

CITY OF SEBASTOPOL



NOTICE TO BIDDERS, PROPOSAL, CONTRACT

FOR

CONSTRUCTION OF THE

Burbank Farm Restroom Addition and Access Path

CONTRACT NO. 2025-01

BID OPENING DATE:

OCTOBER 15, 2025

CITY OF SEBASTOPOL
ENGINEERING DEPARTMENT
714 Johnson Street

SEBASTOPOL, CALIFORNIA 95472
PHONE: (707) 823-2151

Approved for Release:



Mario Landeros, Interim City Engineer

9/25/25
Date

NOTICE TO BIDDERS

NOTICE IS HEREBY GIVEN that sealed bids will be received by the City Engineer of the City of Sebastopol at the Engineering Department located 714 Johnson Street, Sebastopol, County of Sonoma, State of California, until the hour of 2:00 p.m., on the **15th day of October, 2025** at which time they will be publicly opened and read aloud in the conference room of the Public Works Department, 714 Johnson Street, Sebastopol, California, for:

BURBANK FARM RESTROOM ADDITION AND ACCESS PATH City Contract No. 2025-01

Project plans and specifications may only be obtained by registering for the project plan holder list. Contact DraTech at (707) 578-9442 or visit <https://www.drafttechplanroom.com/> for more information on obtaining project documents and registering for the project plan holder list. Any bidder not registered for the plan holders list prior to the bid opening date shall have their bid deemed non-responsive. Questions may be directed to engineering@cityofsebastopol.gov.

The Work in general consists of constructing a new 2-room unisex public restroom facility in a historical matching appearance at the Luther Burbank Experiment Farm and revising the current path from nearby parking to the new restroom. All work is to be ADA-compliant. The Engineer's estimate of cost is \$300,000.

In accordance with California Public Contract Code Section 3300, a valid Class B California General Contractor License is required to bid on the project.

This project is partially funded by the U.S. Department of Housing and Urban Development (HUD). The bidders' attention is directed to Appendix "B" of the Project Specifications for the Federal Labor Standards Provisions (form HUD-4010) applicable to this project. All mechanics and laborers employed or working upon the project site will be paid unconditionally in accordance with the provisions in the Federal requirements listed in Appendix "C" of the Project Specifications. Federal wage rates applicable to the project shall comply with the Federal Wage Decision contained in Appendix "E" of the Project Specifications. It was the most current wage decision available at the time these bid documents were assembled. The Federal Wage Decision is updated periodically by the U.S. Department of Labor. The wage decision applicable for this project will be locked in 10 days prior to the bid opening date and will be made part of the contract by addendum.

Pursuant to the provisions of Section 1720 et seq. of the Labor Code of California, the Director of Industrial Relations for the State of California has ascertained the current general prevailing rate of wages for employer purposes, in Sonoma County, State of California. Not less than the general prevailing rate of per diem wages for work of a similar character in Sonoma County and not less than the general prevailing rate of per diem wages for holiday work fixed as provided in the California Labor Code must be paid to all workers engaged in performing the project.

In accordance with the California Labor Code Section 1773.2, copies of the applicable determinations of the Director are on file in the City of Sebastopol City Engineer's Office and may be reviewed upon request.

In accordance with California Public Contract Code Section 3400, bidders may propose equals of products listed in the Special Provisions or project plans by manufacturer name, brand, or model number, unless the Special Provisions or plans specify that the product is necessary to match others in use. Complete information for products proposed as equals must be submitted to the City Engineer's Office for review at least seven (7) working days before the time specified for bid opening in accordance with the information for bidders contained in the bid package.

In accordance with California Public Contract Code Section 20170, all bids must be presented under sealed cover and include one of the following forms of bidder's security: cash, cashier's check made payable to the City, certified check made payable to the City, or a bidder's bond. The amount of bidder's security provided must equal at least ten (10) percent of the total of the bid price for the base bid and the additive or deductive items listed in this notice. The successful bidder must submit to the City complete, executed copies of all required documents within ten (10) working days of receiving written notice of award of the project. Bidder's security of any successful bidder that fails to do so will be forfeited to the City. Such required documents include, but are not limited to, a payment or labor and materials bond in an amount of at least 100 percent of the amount payable by the terms of the project contract and that satisfies the requirements of California Civil Code Section 9554, and a performance bond in an amount of at least 100 percent of the amount payable by the terms of the contract. All project bonds must be executed by an admitted surety insurer in accordance with applicable law and acceptable to the City.

In accordance with California Public Contract Code Section 22300, except where prohibited by federal regulations or policies, the successful bidder may, on request and at its expense, substitute securities in lieu of amounts withheld by the City from progress payments to ensure performance under the contract in accordance with the contract documents.

The City of Sebastopol reserves the right to postpone the date and time for the opening of proposals at any time prior to the date and time announced in the advertisement in accordance with applicable law.

The City of Sebastopol reserves the right to reject any and all bids or to waive any defects or irregularity in bidding in accordance with applicable law. In accordance with California Public Contract Code Section 20103.8, if the City elects to award a contract for performance of the project, the contract will be awarded in accordance with California Public Contract Code Section 20162 and other applicable law to the responsible bidder submitting a responsive bid with the lowest total bid price for the base bid without consideration of the bid price for any additive or deductive items. All bids will remain valid for 90 days after the bid opening. Except as permitted by law and subject to all applicable remedies, including forfeiture of bidder's security, bidders may not withdraw their bid during the 90-day period after the bid opening.

Questions regarding this Notice may be submitted to engineering@cityofsebastopol.gov.

By order of the City Council of the City of Sebastopol, Sonoma County, California.

/s/ Mario Landeros
City Engineer

Date 09/25/25

TABLE OF CONTENTS

INFORMATION FOR BIDDERS	1
1. DEFINITIONS	1
2. BIDDER'S REPRESENTATIONS	1
3. PRE-BID COMMUNICATION AND INTERPRETATION OF THE BID PACKAGE	2
4. PRE-BID ACCESS TO THE PROJECT SITE.....	2
5. BIDDING PROCEDURE	2
6. BID PROTESTS	4
7. AWARD	5
8. PRICING	5
9. QUANTITIES.....	6
10. SUBSTITUTION OF "OR EQUAL" ITEMS.....	6
11. SUBCONTRACTING	7
12. ASSIGNMENT	7
13. BONDS	8
14. LABOR LAWS	8
BIDDER'S CHECK LIST	10
PROPOSAL	11
BID BOND.....	14
CONTRACTOR LICENSE INFORMATION	15
LIST OF SUBCONTRACTORS.....	16
NON-COLLUSION AFFIDAVIT	19
WORKERS COMPENSATION INSURANCE CERTIFICATION	20
DEBARMENT CERTIFICATION	20
ACKNOWLEDGMENT OF INSURANCE AND INDEMNITY REQUIREMENTS.....	21
49CFR29 DEBARMENT AND SUSPENSION CERTIFICATION	24
PUBLIC CONTRACT CODE SECTION 10285.1 STATEMENT	25
PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNAIRE.....	26
PUBLIC CONTRACT SECTION 10232 STATEMENT	27
BIDDER'S SIGNATURE PAGE.....	28
CONTRACT DOCUMENTS CHECK LIST	30
 CONTRACT	
PART 1 - AGREEMENT	31
100% PERFORMANCE BOND	33
50% PAYMENT BOND.....	35
MAINTENANCE BOND	37
ESCROW AGREEMENT	39

PART 2 - GENERAL PROVISIONS	42
SECTION 1 Definitions.....	42
SECTION 2 Scope of Work.....	44
SECTION 3 Control of Work and Material.....	46
SECTION 4 Changes in Work.....	51
SECTION 5 Trenching and Utilities	54
SECTION 6 Project Facilities.....	57
SECTION 7 Prosecution and Progress of the Work	58
SECTION 8 Contractor Responsibilities	61
SECTION 9 Measurement and Payment	70
SECTION 10 Project Acceptance and Closeout.....	74
SECTION 11 Remedies and Disputes	75
SECTION 12 Additional Provisions	80
SECTION 13 Safety Rules and Requirements	88
PART 3 - SPECIFICATIONS	91
 LIST OF APPENDICES	
General Guidelines for Construction Activities	Appendix A
Erosion and Sediment Control and Minimization of Hazardous Materials Contact with Stormwater	
HUD-4010	Appendix B
HUD Section 3 Compliance	Appendix C
US Dept. of Labor - Payroll form	Appendix D
and other required forms	
Wage Decision 2025 - California.....	Appendix E

INFORMATION FOR BIDDERS

1. DEFINITIONS

- 1.1 Bid forms. The bid forms are the forms listed in the Bid Forms Section in the bid package Table of Contents.
- 1.2 Bid package. A complete bid package consists of the following documents: Notice to Bidders, Information for Bidders, Bidder's Check List, Proposal and Schedule of Bid Prices, Bid Bond, Contractor License Information, List of Proposed Subcontractors, Non-collusion Affidavit, Workers Compensation Insurance Certification, Debarment and Suspension Certification, Acknowledgement of Indemnity and Insurance Requirements, Public Contract Code Section 10285.1 Statement, Public Contract Code Section 10162 Questionnaire, Public Contract Code Section 10232 Statement, Bidder's Signature Page, Contract Documents Check List, Contract, Part 1, Performance Bond, Payment Bond, Escrow Agreement (if applicable), General Provisions, Special Provisions , the Project Plans.
- 1.3 Business day. The City is open for business Monday through Thursday, excluding holidays, from 7:00 a.m. to 5:30 p.m. (Note that the office is closed noon – 12:30 p.m. for lunch.)
- 1.4 Contract documents. All of the documents incorporated into the final Project contract as listed in the contract, as described in the Contract.
- 1.5 Project. The Project is the BURBANK FARM RESTROOM ADDITION AND ACCESS PATH as described in the bid package.
- 1.6 Project Plans. The Project Plans are the primarily graphic detailed requirements concerning the Project contained in the bid package.
- 1.7 Special Provisions, Part 3. The Special Provisions provide detailed requirements concerning the Project.

2. BIDDER'S REPRESENTATIONS

Each bidder by submitting a bid represents that:

- 2.1 The bidder has read and understands the bid package and the bid is in accordance with all the requirements of the bid package and applicable law.
- 2.2 Neither the bidder nor any subcontractor included on the list of proposed subcontractors submitted with the bid are ineligible to perform work on public works projects pursuant to California Labor Code Sections 1777.1 or 1777.7.
- 2.3 The bidder understands that quantities of unit price items may vary from the estimates provided in the Special Provisions.
- 2.4 Representatives of the bidder have visited the Project site and have familiarized themselves with the conditions under which the Project work is to be performed so as to ensure that the Project work may be performed for the amount bid.

- 2.5 The bidder has informed the City in writing no later than five (5) working days prior to the time specified for bid opening of any apparent conflicts, errors, or ambiguities contained in the bid package or between the contents of the bid package and the Project site.

3. PRE-BID COMMUNICATION AND INTERPRETATION OF THE BID PACKAGE

- 3.1 Any bidder that discovers any apparent conflicts, errors, or ambiguities contained in the bid package or between the contents of the bid package and the Project site, or that has questions or requires clarification concerning the bid package or its intent must inform the City in writing as soon as reasonably possible, but no later than five (5) working days before the date specified for bid opening. Such notice to the City must be sent to the address specified in the Notice to Bidders for questions concerning the bid package. Questions received less than five (5) working days before the time specified for opening bids may not be answered.
- 3.2 Any interpretation, correction or change of the bid package prior to bid opening will be made by addendum signed by an authorized representative of the City and transmitted to all bid package recipients. No other interpretation or information concerning the bid package issued prior to the date specified for opening bids will be binding. All addenda signed by an authorized representative of the City and issued prior to the time and date specified for opening bids will form a part of the contract documents and must be acknowledged on the bid forms. Any changes, exceptions or conditions concerning the Project and/or the bid package submitted by any bidder as part of a bid may render that bid non-responsive.

