isolated output points each rated for loads of up to 1,000 ohms.

4. Communications modules:
   a. Network communications modules:
      1) General:
         a) Install communications modules in the PLC backplane.

2) Ethernet:
a) Model: BMX-NOE-01x0.
b) Ports: 1 RJ-45.
c) Communication rate: 100 Mbit/s.
3) Provide all network taps, connectors, termination resistors, drop cables, and trunk cables necessary for remote I/O communications.

5. PLC backplane housing:
a. Model: BMEXBP – Dual Ethernet and X bus rack.
b. Mount the PLC power supply, CPU, communications module, and I/O modules in a suitable standard PLC backplane or housing.
c. Provide spare slots in each PLC and RIO location in accordance with the requirements of this Section.
d. Provide a blank slot filler module for each spare slot.

B. PLC programming software:
1. PLC software shall be Modicon, Unity Pro.
2. Furnish operating software capable of monitoring and/or controlling the PLCs via the PLC data network:
a. Contain diagnostics to collect troubleshooting and performance data and display it in easy to understand graphs and tables.
b. Monitor devices at each drop on the PLC data network for proper communications.
c. Provide the ability to program all PLCs on the PLC data network from the Engineer's console.
3. PLC programming laptop/desktop operating system:
a. Microsoft Windows 10 or newer.
4. PLC programming software for all programming, monitoring, searching, and editing:
a. Usable both on-line, while connected to the PLC, and off-line.
b. The operating software shall display multiple series and parallel contacts, coils, timers, counters, and mathematical function blocks.
c. Capable of disabling/forcing all inputs, outputs, and coils to simulate the elements of the ladder logic; forced elements shall be identifiable by means of color change.
d. Include a search capability to locate any address or element and its program location.
e. Display at the EC, PLC status information, such as faults and communication errors and amount of memory remaining.
5. Generate a PLC program printout, which is fully documented, through the PLC programming software:
a. Fully documented program listings include, as a minimum, appropriate rungs, address, and coils shown with comments to clarify to a reader what that segment of the program accomplishes on an individual line-by-line basis.
b. Include a sufficient embedded comment for every rung of the program explaining the control function accomplished in said rung.
c. Use a mnemonic associated with each contact, coil, etc. that describes its function.
d. Utilize the tag and loop identification as contained in the P&IDs:
1) If additional internal coils, timers, etc. are used for a loop, they shall contain the loop number.
e. Provide a cross-reference report of program addresses.

6. Furnish a comprehensive database for the analog inputs, calculated values, control modules, and outputs:
    a. In addition, provide spare database points for future expansion.
7. One integrated database can be utilized for all types of analog points or separate databases for each type; in either case, the database for each point must include all specified aspects.
8. All portions of the database must be available for use by the display, report, and other specified software modules.
9. All of the data fields and functions specified below must be part of the point definition database at the operator interface. Provide the capability to define new database points through the point display specified below as well as modifying defined points through these displays. This point definition and modification must include all of the features and functions defined below. The analog database software must support the following functions and attributes:
    a. Analog input signal types:
        1) Provide software at the PLCs to read variable voltage/current signals and pulse duration/frequency type analog input signals.
    b. Input accuracy:
        1) Inputs must be read with an accuracy of within 0.05-percent full-scale or better.
        2) Data conversion errors must be less than 0.05-percent full-scale.
        3) Pulse accumulation error less than or equal to 1 count of actual input count at a scan rate of once per minute.
        4) Maintain for a minimum of 1 year the system accuracy stated above without adjustments.
    c. Blocking:
        1) Provide mechanisms to inhibit or block the scanning and/or processing of any analog input through the operator interface.
        2) For any input so blocked, the operator may manually enter a value to be used as the input value.
    d. Filtering:
        1) For each analog input, provide a first order lag digital filter with an adjustable filter factor.
    e. Linearizing:
        1) Where analog inputs require square root extraction or other linearization, provide a mechanism to condition the filtered data before the process of scaling and zero suppression takes place.
    f. Calculated values:
        1) Provide means to allow for pseudo-inputs calculated by algebraic and/or Boolean expressions utilizing real inputs, other calculated values, constants, etc.
        2) These values must be handled the same as real inputs in terms of record-keeping, alarming, etc.
    g. Scaling and zero suppression:
        1) Provide a conversion program to convert input values into engineering units in a floating-point format.
    h. Alarms:
        1) Provide an alarm program to check all analog variables against high-high, high, low, and low-low alarm limits.
        2) When an analog value exceeds a set limit, it must be reported as an alarm based on individually set priority level for each alarm point.

3) Provide an adjustable hysteresis band in order to prevent excessive alarms when a variable is hovering around an alarm limit.
4) Must be possible to inhibit alarms based on external events, e.g., lock-out low pump flow alarm when the pump is off.

i. Averages:
1) Provide a program to calculate and store hourly, daily, and monthly averages of analog variables.
2) Continuously compute averages, e.g., the average for the current period to the present point in time must be stored in memory and available for use in displays, etc.
3) Update hourly averages each minute or at the polling interval for the selected variable.
4) Update daily averages at least once each hour and calculate using the results of the hourly averages.
5) Update monthly averages at least once each day and calculate using the results of the daily averages.
6) At the end of each averaging period, store the average values for the period on the hard disk for historical record-keeping and reset the present period average register to the present value of the variable.
7) The active database must include the present period average and previous period average for each variable and averaging period.

j. Totals:
1) Provide a program to calculate and store hourly, daily, and monthly totalization of analog variables.
2) Assign a scaling factor to each variable to convert to the appropriate units based on a 1-minute totalizing interval.
3) Assign a separate factor for each totalizing interval.
4) Variables for which totalization is inappropriate must have scaling factors of zero.
5) At the end of each totalizing period, store the totalized values for the period on the hard disk for historical record-keeping and reset the present period totalization register to zero.
6) The active database must include the present period total and previous period total for each variable and totalizing period.

k. Engineering units:
1) Provide software to allow the system and the operator to convert all the measured analog variables to any desired engineering units.
2) The operator must be able to view displays and generate reports of any measured variable in one or more engineering units such as flow in gpm, mgd, cfs, and acre-feet per day.
3) Pre-program the conversion of the engineering units, and, if not pre-programmed, the operator must be able to program new engineering unit conversions by using simple methods, e.g., multiplication of the database attributes by a constant.
4) The programming method must be at a level and compatible with the specified training of the operator and the Owner's personnel.
5) New conversions must not require the services of a special programmer and/or special, high-level, programming training.

l. Control modules:
1) For each control function configured, whether processed at the PLC, or operator interface, maintain a file of necessary data including input

values, setpoints, constants, intermediate calculated values, output value and limit clamps, etc.
2) Input and output assignments, setpoints, and constants must be adjustable by the operator through the operator interface.
3) Provide control algorithms for manual control with output values adjustable by the operator.

m. Analog outputs:
1) Analog outputs must be maintained as part of the database.
2) These outputs must be adjustable manually by the operator through the operator interface or through automatic control algorithms.

10. Some of the above functions may be better accomplished in the data acquisition and graphic display software package; it is the responsibility of the ICSC to optimize the location of the various functions between all software packages.

C. General control functions:
1. Analog control functions:
a. PID, lead/lag, signal select, alarm, limit, delay, and time base.
b. Furnish the control system complete with a library of mathematical/calculation software to support averaging, weighted average, addition, subtraction, multiplication, division, square root extraction, exponential, AND, OR, NAND, NOR, XOR, and NXOR functions.
c. All math utilities must be linkable to process data points or manual inputs via control block configuration.
d. By linking control blocks to data points, the math library must support system unit conversion and calculation requirements.

2. Discrete control functions:
a. AND, OR, NOT, EXCLUSIVE OR, comparators, delays, and time base.

3. Software support:
a. Retain in firmware all control and logic functions at each PLC and in RAM at the operator interface.
b. Call each function as required by the configured controls to perform the intended function.

4. Control and status discrepancies:
a. Generate a discrepancy/fail alarm for any pump, valve, or final control element if a discrepancy exists between a system or operator command and the device status.
1) For example, the system commands to start (call), and the pump fails to start (run status report back), within predetermined operator-programmable time delay (time disagree), then a discrepancy (fail) alarm shall be generated.
b. Involuntary change in the device's status must also generate an alarm:
1) For example, a pump starts when not commanded to do so, or a pump shuts down while running even though it still has a command to run.
c. Each command, status, and alarm must cause the color of the symbol to change.
d. Because many discrete final control elements have a cycle time in excess of the scan interval, provide each control output with an associated delay

period selected to be longer than the operating period of the control element:
1) Delay periods for each final control element must be adjustable at the operator interface.
2) List all time delays in the final documentation.

5. Some of the above functions may be better accomplished in the data acquisition and graphic display software package; it is the responsibility of the ICSC to optimize the location of the various functions between all software packages.

D. Control configuration:
1. Provide software to allow control strategies to be developed, and their operation initiated through the operator interface.
2. Provide standardized control point displays for defining the control functions including the function type, input/output addresses, setpoints, tuning constants, etc.
3. Provide a mechanism to link separate control functions together into an integrated control strategy.
4. Provide a mechanism to download operational/control setpoints developed at any operator interface to any PLC for operational implementation.
5. Provide a mechanism to define and implement operational/control setpoints locally at the PLC and to upload them to the operator interface for operational record-keeping.
6. Perform control configurations on-line at the operator interface; the PLC may be taken off-line when being configured or downloaded.

2.05 EQUIPMENT (NOT USED)

2.06 COMPONENTS (NOT USED)

2.07 ACCESSORIES (NOT USED)

2.08 MIXES (NOT USED)

2.09 FABRICATION (NOT USED)

2.10 FINISHES (NOT USED)

2.11 SOURCE QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Utilize personnel to accomplish or supervise the physical installation of all elements, components, accessories, or assemblies:
   1. Employ installers who are skilled and experienced in the installation and connection of all elements, components, accessories, and assemblies.

C. All components of the control system including all data network cables are the installation responsibility of the ICSC unless specifically noted otherwise.

D. General:
   1. The control system logic program shall reside at the PLC level.

E. Use the tag and loop identifications found on the P&IDs for all tags used and/or assigned as part of the application software work provided by the ICSC.

F. Program the PLC logic using the following language(s):
   1. Ladder Diagram.
   2. Function Block Diagram.
   3. Sequential Function Chart.

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION

A. Provide a minimum of 4 CD/DVD copies of the following:
   1. Application software:
      a. Finalized fully annotated copy of programmed PLC logic in its native format.
      b. Cross-referenced index of all PLC registers or points.