4. PRE-BID ACCESS TO THE PROJECT SITE

- 4.1 Prior to submitting a bid, it will be the sole responsibility of each bidder to conduct any additional examination, investigation, exploration, test, study or other inquiry and to obtain any additional information pertaining to the physical conditions (including surface, subsurface, and underground utilities) at or near the Project site that may affect the cost, progress, or performance of the Project, and that the bidder deems are necessary to prepare its bid for performance of the Project in accordance with the bid package and contract documents. Bidders seeking any such additional examination or other inquiries or information concerning the Project will do so at the bidder's sole expense.
- 4.2 Bidders seeking to conduct any additional examination or other inquiry at the Project site must request site access from the City at least two (2) working days in advance. The location of any excavation, boring or other invasive testing will be subject to approval on behalf of the City and any other agencies with jurisdiction over such testing. Bidders may not conduct tests at the Project site prior to obtaining City approval. The City may require bidders to execute an access agreement prior to approving testing at the Project site. Once approved testing is complete, Bidders must fill all trenches or holes, restore all pavement to match existing structural section, and otherwise clean up and restore the test site to its pre-test condition.

5. BIDDING PROCEDURE

- 5.1 Bids must be delivered to the City of Sebastopol, 714 Johnson Street, Sebastopol, California 95472, no later than the time and date specified in the Notice to Bidders. Bids will be opened and read publicly at that time. Bids that are submitted late according to

the official time kept by the Public Works Management Analyst or a designee will be returned unopened. Telephones for use by bidders are not available at the City offices.

- 5.2 In accordance with California Public Contract Code Section 20170, bids must be presented under sealed cover. Bids must be submitted using the bid forms furnished with the bid package. Bids must include all documents listed in the Bidder's Check List completed in accordance with the bid package. Bids must bear the bidder's legal name and be signed by a representative authorized to bind the bidder. Bids must be typed or written in ink. Corrections may be made if initialed by the individual signing the bid. No oral or telegraphic modifications of bids, including facsimile modifications, will be considered. Bids that are incomplete or that are not presented on the bid forms furnished with the bid package may be deemed non-responsive.
- 5.3 Each bid must give the full business address of the bidder. Bids of partnerships must furnish the full name of all partners and must be signed in the partnership name by one of the members of the partnership, or by an authorized representative, followed by the printed name and title of the person signing. Bids of corporations must be signed with the legal name of the corporation, followed by the name of the state of incorporation and by the signature and designation of the president, secretary or other person authorized to bind the corporation. The name of each person signing must also be typed or printed below the signature. Upon request of the City, bidders will furnish satisfactory evidence of the authority of the person signing the bid. Bids of joint ventures must include a certified copy of the legal agreement constituting the joint venture.
- 5.4 No person, firm, corporation, partnership or legal joint venture may submit more than one bid for the Project. However, a person, firm, corporation, partnership or legal joint venture that has submitted a subcontract proposal to a bidder, or that has quoted prices on materials to a bidder may submit a subcontract proposal, quote prices to other bidders and submit its own bid.
- 5.5 In accordance with California Public Contract Code Section 20170, all bids must include one of the forms of bidder's security specified in the Notice to Bidders in an amount of at least ten (10) per cent of the total of the bid prices for the base bid and those additive or deductive items specifically identified in the Notice to Bidders for the purpose of determining the lowest price bid. Bidders that elect to provide bidder's security in the form of a bid bond must execute a bid bond using the form provided in the bid forms. The bidder's security is tendered as a guarantee that the successful bidder, if issued a notice of award concerning the Project contract, will execute and submit to the City all required bonds, certificates of insurance, completed contract forms and other documents listed in the Contract Check List and enter into a contract with the City within ten (10) working days of receipt of the notice of award. The bidder's security of any successful bidder that fails to do so will be forfeited to the City. All bidders' security not forfeited to the City will be returned once a successful bidder provides all required documents and enters a contract with the City in accordance with all applicable bid package requirements. Forfeiture of the bidder's security to the City will not waive or otherwise limit any other remedy available to the City under applicable law.
- 5.6 In accordance with California Business and Professions Code Section 7028.15, Public Contract Code Section 20103.5, and as specified in the Notice to Bidders, all Project work must be performed by properly licensed contractors and subcontractors with active licenses in good standing as of the date and time specified for bid opening, or, if the Project involves federal funds, no later than the time the Project contract is awarded. Bidders must verify their Contractor's License number and license expiration date in the

proposal under penalty of perjury. Bids that do not satisfy applicable licensing requirements will be considered non-responsive and rejected and may subject the bidder to criminal and/or civil penalties.

- 5.7 Pursuant to Labor Code Section 1771.1(a), 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 Public Contract Code or engage in the performance of any contract for public work, as defined in Part 7, Chapter 1 of the Labor Code., unless currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5. It is not a violation of Labor Code Section 1771.1 for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Labor Code Section 1725.5 at the time the contract is awarded.
- 5.8 If the bid forms include a bidder's questionnaire, all bids must include a completed bidder's questionnaire on the forms provided. By submitting a bid, bidders authorize City representatives to verify any and all information provided on the bidder's questionnaire and agree to indemnify, defend and hold harmless the City and its officials, officers, employees, agents and volunteers to the full extent permitted by law from and against any claims, liability or causes of action, including, without limitation, legal fees and costs, arising out of verification of the information provided on the bidder's questionnaire, and/or arising out of use of information provided in the bidder's questionnaire to determine, in accordance with applicable law, the qualification of the bidder to perform the Project.
- 5.9 Bids may be withdrawn prior to the time set for bid opening by a written request signed by an authorized representative of the bidder filed with the Management Analyst. The bid security submitted with bids so withdrawn will be returned to the bidder. Bidders that have withdrawn their bid in accordance with this provision may submit a new bid prior to the time set for bid opening in accordance with all applicable bid package requirements. Bids may not be withdrawn during the ninety-day period after the time set for bid opening except as permitted by law pursuant to California Public Contract Code Section 5100 and following. Any other bid withdrawal will result in forfeiture of the bidder's bid security to the City.

6. BID PROTESTS

- 6.1 Any protest of the proposed Project award must be submitted in writing to the City and received at the City, Public Works Office, 714 Johnson Street, Sebastopol, no later than 5:00 PM on the third business day following the date of the bid opening.
- 6.2 The protest must contain a complete statement of the basis for the protest.
- 6.3 The protest must state the facts and refer to the specific portion of the document or the specific statute that forms the basis for the protest. The protest must include the name, address, and telephone number of the person representing the protesting party.
- 6.4 The party filing the protest must concurrently transmit a copy of the protest to the proposed awardee.

- 6.5 The party filing the protest must have submitted a bid for the Project. A subcontractor of a party filing a bid for the Project may not submit a bid protest. A party may not rely on the bid protest submitted by another bidder but must timely pursue its own protest.
- 6.6 The procedure and time limits set forth in these Information for Bidders are mandatory and are the bidders' sole and exclusive remedy in the event of a bid protest. Any bidder's failure to fully comply with these procedures will constitute a waiver of any right to further pursue a bid protest, including filing of a challenge of the award pursuant to the California Public Contract Code, filing of a claim pursuant to the California Government Code, or filing of any other legal proceedings.
- 6.7 The City will review all timely protests prior to award of the contract. The City will not be required to hold an administrative hearing to consider any protests, but may do so at its option. At the time of the City Council's consideration of the award, the City Council will also consider the merits of any timely protests. The City Council may either reject the protest and award to the lowest responsible bidder or accept the protest and award the bid to the next lowest responsible bidder. Nothing in this section will be construed as a waiver of the City Council's right to reject all bids.

7. AWARD

- 7.1 In accordance with applicable law, the City reserves the right to reject any or all bids and to waive any informality in any bid. The City reserves the right to accept any portion of any bid, unless the bid package expressly provides that the award will be made as a whole. If the City elects to award a contract for performance of the Project, the contract will be awarded in accordance with California UPCCAA under the Public Contract Code Section 22000, et. seq. and other applicable law to the responsible bidder submitting a responsive bid with the lowest total bid price for the base bid and the additive or deductive alternate items listed in the Notice to Bidders. In accordance with the contract documents and applicable law, the City may add or deduct items of work from the Project after the lowest responsible bidder is determined.
- 7.2 The successful bidder must submit to the City complete, executed copies of all documents specified in the Contract Checklist within ten (10) working days of receiving written notice of award of the Project. Bidder's security of any successful bidder that fails to do so will be forfeited to the City.
- 7.3 The successful bidder and any subcontractors and others engaged in performance of the Project must have valid local business license(s), as applicable, before commencing work on the Project.
- 7.4 Upon verifying that the successful bidder has provided complete, executed copies of all documents specified in the Contract Checklist an authorized City representative will execute the Project contract, and the City will issue to the successful bidder a notice to proceed specifying the Project commencement date. The number of days within which the Project must be complete begins to run on the Project commencement date.

8. PRICING

- 8.1 If an inconsistency exists between the amount listed for a unit price in a bid and the total listed for that bid item (e.g., if the total listed for a bid item does not equal the unit price listed in the bid multiplied by the quantity listed), subject to applicable law, the unit price will be deemed to accurately reflect the bidder's intent concerning the bid item and the

intended total for the bid item will be deemed to be the unit price as listed in the bid multiplied by the quantity listed.

- 8.2 If the Project bid price is a lump sum total made up of smaller individual bid item prices and an inconsistency exists between the lump sum total bid price and any individual bid item price, subject to applicable law, the individual bid item prices as listed in the bid will be deemed to accurately reflect the bidder's intended bid for the Project and the intended lump sum total bid for the Project will be deemed to be the sum of the individual bid item prices as listed in the bid, even if that sum is different from the amount actually listed as the lump sum total bid for the Project.
- 8.3 Any federal, state, or local tax payable on articles to be furnished for the Project will be included in the lump sum total bid price and paid by the Contractor under the contract. The City is exempt from federal excise tax and will provide a certificate of exemption to the successful bidder upon request.

9. QUANTITIES

- 9.1 Quantities, including but not limited to, material or labor quantities, that are provided in the bid package concerning the Project are estimates only and are provided solely as a general indication of the Project scope. The City does not warrant that such quantity estimates provided in the bid package represent the actual quantities required to perform the Project in accordance with the contract documents. Such quantity estimates do not bind the City, and bidders should not rely on them in preparing their bids. Each bidder is solely responsible for determining the quantities on which to base their bids in light of information contained in the bid package, bidder investigation and analysis of the Project and the Project site, and any other analysis or expertise of the bidder concerning the Project.
- 9.2 The City may amend, decrease or increase the Project work in accordance with the bid package and the contract documents. If the City amends, decreases or increases the Project work prior to award of the Project each bidder will be solely responsible for determining the revised quantities, if any, on which to base their bid in light of information contained in the bid package and any amendments or addenda to the bid package, bidder investigation and analysis of the Project as amended, decreased or increased, the Project site, and any other analysis or expertise of the bidder concerning the Project.