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 FIELD QUALITY CONTROL

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.08 ADJUSTING (NOT USED)

3.09 CLEANING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.10 DEMONSTRATION AND TRAINING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Tailor training specifically for this Project that reflects the entire control system installation and configuration.

C. Perform training by pre-approved and qualified representatives of the ICSC and/or manufacturer of the PLC hardware and programming software:
   1. A representative of the ICSC may perform the PLC hardware training only if the representative has completed the manufacturer's training course for the PLC hardware.
   2. A representative of the ICSC may perform the PLC programming software training only if the representative has completed the manufacturer's training course for the PLC programming software.

3.11 PROTECTION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.12 SCHEDULES (NOT USED)

END OF SECTION

SECTION 17733

CONTROL SYSTEMS: NETWORK MATERIALS AND EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Materials and equipment used in process control and LAN networks including:
      a. Network switches.
      b. Media converters.
      c. Patch panels and other data network hardware.
      d. Related accessories.

1.02 REFERENCES

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Electronic Industries Alliance/Electronic Components, Assemblies and Materials Association (EIA/ECA):
   1. 310-E - Cabinets, Racks, Panels, and Associated Equipment.

C. Institute of Electrical and Electronics Engineers (IEEE):
   1. 802.1X - Standard for Local and Metropolitan Area Networks—Port-Based Network Access Control.
   2. 802.3 - Standard for Ethernet.
   3. 802.11b - Standard for Information Technology - Telecommunications and information exchange between systems - Local and Metropolitan networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications: Higher Speed Physical Layer (PHY) Extension in the 2.4 GHz band.

D. National Electrical Manufacturers Association (NEMA):
   1. 250 - Enclosures for Electrical Equipment (1000 V Maximum).

E. Telecommunications Industry Association (TIA):
   1. 569 - Telecommunications Pathways and Spaces.
   2. 607 - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises.

F. Underwriters Laboratories, Inc. (UL).

1.03 DEFINITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.04 SUBMITTALS

A. Furnish submittals as specified in Sections 01330 - Submittal Procedures and 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Product data:
   1. Include information on all network equipment.
   2. Manufacturer's operation and installation instructions.

C. Shop drawings:
   1. Complete set of drawings including but not limited to:
      a. System block diagram showing relationship and connections between devices provided under this Contract **[and existing equipment]**. Include manufacturer and model information, and address settings.
      b. Network riser diagram.
      c. Network port diagram, which physically locates all ports within the facility, and identifies their patch panel and switch port.
      d. Construction drawings for all equipment cabinets, including dimensions, identification of all components, preparation and finish data, and nameplates.
      e. Electrical connection diagrams.
      f. Complete grounding requirements.
   2. Furnish data sheets for each component together with a technical product brochure or bulletin:
      a. Manufacturer's model number.
      b. Project equipment tag.
   3. Complete and detailed bills of materials broken up by each cabinet. Each bill of material item will include the following:
      a. Quantity.
      b. Description.
      c. Manufacturer.
      d. Part numbers.

D. Calculations:
   1. Cooling calculations, including but not limited to:
      a. Highest expected ambient temperature for the enclosure's location.
      b. Internal heat load.
      c. Exposure to direct sunlight.
      d. Dimensions of the enclosure in inches.
      e. Maximum allowable temperature inside the enclosure, based on the lowest operating temperature limit of the installed components.

E. Test reports:
   1. As specified in Sections 16125 - Fiber Optic Cable and Appurtenances and 17950 - Commissioning for Instrumentation and Controls.
   2. Signed test results as described in this Section.
   3. Test results shall include:
      a. Narrative describing the test procedures followed.
      b. Block diagram of test set up.
      c. Manufacturer's information on test equipment used.

d. Detailed test results.
e. A narrative summarizing the results of the testing and identifying any further action required.

F. Operating manuals:
1. Complete installation, operation, calibration, and testing manuals as specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

G. Record drawings:
1. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.
2. Electrical connection diagrams shall be revised to reflect any changes made in the field and submitted as record drawings.

1.05 QUALITY ASSURANCE

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.06 DELIVERY, STORAGE, AND HANDLING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.07 PROJECT OR SITE CONDITIONS

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.08 SEQUENCING (NOT USED)

1.09 SCHEDULING (NOT USED)

1.10 WARRANTY

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.11 SYSTEM START-UP (NOT USED)

1.12 OWNER'S INSTRUCTIONS (NOT USED)

1.13 COMMISSIONING (NOT USED)

1.14 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURERS (NOT USED)

2.02 SYSTEM DESCRIPTION

A. Provide all network equipment identified in the Contract Documents.

2.03 EXISTING PRODUCTS (NOT USED)

2.04 MATERIALS (NOT USED)

2.05 MANUFACTURED UNITS

A. Ethernet switches:
   1. Managed Process Floor Ethernet switches:
      a. Manufacturers: One of the following, no equal:
         1) Red Lion, N-T24K-16TX.
         2) Mounting:
            a) DIN Rail mounting.

B. Firewall:
   1. Manufacturers: One of the following, no equal:
      a. PaloAlto, PA-220R.

C. Patch panels:
   1. Fiber optic patch panels:
      a. General:
         1) All optical fiber cables shall be provided with strain relief and terminated at a fiber patch panel. Final connections between the patch panel and the fiber optic network equipment shall be made via factory tested fiber optic patch cords.
         2) All fiber cable strands shall be terminated at the patch panels, no loose fiber strands are allowed.
         3) Provide space for excess fiber and provide strain relief for the fiber cable.
         4) Fiber cables shall be installed such that the outer sheath of the cable is carried into the interconnect enclosure or patch panels before breaking out buffer tubes.
         5) Fiber connectors: LC.
      b. DIN Rail mounted:
         1) Manufacturers: One of the following or equal:
            a) DINSpace, SNAP XL.
            b) Corning.
         2) Properties:
            a) Use for the termination of a single cable inside of cabinets, in small enclosures or as indicated on the plans.
            b) DIN rail mounted fiber patch panels shall be provided as complete unit including the housing, connector panels, splice trays, and fiber connectors.

2.06 EQUIPMENT (NOT USED)

2.07 COMPONENTS (NOT USED)

2.08 ACCESSORIES

A. Provide dust covers or plugs for all unused ports.

B. Furnish accessories as specified in Section 17730 - Control Systems: PCS Computer Equipment.

2.09 MIXES (NOT USED)

2.10 FABRICATION (NOT USED)

2.11 FINISHES (NOT USED)

2.12 SOURCE QUALITY CONTROL (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. Provide installation and configuration for the new and existing managed Ethernet switches. Provide configuration of the Ethernet switch network for a complete, functioning plant control system as indicated on the Drawings and as specified in this Section:
   1. Refer to SCADA block diagrams for all new network connections.
   2. Provide configuration for all managed Ethernet switches and other components including but not limited to VLAN (virtual local area network), additional Plant PLC communication cards and separate managed Ethernet switches as required, such that there is isolation of the following networks:
      a. Field and PLC I/O network: This includes the connections between the Plant PLC and:
         1) Plant PLC expansion racks.
         2) Plant PLC remote I/O (RIO) racks.
         3) Field Networks.
         4) HMI(s) part of a Plant PLC.
         5) Vendor furnished Ethernet network components.
      b. Process control network: This includes the connections between the Plant PLC and other Plant PLCs.
      c. SCADA network: This includes the connections between the various SCADA equipment including but not limited to servers (existing), workstations and printers.
      d. Security network: This includes any security hardware with Ethernet communication as provided by the security/telephone/internet subcontractor.
   3. The process floor managed Ethernet switches for the process control network shall be configured and programmed for rapid fail over protection.

C. All work shall be performed in a neat and workmanlike manner.

D. Cable management:
   1. All cables and equipment shall be installed in strict conformance with the manufacturer's recommendations.
   2. Install cable using lubricant designed for cable pulling.
   3. Install hook-and-loop wrap on all cable bundles within the network rack/enclosure. Plastic tie-wraps are not acceptable.
   4. Install network cables without splices.
   5. Installed bend radius shall be a minimum of 10 times the cable diameter.
   6. Terminate all pairs at the jack and patch panel.
   7. Route all cables through cable management or other form of containment. No loose, unsupported cables are permitted to span across network equipment.
   8. Use corner strips to protect cables from edges inside ducts and to maintain bend radius requirements.

E. Internal rack wiring:
   1. Cables shall be installed avoiding sharp bends.
   2. Provide enough working space inside rack or cabinets such that closing enclosure doors does not crush or compress cabling.
   3. Bundle cables together in groups of no more than 12.
   4. Route cables from both sides of the rack to patch panels. Do not bring all bundles from a single side.
   5. No cabling shall obstruct equipment ventilation.
   6. Individual pairs will be untwisted less than 1/2-inch at termination points.
   7. Ground enclosure and equipment in accordance with TIA-607.
      a. Individually bond all network equipment chassis to rack's grounding busbar. Do not daisy-chain bonding conductors.
      b. Size the bonding conductor per network equipment manufacturer's recommendation, or #10 AWG, whichever is larger.

F. External rack wiring:
   1. Do not install fiber cables in non-continuous cable supports such as cable ladders or wire baskets without radius cable supports or solid bottoms.
   2. Maintain cable separation in accordance with TIA-569.
      a. Install cables a minimum of 40 inches away from electrical motors and transformers.
      b. Install cables a minimum of 12 inches away from fluorescent lighting.

G. All cables and terminations shall be labeled with cable designations as specified in Section 16075 - Identification for Electrical Systems.

H. Each data port shall be individually labeled with its patch panel/switch port ID:
   1. Labeling must be printed - no handwritten labels will be allowed.

I. At the completion of the wiring installation, provide the following documentation:
   1. A plan-view of the premise(s) showing the jack numbering scheme.

2. A printed certification report for the entire wiring installation showing compliance with all TIA specifications for data cable.
3. Reports such as those generated by Fluke DSP cable certification equipment meet this requirement.

J. Managed Ethernet switches:
1. Configure switches to prevent broadcast storms.
2. All installations shall employ IGMP snooping to limit multicast messaging.

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 FIELD QUALITY CONTROL (NOT USED)

3.08 ADJUSTING

A. Perform all firmware installations, configuration and other set up, as required, to place the network into proper operation.

3.09 CLEANING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

3.10 DEMONSTRATION AND TRAINING

A. As specified in Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

B. After completion of the cable system tests and before placing the system in operation, power up all devices installed on the LAN and verify communication between the devices.

C. Verify that all equipment is operable on the network simultaneously. Confirm that all network device communications settings are properly configured.