10. SUBSTITUTION OF "OR EQUAL" ITEMS

- 10.1 In accordance with California Public Contract Code Section 3400, where the Special Provisions or Project Plans list products by manufacturer's name, brand or model number such information indicates the quality and utility of the items desired and does not restrict bidders to that manufacturer's name, brand or model number, unless the Special Provisions or Project Plans specify that the listed product is necessary to match others in use on a particular public improvement either completed or in the course of completion. Except where the Special Provisions indicate that a particular brand product is necessary to match others in use, when a manufacturer's name, brand or model number is listed, it will be construed to be followed by the words "or equal" whether or not those words in fact follow the manufacturer's name, brand name or model number listed in the Special Provisions or Project Plans. Unless the Special Provisions or Project Plans indicate that a particular brand product is necessary to match others in use, bidders may propose equals of products listed by manufacturer name, brand name or model number.

- 10.2 Complete information for products proposed as equals must be submitted to the City for review at least seven (7) working days before the time specified for opening bids. To be considered, proposals concerning products proposed as equals must include sufficient information to permit the City to determine whether the products proposed as equals will satisfy the same performance requirements as products listed by manufacturer name, brand or model number. Such performance requirements may include, but are not limited to, size, strength, function, appearance, ease of maintenance and repair, and useful life requirements. Proposals concerning products proposed as equals that are submitted less than seven (7) days before the time specified for opening bids will not be considered. Failure to bid products specified by manufacturer name, brand name or model number where the Special Provisions or Project Plans specify that a particular product is necessary to match others in use, or where no proposal concerning products proposed as equals has been submitted in accordance with this provision may render a bid non-responsive.

11. SUBCONTRACTING

- 11.1 Bids must be in accordance with the requirements of the Subletting and Subcontracting Fair Practices, Act, California Public Contract Code Section 4100 and following. Bids must include a completed list of proposed subcontractors on the form included in the bid package. In accordance with California Public Contract Code Section 4104, completed lists of proposed subcontractors must include the name, business location, the portion (type or trade), and dollar amount of the Project work to be subcontracted for each subcontractor that will perform a portion of the Project work (including special fabrication and installation of a portion of the work) valued in excess of one half of one percent of the total Project bid price. If the Project work includes construction of streets or highways, the completed list of proposed subcontractors must include the subcontractor name, business location, type of work and dollar amount to be subcontracted for each subcontractor that will perform a portion of the Project work (including special fabrication and installation of a portion of the work) valued in excess of one half of one percent of the total Project bid price, or ten thousand dollars (\$10,000), whichever is greater.
- 11.2 In accordance with California Public Contract Code Section 4106, for any portion of the Project work with a value of more than one half of one percent of the total Project bid price for which no subcontractor is listed, or for which more than one subcontractor is listed, bidders certify by submitting their bids that they are qualified to perform that portion of the Project work and that they will perform that portion of the Project work with their own forces. Bidders may not substitute another subcontractor for a subcontractor listed in their bid except as permitted by the City in accordance with Section 4107 and following of the California Public Contract Code.
- 11.3 The Contractor must perform with his or her own organization a value of work amounting to not less than 50% of the contract amount in accordance with the Contract.
- 11.4 Subcontractors must meet all applicable indemnification and insurance requirements as detailed in the Acknowledgement of Indemnity and Insurance Requirement.

12. ASSIGNMENT

- 12.1 Bidders may not assign, sublet, sell, transfer, or otherwise dispose of their bid or any right, title or interest in their bid, or their obligations under their bid, without the written

consent of an authorized representative of the City. Any purported assignment, subletting, sale, transfer or other disposition of a bid or any interest in a bid, or of any obligations under a bid without such written consent will be void and of no effect.

13. BONDS

- 13.1 The successful bidder must submit to the City a performance bond within ten working days of receiving written notice of award. If the Project involves expenditures in excess of twenty-five thousand dollars (\$25,000), the successful bidder must submit to the City a payment or labor and materials bond within 10 days of the date of mailing of the notice of award. Prior to issuance of the final Project payment, the successful bidder must submit a warranty or maintenance bond. All bonds must be executed by corporate sureties who are admitted surety insurers in the State of California in accordance with applicable law and acceptable to the City. Individual sureties will not be accepted. All Project bonds must be executed using the forms provided in the bid package.
- 13.2 In accordance with California Civil Code Section 9554, the payment or labor and materials bond must be in the amount of one hundred percent of the total amount payable by the terms of the Project contract and guarantee payment to persons listed in California Civil Code Section 9100(a) for work performed and for charges for materials, supplies, and equipment provided under the Project contract (including amounts due under or subject to the Unemployment Insurance Code) in accordance with the requirements of California Civil Code Section 9554.
- 13.3 The performance bond must be in the amount of one hundred percent of the amount payable by the terms of the Project contract to guarantee the faithful performance of the Project work.
- 13.4 The warranty or maintenance bond must be in the amount of ten percent of the final Project contract amount and guaranty the Project work against defects in materials, equipment, workmanship, or needed repair for one year from the City's acceptance of the Project work. A warranty or maintenance bond that meets these requirements must be submitted to the City prior to issuance of final Project payment.

14. LABOR LAWS

- 14.1 Bidders must comply with applicable provisions of the California Labor Code.
- 14.2 In accordance with California Labor Code Section 1861, bids must include a workers compensation insurance certification on the form included in the bid package.
- 14.3 In accordance with California Labor Code Section 1771, not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the Project is to be performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed as provided in the California Labor Code must be paid to all workers engaged in performing the Project.
- 14.4 In accordance with California Labor Code Part 7, Chapter 1m Article 2, Sections 1770, 1773, and 1173.2 and following, the Director of Industrial Relations has determined the general prevailing wage per diem rates for work in the locality in which the Project is to be performed. In accordance with California Labor Code Section 1773, the City has obtained the general prevailing rate of per diem wages and the general rate for holiday and overtime work in the locality in which the Project is to be performed for each craft,

classification or type of worker needed to perform the Project. In accordance with California Labor Code Section 1773.2, copies of the prevailing rate of per diem wages are on file at the City offices and will be made available on request. The Contractor can also download this information from the website: <https://www.dir.ca.gov/public-works/prevailing-wage.html>.

- 14.5 In accordance with California Labor Code Section 1777.1, contractors and subcontractors that are found guilty of willfully violating Chapter 1 of Part 7 of Division 2 of the Labor Code (except for Section 1777.5), or that are found guilty of such violations with intent to defraud, and entities in which such contractors or subcontractors have any interest, may be ineligible to bid on, be awarded, or perform Project work as a subcontractor.
- 14.6 Pursuant to, Labor Code Section 1771.1(a), 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 Public Contract Code, or engage in the performance of any contract for public work, as defined in Part 7, Chapter 1 of the Labor Code, unless currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5. It is not a violation of Labor Code Section 1771.1 for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Labor Code Section 1725.5 at the time the contract is awarded.

BIDDER'S CHECK LIST

Did You:

- _____ Submit equal product proposals, if any, in accordance with the information for bidders included in the bid package at least 7 days before the time specified for bid opening?
- _____ Include with your bid properly completed, accurate copies of the following documents in the following order using the forms included in the bid package:
 - _____ Bidder's check list
 - _____ Proposal and Schedule of Bid Prices that state the bid as intended
 - _____ Copies of each Addendum issued signed and dated on behalf of the bidder
 - _____ Executed Bid Bond
 - _____ Contractor License Information
 - _____ List of Proposed Subcontractors
 - _____ Signed Title 23 USC Section 112 and Public Contract Code 7106 Non-Collusion Affidavit
 - _____ Signed Workers compensation insurance & Public Contract Code 6109 Debarment certification
 - _____ Signed Acknowledgment of Insurance and Indemnity Requirements
 - _____ Signed Title 49 CFR Part 29 Debarment and Suspension Certifications
 - _____ Public Contract Code Section 10285.1 Statement
 - _____ Public Contract Code Section 10162 Questionnaire
 - _____ Public Contract Section 10232 Statement
 - _____ Executed Bidder's Signature Page
- _____ Arrange to have the sealed bid delivered to the City of Sebastopol offices at 714 Johnson Street, Sebastopol, California, 95472 on or before 2:00 p.m. on the Bid Date specified in the Notice to Bidders, or as amended by Addendum.

PROPOSAL

For: Construction of BURBANK FARM RESTROOM ADDITION AND ACCESS PATH
For the City of Sebastopol, Sonoma County, California.

TO THE HONORABLE CITY COUNCIL OF THE CITY OF SEBASTOPOL

The undersigned, as bidder, declares that he/she has carefully examined the work, the annexed proposed form of contract, and agrees that if this Proposal is accepted that he/she will contract with the City of Sebastopol, under the form of contract annexed of hereto, to provide all the necessary tools, apparatus, and other means of accomplishing the work as specified in the contract in the manner and time herein prescribed, and in accordance with the requirements of the Engineer as therein set forth, and he/she will take in full payment therefore the following prices for the work to be done completely performed to the satisfaction of the City of Sebastopol, to-wit:

SCHEDULE OF BID PRICES

Item No.	Item Description	Estimated Quantity	Unit of Measure	Unit Cost (in figures)	Total Cost (in figures)
0.0	GENERAL				
0.1	Mobilization, Bonds and Insurance	1	LS		
0.2	Storm Water Pollution Prevention	1	LS		
1.0	SITWORK				
1.1	Clearing and Grubbing	1	LS		
1.2	Demolition	957	SF		
1.3	Grading	957	SF		
1.4	Crushed granite path	538	SF		
1.5	Edging	158	LF		
1.6	Patch adjacent areas	1	LS		
1.7	Site water to building	320	LF		
1.8	Site sewer to building	320	LF		
1.9	Site electrical power to building	100	LF		
2.0	CONCRETE				
2.1	4" slab on grade	192	SF		
2.2	Concrete footings	5	CY		
2.3	Concrete stem wall, 6"	100	SF		
3.0	CONCRETE				
3.1	Anchor bolts	21	EA		
4.0	ROUGH CARPENTRY				
4.1	2x6 wall framing	603	SF		
4.2	Plywood sheathing	504	SF		
4.3	2x6 roof framing at 24" o.c. w/plywood sheathing	331	SF		
4.4	2x6 ceiling framing at 24" o.c.	167	SF		
4.5	2x8 ridge	19	LF		
4.6	6x6 headers	15	LF		

5.0	THERMAL & MOISTURE PROTECTION				
5.1	Building wrap	504	SF		
5.2	Wood siding and trim, painted	504	SF		
5.3	Galvanized corrugated metal roofing	331	SF		
5.4	Sealants and caulking	192	SF		
6.0	OPENINGS				
6.1	Exterior door, frame and hardware	2	EA		
6.2	2x4 awning windows	2	EA		
6.3	12x12 gable vent	2	EA		
7.0	FINISHES				
7.1	5/8" drywall to walls	657	SF		
7.2	1/2" drywall to ceilings	167	SF		
7.3	FRP wainscot	292	SF		
7.4	Paint walls and ceilings	532	SF		
7.5	Concrete sealer	192	SF		
8.0	SPECIALTIES				
8.1	Grab bar	2	EA		
8.2	Mirror	2	EA		
8.3	Signage	4	EA		
8.4	Hand dryers	2	EA		
9.0	PLUMBING				
9.1	Water closet, complete	2	EA		
9.2	Lavatory, complete	2	EA		
9.3	Hose bibb	1	EA		
9.4	Floor drain	2	EA		
10.0	MECHANICAL				
10.1	Exhaust fans and controls	2	EA		
11.0	ELECTRICAL				
11.1	30a disconnect switch	1	EA		
11.2	Astronomical timeclock	1	EA		
11.3	Light fixtures	4	EA		
11.4	Occupancy sensor	2	EA		
11.5	Power to hand dryers	2	EA		
11.6	Power to exhaust fans	2	EA		
11.7	MC cabling	120	LF		

Total Base Bid \$ _____

_____ Total Base Bid Written in words

NOTICE TO BIDDERS: The lowest bid shall be the lowest bid price on the SCHEDULE OF BASE BID PRICES without consideration of the prices on the ADDITIVE ALTERNATE BID SCHEDULE.