3.11 PROTECTION (NOT USED)

3.12 SCHEDULES (NOT USED)

END OF SECTION

ORDINANCE NO. 6406

ORDINANCE OF THE COUNCIL OF THE CITY OF ROSEVILLE AUTHORIZING CERTAIN AMENDMENTS TO THE FISCAL YEAR 2021-22 BUDGET AND DECLARING THIS ORDINANCE TO BE IMMEDIATELY EFFECTIVE AS AN APPROPRIATION MEASURE

THE CITY OF ROSEVILLE ORDAINS:

SECTION 1. The City of Roseville Annual Budget, Fiscal Year 2021-22, is hereby amended as listed on the attached budget adjustment for the Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) Construction Project.

SECTION 2. This ordinance is hereby declared to be an appropriation measure, immediately effective pursuant to the provisions of Section 5.03 of the Charter.

SECTION 3. The City Clerk is hereby authorized and directed to post a true copy of the foregoing ordinance in each of three (3) conspicuous locations in the City and she shall immediately after such posting enter in the ordinance book, under the record of the ordinance, a certificate under her hand stating the time and place of such publication by posting.

PASSED AND ADOPTED by the Council of the City of Roseville, this _____ day of _____, 2021, by the following vote on roll call:

AYES COUNCILMEMBERS:

NOES COUNCILMEMBERS:

ABSENT COUNCILMEMBERS:

_____
MAYOR

ATTEST:

_____
City Clerk

REQUEST FOR BUDGET ADJUSTMENT

REQUESTER NAME & TITLE: Janice Gainey, Sr. Engineer
FISCAL YEAR: 2022
PREPARER NAME & TITLE: Nancy Rothlisberger, Sr. EU Business Analyst
COUNCIL DATE (if applicable): 10/20/2021
DEPARTMENT/DIVISION: EU/Technical Services
ORDINANCE:

EXPENDITURES/EXPENSES/TRANSFERS OUT

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
6120	6587	84001	500157	7,600,000	Capital costs for project 500157
6120	5080	84001	500157	150,000	Secondary labor for project 500157
			TOTAL	7,750,000	

REVENUES/TRANSFERS IN

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
			TOTAL	-	

NET ADJUSTMENT	7,750,000	

FUND BALANCE

ACCOUNT STRING				BUDGET ($)	DESCRIPTION
Fund	Account	Center	Project	Adjustment	
6120				(7,750,000)	Reduce available resources in Water Construction Fund
			TOTAL	(7,750,000)	

Justification for Budget Adjustment:

The Aquifer Storage and Recovery Wells 9 (Westbrook) and 18 (Solaire) project (formerly known as the Aquifer Storage and Recovery Wells 1 and 2 project) is being expedited due to current drought conditions. The costs for the design and construction of these wells have increased from initial estimates. The current remaining budget for this project is $9,616,240. The new costs associated with this contract are $17,285,830: design-assist construction agreement with Auburn Constructors ($14,525,300), a 10% contract contingency ($1,452,530), staff labor ($150,000), City Wastewater Regional Connection Fees (initial estimate of $1,000,000), Roseville Electric Backbone Fee (estimate of $120,000), and additional hardware ($38,000). This project requires a budget adjustment from available resources in the Water Construction Fund of $7,750,000 to fully-fund these new costs. This will bring the current budget up to $17,366,240 (total lifetime project budget = $17,750,000). The secondary labor offsets for staff time are already included in the FY2022 Environmental Utilities operating budget.

REQUIRED APPROVALS:

Richard D. Pankey	10/6/21		
REQUESTING DEPARTMENT HEAD / DESIGNEE	DATE	BUDGET MANAGER / DESIGNEE	DATE
CHIEF FINANCIAL OFFICER / DESIGNEE	DATE	CITY MANAGER / DESIGNEE	DATE

BUDGET DEPARTMENT USE ONLY:

POSTED BY DATE

Revised: June 24, 2019

COUNCIL COMMUNICATION

CC #: 1740
File #: 0102

Title:	Council Discretionary Funds - Downtown Roseville Partnership
Contact:	Heather Blanco 916-746-1171 hblanco@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 9.1.

RECOMMENDATION TO COUNCIL

Recommend City Council consider a request for $2,000 from Council Discretionary Funds to The Downtown Roseville Partnership for the 60th Annual Sylvia Besana Holiday Parade.

BACKGROUND

The Downtown Roseville Partnership is proud to host the 60th Annual Sylvia Besana Holiday Parade. This family-friendly holiday event will be held on Saturday, November 20th, with the vendor booths opening at 9:00 AM and the parade beginning at 10:30 AM.

The parade presents an opportunity to drive business and interest in our Downtown area as well as create additional revenue for our City through sales and increased business. The Downtown Roseville Partnership requests a $2,000 sponsorship for the 60th Annual Sylvia Besana Holiday Parade from the City Council discretionary funds.

The Citizens' Benefit Fund was established in 1993 with the net proceeds from the sale of the Roseville Hospital. The City Council may, after receiving the recommendation of the Roseville Grants Advisory Commission, annually appropriate up to 90 percent of the annual earnings of the Citizens' Benefit Fund for the purpose of improving the quality of life for the citizens of the City of Roseville. In addition, the City Council, without the recommendation of the Roseville Grants Advisory Commission, may annually appropriate a minor amount up to $15,000 of the annual earnings for the purpose of improving the quality of life in Roseville.

The balance remaining in the Council's Discretionary Funds for FY2021-22 is $24,509.