Item No.	Item Description	Estimated Quantity	Unit of Measure	Unit Cost (in figures)	Total Cost (in figures)
A-1.4	4" Concrete path in lieu of crushed granite path	538	SF		

(Bid Alternate prices shall not be considered in determination of lowest responsive bid).

Within 10 days of the date of mailing of the notice of award, the undersigned agrees to enter into and execute and provide to the City the necessary contract with the necessary bonds and other required documents, and in case of default in executing the necessary contract within the time fixed by the Information for Bidders, the bidder's security accompanying this bid will become the property of and be forfeited to the City of Sebastopol.

Prime Contractor _____

License # _____ Expiration Date: _____

Name of person submitting bid: _____ Email: _____

The Contractor's license number and expiration date are herein stated under penalty of perjury.

By: _____ Title: _____

Dated this _____ day of _____, 20____

CORPORATION

(Corporate Seal)

Corporate signature

Address: _____

Phone No.: _____

President's signature _____

Secretary's signature _____

Corporation organized under the laws of the State of _____

PARTNERSHIP

Partnership Name: _____

Address: _____

Names of Co-Partners and Addresses: _____

SOLE PROPRIETORSHIP

Names of Individuals and Addresses: _____

NOTE: Sign in proper space above.

BID BOND

(NOTE: Bidders must use this form. Use of any other bond form may render a bid non-responsive)

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____ as Principal, and _____ as Surety, are hereby held and firmly bound unto the CITY OF SEBASTOPOL, as owner in the penal sum of \$ _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed this _____ day of, _____ 20.

The condition of the above obligation is such that whereas the Principal has submitted to the CITY OF SEBASTOPOL a certain Bid, attached hereto and hereby made a part hereof to enter in a contract in writing for the

BURBANK FARM RESTROOM ADDITION AND ACCESS PATH Contract No. 2025-01

NOW, THEREFORE,

- a) If said Bid shall be rejected, or in the alternate,
- b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder, in no event, exceed the penal amount of this obligation as herein stated. The Surety for value received, hereby stipulated and agrees that the obligations of said surety and its bond shall be in no way impaired or affected by any extension of the time within which the City may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal

Surety

SEAL

BY: _____

(NOTE TO SURETY COMPANY: A certified copy of unrevoked resolution of authority for the attorney-in-fact must be submitted with and attached to the executed bid bond.)

CONTRACTOR LICENSE INFORMATION

The bidder acknowledges that the license required for performance of the BURBANK FARM RESTROOM ADDITION AND ACCESS PATH Project is a Class B California General Contractor License.

The bidder holds the following California Contractors License(s):

1. License No. _____, Class _____, Expiration Date _____
2. License No. _____, Class _____, Expiration Date _____
3. License No. _____, Class _____, Expiration Date _____
4. License No. _____, Class _____, Expiration Date _____
5. License No. _____, Class _____, Expiration Date _____
6. License No. _____, Class _____, Expiration Date _____
7. License No. _____, Class _____, Expiration Date _____
8. License No. _____, Class _____, Expiration Date _____
9. License No. _____, Class _____, Expiration Date _____
10. License No. _____, Class _____, Expiration Date _____

Bidder's Taxpayer Identification No. _____

Public Works Contractor DIR Registration # _____

LIST OF PROPOSED SUBCONTRACTORS

In accordance with the requirements of the Subletting and Subcontracting Fair Practices, Act, California Public Contract Code Section 4100 and following, listed below are the name, business location, and the portion (type or trade) of the Project work to be subcontracted to each subcontractor that will perform a portion of the Project work (including special fabrication and installation of a portion of the work) valued in excess of one half of one percent of the total bid price. If the Project work includes construction of streets or highways, listed below are the name, business location, and the portion (type or trade) of the Project work to be subcontracted to each subcontractor that will perform a portion of the Project work (including special fabrication and installation of a portion of the work) valued in excess of one half of one percent of the total Project bid price, or ten thousand dollars, whichever is greater. Also listed below are the proposed subcontract dollar amount and current California Contractor's License Number(s) for each proposed subcontractor. Bids that fail to include complete proposed subcontractor information in accordance with this form and Public Contract Code Section 4100 and following may be deemed non-responsive.

In accordance with California Public Contract Code Section 4106, for any portion of the Project work with a value of more than one half of one percent (0.5%) of the total bid price for which no subcontractor is listed, or for which more than one subcontractor is listed, the bidder certifies by submission of its bid that the bidder is qualified to perform that portion of the Project work and that the bidder will perform that portion of the Project work with its own forces. The penalties listed in California Public Contract Code Section 4111 will apply to any substitution of another subcontractor for a subcontractor listed below except as permitted by the City in accordance with Section 4107 and following of the California Public Contract Code.

The Contractor must perform with his or her own organization, a value of work amounting to not less than fifty percent (50%) of the contract amount, except that the bid amount for "Specialty Items" so designated in any Special Provisions if included may be eliminated from the contract amount and not considered as sub-contracted for the purposes of calculating the value of work to be performed by the Contractor. For the purposes of determining the value of work to be performed by the Contractor pursuant to this provision, materials, equipment, incidentals, etc., shall be considered to have been purchased by the contractor or subcontractor that is to install them. Where a portion of an item is subcontracted, the value of work subcontracted will be based on the estimated cost of such portion of the subcontracted item, as determined from information submitted by the Contractor, subject to approval by the Engineer.

1. Subcontractor Name _____
Business Location _____
Trade _____
Subcontract Amount _____
Current Contractor's License No.(s) _____
Public Works Contractor DIR Registration # _____
2. Subcontractor Name _____
Business Location _____
Trade _____
Subcontract Amount _____
Current Contractor's License No.(s) _____
Public Works Contractor DIR Registration # _____

3. Subcontractor Name _____
Business Location _____
Trade _____
Subcontract Amount _____
Current Contractor's License No.(s) _____
Public Works Contractor DIR Registration # _____
4. Subcontractor Name _____
Business Location _____
Trade _____
Subcontract Amount _____
Current Contractor's License No.(s) _____
Public Works Contractor DIR Registration # _____
5. Subcontractor Name _____
Business Location _____
Trade _____
Subcontract Amount _____
Current Contractor's License No.(s) _____
Public Works Contractor DIR Registration # _____
6. Subcontractor Name _____
Business Location _____
Trade _____
Subcontract Amount _____
Current Contractor's License No.(s) _____
Public Works Contractor DIR Registration # _____
7. Subcontractor Name _____
Business Location _____
Trade _____
Subcontract Amount _____
Current Contractor's License No.(s) _____
Public Works Contractor DIR Registration # _____
8. Subcontractor Name _____
Business Location _____
Trade _____
Subcontract Amount _____
Current Contractor's License No.(s) _____
Public Works Contractor DIR Registration # _____

9. Subcontractor Name _____
Business Location _____
Trade _____
Subcontract Amount _____
Current Contractor's License No.(s) _____
Public Works Contractor DIR Registration # _____
10. Subcontractor Name _____
Business Location _____
Trade _____
Subcontract Amount _____
Current Contractor's License No.(s) _____
Public Works Contractor DIR Registration # _____

NON-COLLUSION AFFIDAVIT

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

(Title 23 United States Code Section 112 and Public Contract Code Section 7106)

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid. The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid 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 bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder 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 bidder.

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 _____, at _____, _____.

Signature of Bidder

WORKERS COMPENSATION INSURANCE CERTIFICATION

By submitting its bid, the bidder certifies as follows:

I am aware of the provisions of California Labor Code Section 3700, which require every employer to be insured against liability for workmen's compensation or to undertake self-insurance in accordance with the provisions of the Labor Code, and I will comply with such provisions before commencing performance of the work of this Contract.

DEBARMENT CERTIFICATION

By submitting its bid, the bidder certifies in accordance with California Public Contract Code Section 6109 that neither the bidder nor any subcontractor included on the list of proposed subcontractors submitted with the bid is ineligible to perform work on public works projects pursuant to California Labor Code Sections 1777.1 or 1777.7. In accordance with California Public Contract Code Section 6109, contractors and subcontractors who are ineligible to perform work on public works projects pursuant to California Labor Code Sections 1777.1 or 1777.7 may neither bid on, be awarded, or perform as a contractor or subcontractor on public works projects.

Signature of Bidder

Printed Name

ACKNOWLEDGMENT OF INSURANCE AND INDEMNITY REQUIREMENTS

Contractor shall procure and maintain for the duration of the contract, and for 2 years thereafter, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees, or subcontractors.

INSURANCE:

A. MINIMUM SCOPE AND LIMIT OF INSURANCE

Coverage shall be at least as broad as:

1. Commercial General Liability (CGL): Insurance Services Office (ISO) Form CG 00 01 covering CGL on an "occurrence" basis, including products and completed operations, property damage, bodily injury and personal & advertising injury with limits no less than \$3,000,000 per occurrence. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (ISO CG 25 03 or 25 04) or the general aggregate limit shall be twice the required occurrence limit.
2. Automobile Liability: Insurance Services Office Form CA 0001 covering Code 1 (any auto), with limits no less than \$2,000,000 per accident for bodily injury and property damage.
3. Workers' Compensation insurance as required by the State of California, with Statutory Limits, and Employers' Liability insurance with a limit of no less than \$1,000,000 per accident for bodily injury or disease.
4. Surety Bonds. Contractor shall provide the following Surety Bonds:
 1. Bid bond
 2. Performance bond
 3. Payment bond
 4. Maintenance bondThe Payment Bond and the Performance Bond shall be in a sum equal to the contract price. If the Performance Bond provides for a one-year warranty a separate Maintenance Bond is not necessary. If the warranty period specified in the contract is for longer than one year, a Maintenance Bond equal to 10% of the contract price is required. Bonds shall be duly executed by a responsible corporate surety, authorized to issue such bonds in the State of California and secured through an authorized agent with an office in California.
5. Professional Liability (if Design/Build), with limits no less than \$2,000,000 per occurrence or claim, and \$2,000,000 policy aggregate. The retroactive date must be shown, and this date must be before the execution date of the contract or the beginning of contract work. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of contract work. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the contract effective, or start of work date, the Contractor must purchase extended reporting period coverage for a minimum of five (5) years after completion of contract work. A copy of the claims reporting requirements must be submitted to the City of Sebastopol for review.
6. Contractors' Pollution Legal Liability and/or Asbestos Legal Liability and/or Errors and Omissions (if project involves environmental hazards) with limits no less than \$1,000,000 per occurrence or claim, and \$2,000,000 policy aggregate. If the services involve lead-based paint or asbestos identification/remediation, the Contractors Pollution Liability policy shall not contain lead-based paint or asbestos exclusions. If the services involve mold identification/remediation, the Contractors Pollution Liability policy shall not contain a mold exclusion, and the definition of Pollution shall include microbial matter, including mold.
7. If the contractor maintains broader coverage and/or higher limits than the minimums shown above for all policies, the City of Sebastopol requires, and shall be entitled to, the broader

coverage and/or higher limits maintained by the contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City of Sebastopol.