FISCAL IMPACT

There is no fiscal impact on the City's general fund. Annually the City Treasurer allocates $15,000 of the annual earnings on the Citizens' Benefit Fund per section 4.06.04 in the Municipal Code and is included in the annual budget along with the Citizens' Benefit Fund available for appropriation each year. These earnings are restricted for the purpose of improving the quality of

life for the citizens in Roseville and appropriated by the City Council.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. The award of funds meets the above criteria and is not subject to CEQA. No additional environmental review is required.

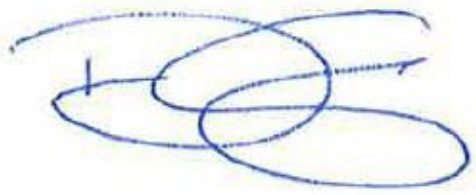
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal E - Deliver exceptional city services

Respectfully Submitted,

Heather Blanco, Management Assistant

Sonia Orozco, City Clerk



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Dominick Casey, City Manager

ATTACHMENTS:

Description

The Downtown Roseville Partnership request letter

60th Annual
Sylvia Besana Holiday Parade
Saturday, November 20th • Downtown Roseville

August 31, 2021

Krista Bernasconi, Mayor
City of Roseville
311 Vernon Street
Roseville, CA 95678

Dear Mayor Bernasconi and City Council:

The Downtown Roseville Partnership is proud to host the 60th Annual Sylvia Besana Holiday Parade. This family-friendly holiday event will be held on Saturday, November 20th with the vendor booths opening at 9:00 AM and the parade beginning at 10:30 AM. There will be fun events for all ages both before and after the parade, including Santa, food and craft booths and some new surprises this year!

The event in 2019 drew over 4,000 parade watchers, 60 parade units, and dozens of volunteers! This year we expect even more than that to come to spend time with their family and friends, watch the parade, and then spend time in the Downtown Roseville area.

The parade presents an opportunity to drive business and interest in our Downtown area as well as create additional revenue for our City through sales and increased business. The Downtown Roseville Partnership requests a $2000 sponsorship for the 60th Annual Sylvia Besana Holiday Parade from the City Council discretionary funds.

The Downtown Roseville Partnership is a non-profit with a 501(c)6 status, and, as such, is not eligible for grant applications through the City of Roseville. The Council has generously allotted funds to the Parade for the last few years through the Discretionary Funds program.

The goal of the Partnership is to keep the participation costs for parade applicants as low as possible so they rely on sponsors from outside to assist with costs. The parade sponsorship program has grown during the last few years and the hope is to eventually rely entirely on community and business sponsorships to fund the parade to allow maximum participation.

These funds will go to the general operations of the Holiday Parade. This includes, but is not limited to, the expense to close the streets, the staffing it takes to organize the parade, additional restrooms for our attendees, insurance policies to cover the event and the attendees, and other parade expenses. The total cost for the Parade, dependent on number of participants, may reach $12,000. These funds will be used to off-set those costs.

We are proud to say that since the event has been taken over by the Downtown Roseville Partnership in 2017, Parade float/unit numbers have risen 20%, vendor booth numbers have risen almost 200%, and sponsorships from outside businesses have doubled!

60th Annual

Sylvia Besana Holiday Parade

Saturday, November 20th • Downtown Roseville

We would greatly appreciate the Council's granting this sponsorship request. If you have additional questions please feel free to contact me at info@sylviabesanaparade.org or by phone at 916-910-5769.

Respectfully,

Stephanie Hill, Parade Director

COUNCIL COMMUNICATION

CC #: 1741
File #: 0102

Title:	Council Discretionary Funds - Placer Breast Cancer Foundation
Contact:	Heather Blanco 916-746-1171 hblanco@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 9.2.

RECOMMENDATION TO COUNCIL

Recommend City Council consider a request for $2,000 from Council Discretionary Funds to the Placer Breast Cancer Foundation for the 2nd Annual Paint Placer Pink campaign.

BACKGROUND

The campaign will serve the community in three important ways:

1. The campaign will bring the community out to local restaurants, gyms, retail shops, and non-profits, generating revenue for some of the local businesses that could use a boost.
2. The campaign will raise awareness of health issues related to breast cancer as well as health tips for cancer prevention.
3. Funds raised through this Campaign will be used:
    a. To donate funds to the UC Davis Comprehensive Cancer Center study that is working to determine how best to treat Triple-Negative breast cancer sufferers.
    b. To present our Annual Hot Pink Fun Run in Downtown Roseville on September 26, 2021. This is an opportunity to unite our community in the fight, celebrate Survivors, and present a healthy, family-fun event as well as to bring visitors to our Downtown area.
    c. To present the Annual Placer Women's Retreat in Roseville on October 3, 2021, helping women in our area improve their health by focusing on beneficial practices including health care, exercise, and mental well-being.

The Citizens' Benefit Fund was established in 1993 with the net proceeds from the sale of the Roseville Hospital. The City Council may, after receiving the recommendation of the Roseville Grants Advisory Commission, annually appropriate up to 90 percent of the annual earnings of the Citizens' Benefit Fund for the purpose of improving the quality of life for the citizens of the City of Roseville. In addition, the City Council, without the recommendation of the Roseville Grants Advisory Commission, may annually appropriate a minor amount up to $15,000 of the annual earnings for the purpose of improving the quality of life in Roseville.

The balance remaining in the Council's Discretionary Funds for FY2022 is $24,509.