B. SELF-INSURED RETENTIONS

Self-insured retentions must be declared to and approved by the City of Sebastopol. At the option of the City of Sebastopol, either: the contractor shall cause the insurer to reduce or eliminate such self-insured retentions as respects the City of Sebastopol, its officers, officials, employees, and volunteers; or the Contractor shall provide a financial guarantee satisfactory to the City of Sebastopol guaranteeing payment of losses and related investigations, claim administration, and defense expenses. The policy language shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or the City of Sebastopol.

Other Insurance Provisions:

C. ADDITIONAL INSURED

The City of Sebastopol, its officers, officials, employees, and volunteers are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations and automobiles owned, leased, hired, or borrowed by or on behalf of the Contractor. General liability coverage can be provided in the form of an endorsement to the Contractor's insurance at least as broad as one of the following ISO ongoing operations Forms: CG 20 10 or CG 20 26 or CG 20 33 (not allowed from subcontractors), or CG 20 38; and one of the following ISO completed operations Forms: CG 20 37, 2039 (not allowed from subcontractors), or CG 20 40.

D. PRIMARY INSURANCE

For any claims related to this project, the Contractor's insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as respects the City of Sebastopol, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the City of Sebastopol, its officers, officials, employees, or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

E. NOTICE OF CANCELLATION

Contractor shall provide immediate written notice if (1) any of the required insurance policies is terminated; (2) the limits of any of the required policies are reduced; (3) or the deductible or self-insured retention is increased. In the event of any cancellation or reduction in coverage or limits of any insurance, Contractor shall forthwith obtain and submit proof of substitute insurance.

F. ACCEPTABILITY OF INSURERS

Insurance is to be placed with insurers authorized to conduct business in the state with a current A.M. Best rating of no less than A: VII, unless otherwise acceptable to the City of Sebastopol.

G. WAIVER OF SUBROGATION

Contractor hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation, but this provision applies regardless of whether the City of Sebastopol has received a waiver of subrogation endorsement from the insurer. However, the Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the City of Sebastopol for all work performed by the Contractor, its employees, agents and subcontractors.

H. VERIFICATION OF COVERAGE

Contractor shall furnish the City of Sebastopol with original Certificates of Insurance including all required amendatory endorsements (or copies of the applicable policy language effecting coverage

required by this clause) and a copy of the Declarations and Endorsement Page of the CGL policy listing all policy endorsements to City of Sebastopol before work begins. However, failure to obtain the required documents prior to the work beginning shall not waive the Contractor's obligation to provide them. The City of Sebastopol reserves the right to require complete, certified copies of all required insurance policies, including endorsements, required by these specifications, at any time.

I. SUBCONTRACTORS

Contractor shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, and Contractor shall ensure that the City of Sebastopol is an additional insured on insurance required from subcontractors. For CGL coverage subcontractors shall provide coverage with a form at least as broad as CG 20 38 04 13.

J. SPECIAL RISKS OR CIRCUMSTANCES

The City of Sebastopol reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other circumstances.

INDEMNITIES

The Contractor shall defend, indemnify and hold the City of Sebastopol, its officials, officers, employees, volunteers and agents free and harmless from any and all claims, demands, causes of action, costs, expenses, liability, loss, damage or injury, in law or equity, to property or persons, including wrongful death, in any manner which actually or allegedly arise out of or are incident to any alleged acts, omissions, negligence or willful misconduct of Contractor, its officials, officers, employees, agents, and subcontractors arising out of or in connection with the performance of the Services, the Project or this Agreement, including without limitation the payment of all consequential damages and attorney's fees and other related costs and expenses except where caused by the active negligence, sole negligence, or willful misconduct of the City, its officers, officials, employees and volunteers. The Contractor shall defend, at Contractor's own cost, expense, and risk, any and all such aforesaid suits, actions or other legal proceedings of every kind that may be brought or instituted against the City, its directors, officials, officers, employees, agents, or volunteers. The Contractor shall pay and satisfy any judgment, award or decree that may be rendered against the City or its directors, officials, officers, employees, agents, or volunteers, in any such suit, action or other legal proceeding. The Contractor shall reimburse the City and its directors, officials, officers, employees, agents and/or volunteers, for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. The Contractor's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by the City, its directors, officials, officers, employees, agents or volunteers.

I have read, understand, and agree to comply with the Indemnity and Insurance requirements supplied with this notice to bidders.

Signature of Bidder

Printed Name

TITLE 49, CODE OF FEDERAL REGULATIONS - PART 29
DEBARMENT AND SUSPENSION CERTIFICATION

The bidder, under penalty of perjury, certifies that, except as noted below, he/she or any person associated therewith in the capacity of City, partner, director, officer, manager:

1. Is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency;
2. Has not been suspended, debarred, voluntarily excluded or determined ineligible by any Federal Agency within the past 3 years;
3. Does not have a proposed debarment pending; and,
4. Has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

If there are any exceptions to this certification, insert the exceptions in the following space:

Exceptions will not necessarily result in denial of award but will be considered in determining bidder responsibility. For any exception noted above, indicate below to whom it applies, initiating agency, and dates of action.

Signature of Bidder

Printed Name

PUBLIC CONTRACT CODE SECTION 10285.1 STATEMENT

In accordance with Public Contract Code Section 10285.1 (Chapter 376, Stats, 1986), the bidder hereby declares under penalty of perjury under the laws of the State of California, that the bidder has ____ / has not ____ been convicted within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Public Contract Code Section 1100, including the Regents of the University of California or the Trustees of the California State University. The term "bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

Note: The bidder must place a check mark after "has" or "has not" in one of the blank spaces provided.

The above Statement is part of the Proposal.

Bidders are cautioned that making false certification may subject the certifier to criminal prosecution.

Signature of Bidder

Printed Name

PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNAIRE

In accordance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the bidder, any officer of the bidder, or any employee of the bidder who has a proprietary interest in the bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

Yes _____ No _____

If the answer is "Yes", explain the circumstances in the following space.

Signature of Bidder

Printed Name

PUBLIC CONTRACT SECTION 10232 STATEMENT

In accordance with Public Contract Code Section 10232, the Contractor, hereby states under penalty of perjury, that no more than one final unappealable finding of contempt of court by a federal court has been issued against the Contractor within the immediately preceding two-year period because of the Contractor's failure to comply with an order of a federal court which orders the Contractor to comply with an order of the National Labor Relations Board.

Signature of Bidder

Printed Name

BIDDER'S SIGNATURE PAGE

By signing this proposal the bidder certifies, under penalty of perjury under the laws of the State of California, that the information submitted with this proposal for the BURBANK FARM RESTROOM ADDITION AND ACCESS PATH Project ("Project"), which information includes, but is not limited to, the Bidder's Check List, Proposal and Schedule of Bid Prices, Bid Bond, Contractor License Information, List of Subcontractors, Workers Compensation Insurance Certification, Non-collusion Affidavit, Debarment Certification, Debarment and Suspension Certification, Public Contract Code Section 10285.1 Statement, Public Contract Code Section 10162 Questionnaire, and Public Contract Code Section 10232 Statement, is accurate, true and correct, and is submitted in accordance with the requirements of the bid package issued by the City of Sebastopol concerning the Project and applicable law. By signing this proposal, the bidder representative specified below certifies that he or she is legally authorized to bind the bidder.

The bidder agrees to deliver and to complete the Project within **60 working days** from the date of issuance, by the Engineer, of instructions to proceed with the Project, and within 10 days of the date of mailing of the notice concerning the award, to enter into and execute and provide to the City the Project contract, bonds, insurance, and all other documents specified in the Contract Check List included in the bid package, and in case of default in executing the Project contract within the time fixed by the Information for Bidders, the bidder's security accompanying this bid shall become the property of and be forfeited to the City of Sebastopol.

Prime Contractor

By: _____ Title: _____

Dated this _____ day of _____, 20____

(Corporate Seal)

Corporate signature

Address: _____

Phone No.: _____

President's signature _____

Secretary's signature _____

Corporation organized under the laws of the State of _____

Partnership Name: _____

Address: _____

Names of Co-Partners and Addresses:

Names of Individuals and Addresses:

NOTE: Sign in proper space above.

Date: _____

(Typed or printed name)

(Signature)

(Bidder)

Bidder business address (street, city, state and zip code)

Bidder Business phone: () _____

Bidder Business fax: () _____

CONTRACT DOCUMENTS CHECK LIST

Complete, accurate, executed copies of the following documents must be submitted to the City of Sebastopol in accordance with the bid package issued by the City within ten (10) working days of receiving written notice concerning award of the project. The bidder's security of any successful bidder that fails to do so will be forfeited to the City.

- _____ Contract Part 1 - Agreement
- _____ Performance Bond
- _____ Payment Bond/Labor and Material Bond
- _____ Certificates of Insurance, Declarations page(s) and Endorsements
- _____ Escrow Agreement, if applicable
- _____ Contract Part 2 - General Provisions
- _____ Special Provisions
- _____ Project Plans
- _____ Contractor Safety Program

CONTRACT

PART 1 - AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 20____, by and between CITY OF SEBASTOPOL, herein called "Owner," acting herein through its CITY MANAGER and

STRIKE OUT (A Corporation) (A Partnership)
INAPPLICABLE (An Individual doing business as _____)
TERMS

of _____, County of _____, State of _____, hereinafter called "Contractor."

WITNESSETH: That for and in consideration of the payment and agreement hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction described as follows:

BURBANK FARM RESTROOM ADDITION AND ACCESS PATH **Contract No. 2025-01**

hereinafter called the project, for the sum of _____ Dollars (\$_____) and all extra work in connection therewith, under the terms as stated in the General Conditions and Special Provisions of the Contract; and at his or her (its or their) own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in Notice to Bidders, Bidders Proposal, the General Conditions, and Special Provisions of the Contract, the plans, which include all maps, plats, blue prints, and other drawings or written explanation matter thereof, the specifications and contract documents therefor as prepared by the City of Sebastopol Public Works Department, herein entitled the Engineer all of which are made a part hereof and collectively evidence and constitute the contract.

The Contractor hereby agrees to commence work under this contract on or before a date to be specified in a written "Notice to Proceed" of the Owner, and to fully complete the project within sixty (60) working days. The Contractor further agrees to pay, as liquidated damages, the sum of \$1000.00 for each consecutive working day thereafter as provided in Section 7, "Prosecution and Progress of the Work" of the General Provisions.

The Owner agrees to pay the Contractor in current funds for the performance of the Contract, subject to additions and deductions, as provided in the General Conditions of the contract, and to make payments on account thereof as provided in Section 9, "Measure and Payment" of the General Provisions.

IN WITNESS WHEREOF, the parties to these presents have executed this contract in three (3) counterparts, each of which shall be deemed an original, in the year and day above mentioned.

SEAL

CITY OF SEBASTOPOL
(Owner)

Attest:

BY: _____

(City Clerk)

(City Manager)

SEAL

(Contractor)

BY: _____

(Secretary)

(Title)

(Witness)

NOTE: Secretary of the Owner should attest. If Contractor is a corporation, Secretary should attest.