FISCAL IMPACT

There is no fiscal impact on the City's General Fund. Annually the City Treasurer allocates $15,000 of the annual earnings on the Citizens' Benefit Fund per section 4.06.04 in the Municipal Code and is included in the annual budget along with the Citizens' Benefit Fund available for appropriation each year. These earnings are restricted for the purpose of improving the quality of life for the citizens in Roseville and appropriated by the City Council.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. The award of funds meets the above criteria and is not subject to CEQA. No additional environmental review is required.

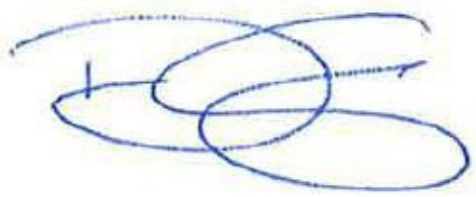
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal C - Maintain a safe and healthy community

Respectfully Submitted,

Heather Blanco, Management Assistant

Sonia Orozco, City Clerk



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Dominick Casey, City Manager

ATTACHMENTS:

Description

Placer Breast Cancer Foundation Request

PLACER
Breast Cancer
FOUNDATION

August 31, 2021

Krista Bernasconi, Mayor
City of Roseville
311 Vernon Street
Roseville, CA 95678

Dear Mayor Bernasconi and City Council:

Breast cancer is the most prevalent cancer in the world, with over 1.3 million people being diagnosed each year. Breast cancer knows no age or gender, and it affects both those who develop the disease and their care givers, family, and friends. We are proud to be continuing this fight!

We are excited to announce that this October (during Breast Cancer Awareness Month), we will be partnering with local businesses, community groups, and sponsors to once again spread the word about cancer research and education through our 2nd Annual Paint Placer Pink campaign!

Paint Placer Pink is an opportunity for us to reach out to our community and for others to join in our fight. The month will include fundraising events at locally owned restaurants (and specifically those who joined with us to give back to our community), service and retail businesses, and support from our local community leaders and partners. In addition, we will be working with our local non-profit partners and health providers to share information on local resources and health tips.

The Placer Breast Cancer Foundation requests a $2,000 sponsorship of our Paint Placer Pink! Campaign.

This campaign will serve the community in three important ways:

1) The Campaign will bring our community out to local restaurants, gyms, retail shops, and non-profits, generating revenue for some of our local businesses that could use a boost.
2) The Campaign will raise awareness of health issues related to breast cancer as well as health tips for cancer prevention.
3) Funds raised through this Campaign will be used:
    a. To donate funds to the UC Davis Comprehensive Cancer Center study that is working to determine how best to treat Triple-Negative breast cancer sufferers.
    b. To present our Annual Hot Pink Fun Run in Downtown Roseville on September 26, 2021. This is an opportunity for us to unite our community in our fight, celebrate Survivors, and present a healthy, family-fun event as well as to bring visitors to our Downtown area.

PLACER
Breast Cancer
FOUNDATION

c. To present our Annual Placer Women's Retreat in Roseville on October 3, 2021, helping women in our area improve their health by focusing on beneficial practices including health care, exercise, and mental well-being.

We would greatly appreciate the Council's granting this sponsorship request this year. If you do, we pledge to apply the monies as we have in the past to doing all we can to continue our education, outreach, and research funding.

Respectfully,

Carol C. Garcia

Carol Garcia, Board Chair

COUNCIL COMMUNICATION

CC #: 1742
File #: 0102

Title:	Council Discretionary Funds - Wreaths Across America
Contact:	Heather Blanco 916-746-1171 hblanco@roseville.ca.us

Meeting Date: 10/20/2021
Item #: 9.3.

RECOMMENDATION TO COUNCIL

Recommend City Council consider a request for a $3,000 sponsorship from Council Discretionary Funds for Wreaths Across America for the National Wreaths Across America ceremony at Roseville District Cemetery on December 18, 2021, at noon.

BACKGROUND

This year, National Wreaths Across America Day will be held on Saturday, December 18, 2021. Locally, a ceremony will begin at noon, followed by the placement of wreaths at Roseville District Cemetery located at 421 Berry Street, Roseville, California, where 2,344 local veterans are laid to rest. This is open to anyone who would like to attend.

In 2020, there were approximately 179 wreaths placed, leaving 2,145 veterans without a remembrance wreath. This year the goal is to place 2,344 wreaths. With the City Council and local citizen and businesses generosity, they hope to meet this goal and ensure no veteran is forgotten. Each hand-made, fresh, live wreath costs $15 to sponsor and is made in the United States with Maine balsam.

The volunteers and military families looking to honor all veterans laid to rest at the Roseville District Cemetery seek the goal to Remember, Honor, Teach.

The Citizens' Benefit Fund was established in 1993 with the net proceeds from the sale of the Roseville Hospital. The City Council may, after receiving the recommendation of the Roseville Grants Advisory Commission, annually appropriate up to 90 percent of the annual earnings of the Citizens' Benefit Fund for the purpose of improving the quality of life for the citizens of the City of Roseville. In addition, the City Council, without the recommendation of the Roseville Grants Advisory Commission, may annually appropriate a minor amount up to $15,000 of the annual earnings for the purpose of improving the quality of life in Roseville.

The balance remaining in the Council's Discretionary Funds for FY2021-22 is $24,509.

FISCAL IMPACT

There is no fiscal impact on the City's General Fund. Annually the City Treasurer allocates $15,000 of the annual earnings on the Citizens' Benefit Fund per section 4.06.04 in the Municipal Code and is included in the annual budget along with the Citizens' Benefit Fund available for appropriation each year. These earnings are restricted for the purpose of improving the quality of life for the citizens in Roseville and appropriated by the City Council.

ENVIRONMENTAL REVIEW

The California Environmental Quality Act (CEQA) does not apply to activities that will not result in a direct or reasonably foreseeable indirect physical change in the environment, or is otherwise not considered a project as defined by CEQA Statute §21065 and CEQA State Guidelines §15060(c)(3) and §15378. The award of funds meets the above criteria and is not subject to CEQA. No additional environmental review is required.

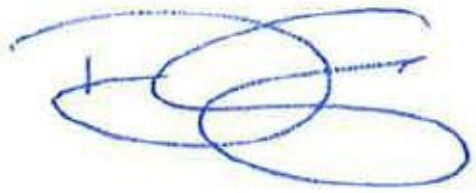
CITY COUNCIL STRATEGIC PLAN/OVERARCHING GOALS

Goal B - Support community engagement and advocacy

Respectfully Submitted,

Heather Blanco, Management Assistant

Sonia Orozco, City Clerk



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Dominick Casey, City Manager

ATTACHMENTS:

Description

Wreaths Across America

Sept. 20, 2021

Dear Mayor Krista Bernasconi

In December 1992 in Harrington, Maine, when wreath maker Morrill Worcester found himself with a surplus of 5,000 wreaths during the holiday season. Worcester saw the surplus as an opportunity to pay tribute to our country's veterans and with the help of Maine Senator Olympia Snowe, arranged for the wreaths to be placed at Arlington National Cemetery. This annual tribute to our country's veterans has continued ever since, touching the lives of millions of veterans' families and volunteers and growing in scope through the years.

In 2007, the Worcester family along with veterans and volunteers formed the non-profit organization Wreaths Across America to continue and expand their efforts at Arlington National Cemetery and to support those around the country who wished to do the same. Wreaths Across America's mission is simple: **Remember** the fallen, **Honor** those that serve, and **Teach** the next generation about the value of freedom. 2021 theme is Live Their Legacy. Morrill's wife, Karen, has served as the organization's volunteer Executive Director since the non-profit was created and today oversees what has become a massive volunteer organization that continues to grow. In 2020 alone, Wreaths Across America and its national network of volunteers placed over 1.7 million veterans' wreaths at over 2,500 locations in all 50 U.S. states, at sea, and abroad.

This year, National Wreaths Across America day will be held on Saturday, December 18th, 2021. Locally, a ceremony will begin at noon followed by the placement of wreaths at Roseville District Cemetery located at 421 Berry St. Roseville, Ca where 2344 local veterans are laid to rest. This is open to anyone who would like to attend.

In 2020, there were approximately 179 wreaths placed, leaving 2145 veterans without a remembrance wreath. This year our goal is to place 2344 wreaths. With the City Council and local citizen and businesses generosity, we are hoping to meet this goal and ensure no veteran is forgotten. Each hand made, fresh, live wreath cost $15 to sponsor and is made in the United States with Maine balsam.

On behalf of the volunteers and military families looking to honor all the veterans laid to rest at Roseville District Cemetery and the Wreaths Across America extended family, I thank you for your consideration of this patriotic cause. I'll be in touch to determine your interest in supporting the mission to Remember, Honor, Teach.

Respectfully,

Clair Alway and Patti Jespersen / Roseville District Cemetery
dalway@comcast.net
916-735-8276 or 916-817-1414

CARVCD 166620 Group and Location Number

Wreath Sponsorship

Roseville District Cemetery, Roseville, CA 95678 **(CARVCD) |166620|**

What does it mean to sponsor a wreath? It means you'll honor an American hero at one of more than 2500 locations nationwide this year on Wreaths Across America Day. It's a day that's been set aside to lay wreaths at the places where we remember, honor and teach about our veterans: cemeteries, monuments, parks… Anywhere we can pay tribute to their sacrifices.

We can't do that without your support, though. Your sponsorship will ensure that a wreath is hand-crafted of all-American balsam and hand-tied with a red velvet bow here in Columbia Falls, Maine. It will then be sent to one of our participating locations, where a volunteer will place it on the marker of a fallen hero. That volunteer will then "say their name" to ensure that the legacy of duty, service and sacrifice of that veteran is never forgotten.

So, what does it mean to sponsor a wreath? It means you have the opportunity to join a grateful nation in saying "thank you" to our veterans.

Number of Wreaths to Sponsor:

- ☐ 1 Wreath Individual Sponsorship ($15)
- ☐ 2 Wreaths ($30.00)
- ☐ 5 Wreaths ($75.00) *Most Popular
- ☐ 10 Wreaths ($150.00)
- ☒ Custom Number of Wreaths 200 Wreaths $3000 Sponsorship Request

For convenience, you go online to www.wreathsacrossamerica.org/CARVCD, place your order and pay by credit card. Please include our location and groups IDs with your order to ensure Roseville District Cemetery for your wreaths sponsorships. At this time we are to receive $5.00 payback for every 3 wreaths sponsored. This payback will assist in the funding of the Gold Star Mothers monument to be dedicated here RCD on October 30,2021.

Thank you so much for supporting Roseville District Cemetery and Wreaths Across America in this National Day of Tribute to our fallen veterans.

For more information call cemetery location co-ordinators Clair Alway 916-735-8276 or
Patti Jespersen 916-817-1414