100% PERFORMANCE BOND

(NOTE: The successful bidder must use this form. Use of any other bond form may prevent a contract from forming and/or result in forfeiture of the successful bidder's bid bond)

KNOW ALL MEN BY THESE PRESENTS: That we (1) _____
_____ a (2) _____
_____ hereinafter called "Principal" and (3) _____ of _____
_____ State of _____ hereinafter called "Surety", are held and firmly
bound into (4) CITY OF SEBASTOPOL of SEBASTOPOL, CALIFORNIA hereinafter
called "Owner", in the penal sum of _____
Dollars (\$ _____) in lawful money of the United States, for the payment of which sum
well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors,
jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a
certain contract with the Owner dated the _____ day of _____, 20 __, a copy of which is
hereto attached and made a part hereof for the construction of:

BURBANK FARM RESTROOM ADDITION AND ACCESS PATH Contract No. 2025-01

NOW, THEREFORE, if the principal shall well, truly and faithfully perform its duties, all the
undertakings, covenants, terms, conditions and agreements of said contract during the original
term thereof, and any extensions thereof which may be granted by the Owner, with or without
notice to the Surety, and if he shall satisfy all claims and demands incurred under such contract,
and shall fully indemnify and save harmless the Owner from all costs and damages which it may
suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and
expense which the Owner may incur in making good any default, then this obligation shall be void;
otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees
that no change, extension of time, alteration or addition to the terms of the contract or to the work
performed thereunder or the specifications accompanying the same shall in any wise affect its
obligation on this bond, and it does hereby waive notice of any such change, extension of time,
alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall
abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS THEREOF, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original, this the _____, day of _____, 20_____.

ATTEST:

(Principal)

By: _____

(Address)

(SEAL)

Witness as to Principal

(Address)

(Surety)

ATTEST:

By: _____
Attorney-in-Fact

(Surety) Secretary

(Address)

(SEAL)

Witness as to Principal

(Address)

NOTE: Date of Bond must not be prior to date of Contract.

- (1) Correct Name of Contractor
- (2) A Corporation, a Partnership or an Individual, as case may be
- (3) Correct Name of Surety
- (4) Correct Name of Owner
- (5) If Contractor is Partnership, all partners should execute bond.

(NOTE TO SURETY COMPANY: A certified copy of unrevoked resolution of authority for the attorney-in-fact must be submitted with and attached to the executed bond.)

50% PAYMENT BOND

(NOTE: The successful bidder must use this form. Use of any other bond form may prevent a contract from forming and/or result in forfeiture of the successful bidder's bid bond)

KNOW ALL MEN BY THESE PRESENTS: That we _____
(Name of Contractor)
a _____ hereinafter called
"Principal" and
(Corporation, Partnership or Individual)
_____ of _____ State of _____
(Surety)

hereinafter called "Surety", are held and firmly bound unto the CITY OF SEBASTOPOL, 7120 BODEGA AVENUE, SEBASTOPOL, CALIFORNIA 95472, hereinafter called "Owner", in the penal sum of _____ Dollars (\$_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain contract with the Owner dated the _____ day of _____, 20_____, a copy of which is hereto attached and made a part hereof for the construction of:

BURBANK FARM RESTROOM ADDITION AND ACCESS PATH Contract No. 2025-01

NOW, THEREFORE, if the principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such contract, any authorized extension of modification thereof, including all amounts due for materials, lubricants, oil, gasoline, and coal, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work, and all insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work performed thereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS THEREOF, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original, this the ., day of _____, 20_____.

ATTEST:

(Principal)

By: _____(S)

(Address)

(SEAL)

Witness as to Principal

(Address)

(Surety)

ATTEST:

By: _____
Attorney-in-Fact

(Surety) Secretary

(Address)

(SEAL)

Witness as to Principal

(Address)

NOTE: Date of Bond must not be prior to date of Contract.

(1) If Contractor is a Partnership, all partners should execute bond.

(NOTE TO SURETY COMPANY: A certified copy of unrevoked resolution of authority for the attorney-in-fact must be submitted with and attached to the executed bond.)

MAINTENANCE BOND

(NOTE: The Contractor must use this form. Use of any other bond form may prevent release of final payment and/or release of retention under the Contract)

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS the City Council of the City of Sebastopol has awarded to _____, (designated as the "PRINCIPAL") a contract for the BURBANK FARM RESTROOM ADDITION AND ACCESS PATH Project, which contract and all of the contract documents as defined therein (designated as the "Contract") are hereby made a part hereof; and

WHEREAS, the PRINCIPAL is required under the terms of the Contract to furnish a bond for the correction of any defects due to defective materials or workmanship in the work performed under the Contract.

NOW, THEREFORE, we the PRINCIPAL and the undersigned _____, as surety (designated as "SURETY"), an admitted surety insurer authorized to do business in the State of California, are held and firmly bound unto the City of Sebastopol, (designated as the "OBLIGEE"), in the penal sum of _____ Dollars (\$ _____), lawful money of the United States, being a sum not less than ten percent (10%) of the final Contract price, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that if, during a maintenance period of one (1) year from the date of acceptance by the OBLIGEE of the contracted work, the PRINCIPAL upon receiving written notice of a need for repairs which are directly attributable to defective materials or workmanship, shall diligently take the necessary steps to correct said defects within seven (7) days from the date of said notice, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

If any action shall be brought by the OBLIGEE upon this bond, a reasonable attorney's fee, to be fixed by the Court, shall be and become a part of OBLIGEE's judgment in any such action. No right of action shall accrue on this bond to, or for the use of, any person or corporation other than the OBLIGEE named herein or the heirs, executors, administrator or successor of the OBLIGEE.

IN WITNESS WHEREOF, the above bound parties have executed this instrument under their seals this _____ day of _____, the name and corporate seals of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

(Corporate Seal)

- 1.
- 2.

PRINCIPAL _____

By _____

(Acknowledgment)

Title _____

SURETY _____

(Corporate Seal)

By _____
(Attorneys-in-fact)

(Acknowledgment)

Title _____

(NOTE TO SURETY COMPANY: A certified copy of unrevoked resolution of authority for the attorney-in-fact must be submitted with and attached to the executed bond.)

ESCROW AGREEMENT

(If applicable)

SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between the City of Sebastopol, whose address is 7120 Bodega Avenue, P.O. Box 1776, Sebastopol, California 95473, hereinafter called "City", _____, whose address is _____, hereinafter called "Contractor", and _____, whose address is _____, hereinafter called "Escrow Agent"

For consideration hereinafter set forth, the 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 with Escrow Agent as a substitute for retention earnings required to be withheld by City pursuant to the Construction Contract entered into between the City and Contractor for the project entitled BURBANK FARM RESTROOM ADDITION AND ACCESS PATH in the amount of _____ dated _____ (hereinafter referred to as the "Contract"). Alternatively, at the written request of the Contractor, the City shall make payments of the retention earnings directly to the Escrow Agent. When Contractor deposits the securities as substitute for Contract earnings, the Escrow Agent shall notify the City within 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 the City and Contractor. Securities shall be held in the name of City of Sebastopol and shall designate the Contractor as the beneficial owner.
2. The City shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.
3. When the City makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until such time as the escrow created under this contract is terminated. The Contractor may direct the investments 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 the City pays the 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 the City. These expenses and payment terms shall be determined by the City, Contractor, and Escrow Agent.
5. The interest earned on the securities, or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of the Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the 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 the Escrow Agent that City consents to the withdrawal of the amount sought to be withdrawn by Contractor.
7. The City shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven day's written notice to the Escrow Agent from the City of the default, the Escrow

Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the City.

8. Upon receipt of written notification from the City certifying that the Contract is final and complete, and that the 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 monies and securities on deposit and payments of fees and charges.

9. Escrow Agent shall rely on the written notifications from the City and the Contractor pursuant to Sections (5) to (8) inclusive, of this agreement and the City 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 names of the persons who are authorized to give written notice or to receive written notice on behalf of the 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

On Behalf of Contractor

Title

Name

On Behalf of Escrow Agent:

Title

Name

Signature

Address

At the time the Escrow Account is opened, the City and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

City:

Contractor:

Title

Title

Name

Signature

Address

Name

Signature

Address

CONTRACT

PART 2 – GENERAL PROVISIONS

SECTION 1 Definitions

The following terms as used in any agreement of which these General Provisions are a part are defined as follows:

- 1-1.01 Contract:** The agreement between the City and Contractor concerning the Project, as evidenced by and comprised of the Contract Documents.
- 1-1.02 Architect:** The person or persons so specified on the Special Provisions and/or Project Plans.
- 1-1.03 ASTM:** American Society for Testing and Materials latest edition.
- 1-1.04 Bid Package:** All of the documents listed as comprising the entire Bid Package as specified in the Information for Bidders and representing the full set of documents made available to bidders on the Project.
- 1-1.05 City:** City of Sebastopol
- 1-1.06 Public Works Standard Specifications and Details:** The City of Sebastopol Standard Details and Specifications, latest edition as approved on September 21, 2021.
- 1-1.07 Contract Documents:** All those documents listed in the Contract as comprising the entire agreement between the City and the Contractor.
- 1-1.08 Contractor:** The successful bidder for the Project and party to the Contract with the City as specified in the Contract Documents.
- 1-1.09 Days:** Unless otherwise specified in the Contract Documents, days mean working days.
- 1-1.10 Engineer:** The City's authorized representative for administration and overall management of the Project, Contract, and Work. The Engineer is the official point of contact between the City and the Contractor.
- 1-1.11 Project:** The BURBANK FARM RESTROOM ADDITION AND ACCESS PATH Project as described in the Special Provisions and Project Plans.
- 1-1.12 Project Plans:** The primarily graphic detailed requirements concerning the Project contained in the Bid Package and any addenda to the Project Plans signed by authorized City representatives and issued prior to bid opening, Equal Product Proposals accepted by the City and signed by authorized City representatives prior to bid opening, and change orders and other amendments to the Project Plans signed by authorized representatives of the City and the Contractor in accordance with the requirements of the Contract Documents.

- 1-1.13 Project Inspector:** The party or parties charged by the City with inspecting the Work for compliance with the requirements of the Contract Documents and applicable laws and regulations. The Project Inspector acts under the direction of the City and must coordinate with the Engineer as directed by the City in accordance with the Contract Documents.
- 1-1.14 Mobilization:** Preparatory work that must be performed or costs incurred before starting work on the various items on the job site.
- 1-1.15 [omitted]**
- 1-1.16 Subcontractor:** A person, firm or corporation that is obligated as a party to a contract with the Contractor to perform part of the Work. For purposes of these General Provisions Subcontractors include, but are not limited to, those that are obligated as parties to a contract with the Contractor to specially fabricate and install a portion of the Work according to the Special Provisions and/or Project Plans.
- 1-1.17 Special Provisions:** The detailed Project requirements contained in the Bid Package and any addenda to the Special Provisions signed by authorized City representatives and issued prior to bid opening, Equal Product Proposals accepted by the City and signed by authorized City representatives prior to bid opening, and change orders and other amendments to the Special Provisions signed by authorized representatives of the City and the Contractor in accordance with the requirements of the Contract Documents.
- 1-1.18 Work:** The furnishing of all equipment, tools, apparatus, facilities, material, labor and skill necessary to perform and complete in a good and workmanlike manner the Project as shown in the City Special Provisions and Project Plans in accordance with the Contract Documents and applicable law.
- 1-1.19 Written Notice:** Will be deemed to have been duly served for purposes of these General Provisions and any Contract of which they are a part if delivered in person to the individual or to a member of the firm or to any office of the corporation for whom the notice is intended, or if sent by registered or certified mail to the last known business address known to the party giving notice. Unless otherwise specified in the Contract Documents, the last known address of the Contractor will be that listed in the Contractor's completed Proposal.

SECTION 2 Scope of Work

2-1.01 Documents Furnished by City. The City will furnish to the Contractor, free of charge, five (5) sets of prints of the Project Plans and Special Provisions for execution of the Work. Throughout the performance of the Work the Contractor must keep one copy of the Project Plans and Special Provisions in good order and available for review by the Engineer, the Architect, and any other City contractors or representatives.

2-1.02 Ownership of Documents Furnished by City. All documents furnished by the City, including, but not limited to, the Special Provisions, Project Plans, and any copies, are the property of the City. Documents furnished by the City may not be used on any other work. All documents furnished by the City must be returned to City upon completion of the Work.

2-1.03 Special Provisions and Project Plans.

- a. The Special Provisions and Project Plans are complementary and intended to mutually describe the Work necessary to complete the Project in accordance with the Contract Documents.
- b. In general, the Project Plans indicate dimensions, position and kind of construction, and the Special Provisions indicate qualities and methods. Any Work indicated on the Project Plans and not mentioned in the Special Provisions or vice versa must be furnished as though fully set forth in both. Work that is not particularly detailed, marked or specified will be the same as similar Work that is detailed, marked or specified. The Contractor must furnish items necessary for the operation of equipment depicted in the Project Plans or specified in the Special Provisions that are suitable to allow such equipment to function properly at no extra charge.
- c. The Contractor must notify the Engineer as soon as possible of any apparent errors or inconsistencies, including, but not limited to, typographical or notational errors in the Project Plans, Special Provisions, and/or in work done by others affecting the Work. The Engineer will issue instructions concerning any such apparent errors or inconsistencies. If the Contractor proceeds with Work impacted by apparent errors or inconsistencies without instructions from the Engineer, the Contractor does so at its sole risk and will have all of the obligations and the City will have all of the rights and remedies specified in Section 11 concerning any resulting damage or defect.
- d. The General Provisions apply with equal force to all of the Work, including extra work authorized by the Engineer in accordance with the Contract Documents. The Contractor must submit any required shop diagrams and/or drawings by the times and in the quantities indicated in the Special Provisions. Any such shop diagrams and/or drawings must show completely the Work to be done, expanding on the Project Plans concerning details not previously shown, field conditions and the condition of the Work. Engineer review of such shop diagrams and/or drawings will concern conformance with the requirements of the Contract Documents only. The Engineer assumes no responsibility for the correctness or accuracy of the dimensions or any other contents of any shop diagrams and/or drawings submitted by the Contractor. The Contractor must check all dimensions at the Work site. Shop diagrams and/or drawings must be clearly marked with the name of the Project and the name of the Contractor, subcontractor or supplier making the submittal, and must be stamped and signed by

the Contractor and submitted under a signed transmittal letter from the Contractor certifying that all dimensions have been checked at the Work site. These requirements are mandatory. The Engineer will not review shop diagrams and/or drawings that do not satisfy these requirements. The Contractor will be responsible for any and all discrepancies between dimensions of the actual Work site and/or Work and those shown on shop diagram and/or drawings submitted by the Contractor, and for any other errors contained in or resulting from such shop diagrams and/or drawings, including, but not limited to, errors in material and/or equipment quantities and any resulting errors, delays or additional cost in the performance of the Work. The Contractor will have all of the obligations and the City will have all of the rights and remedies that are specified in Section 11 concerning any discrepancies or errors in shop diagrams and/or drawings submitted by the Contractor, and concerning any resulting errors, delays or additional costs in the performance of the Work.

SECTION 3 Control of Work and Material

3-1.01 Engineer's Status. The Engineer will administer the Project in accordance with the Contract Documents. After execution of the Contract and issuance of the Notice to Proceed, all correspondence and/or instructions concerning the Project between the Contractor and/or City must be forwarded through the Engineer. Except as otherwise provided in the Contract Documents, the Engineer will not be responsible for and will not have control or charge of construction means, methods, techniques, or procedures or for safety precautions in connection with the Work. The Engineer, however, will have authority to reject materials and/or workmanship that do not conform to the requirements of the Contract Documents. The Engineer will also have the authority to require inspection or testing of the Work.

3-1.02 Architect's Status. The Architect will advise the Engineer concerning decisions on all claims of the Contractor and all other matters relating to the execution and progress of the Work or the interpretation of the Contract Documents. The Architect will also advise the Engineer concerning Work that does not conform to the Contract Documents. Whenever, in the Architect's opinion, it is necessary or advisable in accordance with the Contract Documents, the Architect may recommend to the Engineer inspection or testing of the Work, whether or not such Work is then fabricated, installed or completed.

3-1.03 Inspection and Testing of Work and Material.

- a. The City, the Engineer, the Architect and their representatives will have access to the Work at all times wherever it is in preparation or progress. The Contractor must provide proper facilities for such access and for inspection.
- b. The Contractor must inspect all materials as delivered and promptly return all defective materials without waiting for their rejection by the Architect or Engineer.
- c. If the Engineer, the Special Provisions, or any laws, ordinances, or any public authority require any Work to be tested or approved, the Contractor must give the Engineer timely notice of the Contractor's readiness for inspection. Inspections will be promptly made, and where practicable, at the source of supply. Any Work subject to such testing that is covered up without timely notice to the Engineer or without the approval or consent of the Engineer must, if required by the Engineer, be uncovered for examination at the Contractor's expense. The Contractor will have all of the obligations and the City will have all of the rights and remedies that are specified in Section 11 concerning any Work subject to testing that is covered up or otherwise rendered inaccessible for inspection without timely notice to the Engineer and that is not uncovered for examination at the Contractor's expense if required by the Engineer.
- d. Tests of materials or qualification tests required by the Contract Documents must be made in accordance with the Special Provisions and the requirements of the California Building Standards Code as adopted by the City and other applicable law. Copies of all testing reports will be distributed as required in the Special Provisions.

- e. The City or its representatives may order re-examination of questioned Work. If ordered to do so, the Contractor must uncover such Work. If such Work is found to be according to the Contract Documents, the City will pay the cost of uncovering and restoring the Work, unless such Work was subject to testing and covered up without timely notice to or approval of the Engineer. If re-examined Work is found not in accordance with the Contract Documents, the Contractor must pay the cost of uncovering and restoring the Work. The Contractor will have all of the obligations and the City will have all of the rights and remedies that are specified in Section 11 concerning any re-examined Work not in accordance with the Contract Documents that the Contractor fails to uncover and restore at the Contractor's expense.
- f. The Contractor must replace or correct without charge any material or workmanship found not to conform to the requirements of the Contract Documents, unless the City consents to accept such material or workmanship with an appropriate adjustment in the Contract Price. The Contractor must promptly segregate and remove non-conforming material from the Work site. The Contractor will have all of the obligations and the City will have all of the rights and remedies that are specified in Section 11 concerning any failure by the Contractor to replace or correct without charge any material or workmanship that does not conform to the requirements of the Contract Documents and that the City has not consented to accept.

3-1.04 Samples Furnished by the Contractor. The Contractor must furnish all samples for approval as directed in sufficient time to permit the Architect or Engineer to examine, approve and select samples before they are required by the progress of the Work. Portions of the Work for which samples are required and for which the Architect or Engineer has selected samples must be in accordance with such approved samples. Samples must be sent prepaid to the office of the Engineer or to such place as the Engineer may direct.

3-1.05 Materials and Substitutions.

- a. Materials used for the Work must be new and of the quality specified. When not particularly specified, materials must be the best of their class or kind. The Contractor must, if required, submit satisfactory evidence as to the kind and quality of materials.
- b. If the Contractor submitted complete information to the City Engineer for products proposed as equals in accordance with the bid package, and the City approved such products proposed as equals in writing, the Contractor may either furnish such products approved as equals, or furnish the products listed by manufacturer name, brand or model number in the Special Provisions or Project Plans. The City retains the right, in its sole discretion, to accept or reject any other proposed substitution. To be considered, proposals concerning products proposed as equals must include sufficient information to permit the City to determine whether the products proposed as equals will satisfy the same performance requirements as products listed by manufacturer's name, brand or model number. Such performance requirements may include, but are not limited to, size, strength, function, and appearance, ease of maintenance and repair, and useful life requirements. If the City does not accept a proposed substitution, the Contractor must furnish the product specified in the Special Provisions or Project Plans for the Contract Price, regardless of whether the product is specified by manufacturer's name, brand or model number, or otherwise.

- c. During the performance of the Work, all materials must be neatly stacked, properly protected from the weather and other adverse impacts, and placed so as to avoid interference with efficient progress of the Work, with other activities of the City, or with the use of existing City facilities by the public. Materials may not be stored in a manner that presents a safety hazard or a nuisance. All materials must be delivered so as to ensure efficient and uninterrupted progress of the Work. Materials must be stored so as to cause no obstruction and so as to prevent overloading of any portion of the Work. The Contractor will be responsible for damage or loss of materials delivered to and/or stored at the Work site due to weather or other causes. The Contractor must promptly remove from the Work site all materials rejected by the City or its representatives as failing to conform to the requirements of the Contract Documents, whether such non-conforming materials have been incorporated in the Work or not. If the City or its representatives so direct, the Contractor must promptly replace and re-execute Work performed by the Contractor and order the replacement and re-execution of Work performed by subcontractors using non-conforming materials with materials that satisfy the requirements of the Contract Documents without expense to the City. The Contractor will bear the expense of making good all Work destroyed or damaged by such removal. The Contractor will have all of the obligations and the City will have all of the rights and remedies that are specified in Section 11 concerning any failure by the Contractor to replace or re-execute Work using non-conforming materials, and/or to make good all Work destroyed or damaged by such removal and/or execution.
- d. If any portion of the Work done or material furnished under this Contract proves defective and not in accordance with the Project Plans or Special Provisions, and if the Engineer determines that the imperfection of the same is not of sufficient magnitude or importance to make the Work dangerous or undesirable, or if the removal of such Work, is impractical or will create conditions which are dangerous or undesirable, the Engineer may retain such Work, instead of requiring the imperfect Work to be removed and reconstructed, and make such deductions therefore in the payments due or to become due the Contractor as are just and reasonable.

3-1.06 Audit and Examination of Records. The City may examine and audit at no additional cost to the City all books, estimates, records, contracts, documents, bid documents, bid cost data, subcontract job cost reports and other Project related data of the Contractor, subcontractors engaged in performance of the Work, and suppliers providing supplies, equipment and other materials required for the Work, including computations and projections related to bidding, negotiating, pricing or performing the Work or Contract modifications and other materials concerning the Work, including, but not limited to, Contractor daily logs, in order to evaluate the accuracy, completeness, and currency of cost, pricing, scheduling and any other Project related data. The Contractor will make available all such Project related data at all reasonable times for examination, audit, or reproduction at the Contractor's business office at or near the Work site, and at any other location where such Project related data may be kept until three years after final payment under the Contract. Pursuant to California Government Code Section 8546.7, if the amount of public funds to be expended is in excess of \$10,000, this Contract will be subject to the examination and audit of the State Auditor, at the request of the City, or as part of any audit of the City, for a period of three (3) years after final payment under the Contract.

3-1.07 Advertising. No advertising signs of any kind may be displayed on the Work site, or on fences, offices or elsewhere adjacent to the Work site.

3-1.08 Project Schedule. Within ten (10) days after execution and delivery of the Contract, and prior to the issuance of the notice to proceed, the Contractor must deliver to the Engineer a bar chart and critical path (CPM) schedule detailing the Contractor's intended schedule of Work for the entire Project. The schedules must be detailed to clearly show the relative sequence of the items of Work, their inter-relationships, start and completion dates, float, the critical path, and any other item deemed necessary by the Engineer. The schedule must allow for the completion of the entire Work within the Time for Completion.

- a. City Review of Schedule. The City may review the Contractor's submitted schedule and may note any exceptions. The Contractor must correct any exceptions noted by the City within five (5) working days of being notified of the exceptions.
- b. Update of Schedule. After submission of a schedule to which the City has taken no exceptions, the Contractor must submit an updated schedule on a monthly basis or as otherwise specified by the City until completion of the Work. The updated schedule must show the progress of Work as of the date specified in the updated schedule.
- c. Float. The schedule must show early and late completion dates for each task. The number of days between these dates will be designated as "Float". The Float will be designated to the Project and will be available to both the City and the Contractor as needed to complete the Work in accordance with the Contract.
- d. Failure to Submit Schedule. If the Contractor fails to submit schedules within the time periods specified in this Section or submits a schedule to which the City has taken uncorrected exceptions, the City may withhold payments to the Contractor until such schedules are submitted and/or corrected in accordance with the Contract Documents.
- e. Responsibility for Schedule. The Contractor will be solely and exclusively responsible for creating the schedule and properly updating it. The City may note exceptions to any schedule submitted by the Contractor. However, the Contractor will be solely responsible for determining the proper method for addressing such exceptions and the City's review of the schedule will not create scheduling obligations of the City.

3-1.09 Construction Staking. All Work done under this Contract must be in conformance with the Project Plans and contract documents. It is the responsibility of the Contractor to obtain construction staking services. The Contractor must inform the Engineer, forty-eight (48) hours in advance if electronic design files or other information is needed to be transmitted to a surveyor, , in order that lines and grades may be furnished and necessary measurements for record and payment made, with the minimum of inconvenience to the Engineer and delay to the Contractor.

The City will **NOT** provide construction staking services.

The Contractor shall carefully preserve bench marks, reference points, and stakes and in the case of willful or careless destruction, will be responsible for the cost of replacement

and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance

3-1.10 Materials Testing. Materials will be tested by the City of Sebastopol or its authorized agent, following the Caltrans Standard Specifications. Statistical testing may not be used. All individual samples must meet the specified test results. Each material used must meet the specified requirements.

The Contractor must request and coordinate all testing. All tests must occur in the presence of the Project Inspector. The City will, at its sole discretion, have the right to reject any and/or all test results, that do not meet this requirement, and to order a retest in the presence of the Project Inspector. The costs for all retests so ordered will be the responsibility of the Contractor. The cost of all retests will be charged to the Contractor at the actual cost plus 30 percent, with a minimum charge of \$150.00 per test to cover staff and administrative costs.

The City, at its sole expense, will provide all initial material and compaction tests. Sampling and testing will comply with Chapter 3 of the Caltrans Construction Manual at a minimum. Where conditions vary, the City may perform additional testing. Cost for testing of materials offered in lieu of the specified materials will be the responsibility of the Contractor. Cost for R-value tests when required by the Caltrans Standard Specifications will be the responsibility of the Contractor.

Testing will only be performed on normal City working days between the hours of 8:00 a.m. and 4:00 p.m. unless other arrangements are made in advance. Tests performed outside of these hours may be subject to increased charges.

The Contractor must request all tests in writing a minimum of 2 working days in advance of the time desired. A minimum of one working day must be allowed for compilation and reporting of data and test results after tests have been performed. No subsequent layer of material may be placed until a passing test is obtained and acknowledged by the City.

Concrete and asphalt may be supplied only from suppliers approved and certified by the State Department of Transportation. Proposed mix designs for all concrete and asphalt concrete to be placed within the City of Sebastopol must be provided to and approved by the City, prior to placement.

The Contractor must coordinate with the City concerning any additional testing as required.

SECTION 4 Changes in Work

4-1.01 City Directed Change Orders. The City may at any time during the progress of the Work direct any amendments to the Work or any of the Contract Documents, including, but not limited to the Special Provisions, or Project Plans. Such amendments will in no way void the Contract, but will be applied to amend the Contract Price, if such amendments affect the Contract Price, the Project schedule, if such amendments affect the Project schedule, or any other provision of the Contract Documents based on a fair and reasonable valuation of the amendment in accordance with this Section 4.

4-1.02 Writing Requirement. Change orders and other amendments to the Special Provisions, the Project Plans, or other Contract Documents may be made only upon prior written approval of the Engineer and as evidenced by a writing executed by authorized representatives of the City and the Contractor.

4-1.03 Contractor Proposed Change Orders. Unless the Engineer otherwise authorizes or the City and the Contractor otherwise agree, change order proposals submitted by the Contractor must be submitted to the Engineer no later than the time of the proposed change.

4-1.04 All Change Orders. All change order proposals must be submitted on completed City Change Order forms. All such change order proposals must itemize all cost impacts of the proposed change order and include a total price for that change order and the amended Contract Price that would become effective upon execution of the change order. All change order proposals must specify any change in the Project schedule, or in any Project milestone including, but not limited to, the Time for Completion, under the change order. It is understood that change orders that do not specify a change in any milestone, including, but not limited to, the Time for Completion, may be accomplished by the Time for Completion then in effect.

4-1.05 Change Order Pricing. Change order pricing for all change orders, whether, additive, deductive, or both, will be governed by the following:

- a. Prices specified in the Contract Documents will apply to cost impacts involving items for which the Contract Documents specify prices.
- b. Cost impacts involving items for which the Contract Documents do not specify prices may be paid on a lump sum basis as approved by the City.
- c. For cost impacts involving items for which the Contract Documents do not specify prices, and for which no lump sum amount has been approved by the City, charges or credits for the Work will be paid on a time and materials basis in accordance with the following and subject to Caltrans Standard Specifications, provision 9-1.03 concerning allowable direct charges. The time and materials payment will be the sum of and limited to the direct and indirect costs for labor, materials, equipment and overhead calculated as follows:
 1. Labor: The Contractor will be paid the cost of labor for the workers (including foremen when authorized by the Engineer), used in the actual and direct performance of the Work. The cost of labor utilized in performing the Work,

whether the employer is the Contractor, a subcontractor or other entity engaged in the performance of the Work, will be the sum of the following:

- a. **Actual Wages:** The actual wages paid will include any employer fringe benefit payments to or on behalf of the workers for health and welfare, pension, vacation and similar purposes. The actual wages and fringe benefits paid must be at the rates shown on the certified payroll documents submitted by the Contractor.
 - b. **Labor Surcharge:** The labor surcharge will be as set forth in the latest edition of the California Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates". The labor surcharge will constitute full compensation for all payments imposed by State or Federal laws and for all other payments made to, or on behalf of, workers engaged in the performance of the Work, excluding the Actual Wages as defined above.
 - c. **Fixed Markup:** A fixed markup of 15% of the sum of the actual wages paid and the labor surcharge applicable to such actual wages, together with the actual wage and labor surcharge costs described in this provision will constitute full and complete compensation for all overhead, profit, incidentals, and any and all other direct or indirect expenses associated with furnishing all labor for the Work.
2. **Materials:** Materials costs will be the direct costs for materials actually exhausted, consumed or entering permanently into the Work, plus a fixed markup of 15% of such direct materials costs, which, together with the direct cost of materials as described in this provision will constitute full and complete compensation for all overhead, profit, incidentals, and any and all other direct or indirect expenses associated with furnishing all materials for the Work.
 3. **Equipment:** All equipment used will be paid in accordance with the rates in subsection 9-1.04D entitled "Equipment Rental" of the Caltrans Standard Specifications, which subsection 9-1.04D is made a part of this Contract, plus a fixed markup of 10% of such equipment rates, which, together with the equipment rates as described in this provision will constitute full and complete compensation for all overhead, profit, incidentals, and any and all other direct or indirect expenses associated with furnishing all equipment for the Work.
 4. Unless approved in writing in accordance with provision 4-1.02 of this Contract in advance of performance of the Work, any and all other cost impacts (including, but not limited to profit, bond premiums or fees, insurance premiums or fees, superintendent labor, clerical expenses, home office expenses, Work site office expenses, utility costs, permit costs, and licensing costs) involving items for which the Contract Documents do not specify prices, and for which no lump sum amount has been approved by the City, will constitute incidentals, full compensation for which will be deemed included in the markups for labor, material, and equipment specified above, and no additional compensation for such cost impacts will be allowed.

4-1.06 Liability Under Unapproved Change Orders. The Contractor will be solely responsible for any and all losses, costs, or liabilities of any kind incurred by the Contractor, any subcontractor engaged in the performance of the Work, any party supplying material or equipment for the Work or any third party that are incurred pursuant to Contractor-proposed change orders prior to issuance of an approved change order executed in accordance with this Section 4. The Contractor will have all of the obligations and the City will have all of the rights and remedies that are specified in Section 11 concerning any work or resulting losses, costs, or liabilities pursuant to a Contractor proposed change order before issuance of an approved change order executed in accordance with this Section 4.

4-1.07 Changes Subject to Contract Documents. Any changes in the Work and/or the Contract Documents pursuant to change orders and any other amendments issued in accordance with the Contract Documents, including this Section 4, will in all respects be subject to all provisions of the Contract Documents, including, but not limited to, the Special Provisions and the Project Plans, except as modified by such change orders or amendments.

4-1.08 Change Order Disputes.

- a. Disputed City-Directed Change Orders. If the Contractor disputes a City directed change order following a reasonable effort by the City and the Contractor to resolve the dispute including, at a minimum, a meeting between appropriate representatives of the Contractor and the City, the Contractor must commence performing the Work consistent with the disputed change order within five (5) working days of the last meeting between representatives of the Contractor and the City to resolve the dispute, or within the time specified in the disputed City directed change order, whichever is later. In performing Work consistent with a disputed City-directed change order pursuant to this provision the Contractor will have all of the Contractor's rights concerning claims pursuant to the Contract Documents and applicable law.
- b. Disputed Contractor Proposed Change Orders. If the City disputes a Contractor proposed change order, the City and the Contractor will use reasonable efforts to resolve the dispute including, at a minimum, holding a meeting between appropriate representatives of the Contractor and the City. Regardless of and throughout any such efforts to resolve the dispute the Contractor must continue performing the Work irrespective of and unmodified by the disputed change order. In continuing to perform the Work, the Contractor will retain all of the Contractor's rights under contract or law pertaining to resolution of disputes and protests between contracting parties. Disputes between the City and the Contractor concerning any Contractor-proposed change order or other amendment do not excuse the Contractor's obligation to perform the Work in accordance with the Contract Documents excluding such Contractor-proposed change order or other amendment by the Time for Completion or waive any other Project milestone or other requirement of the Contract Documents.

SECTION 5 Trenching and Utilities

5-1.01 Excavation More Than Four Feet Deep. In accordance with California Public Contract Code Section 7104, if the Work involves excavation more than four feet deep the Contractor must promptly notify the City in writing before disturbing: any material that the Contractor believes may be hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II or Class III disposal site in accordance with provisions of existing law; any subsurface or latent physical conditions at the Work site differing from those indicated; or any unknown physical conditions at the Work site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents. The City will promptly investigate any such conditions for which notice is given. If the City finds that the conditions do materially differ, or involve hazardous waste, and would cause a decrease or increase in the cost or time of performance of the Work, the City will issue a change order pursuant to Section 4 of these General Provisions. If a dispute arises between the City and the Contractor concerning whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the cost or time of performance, the Contractor will not be excused from any completion date provided in the Contract Documents, but will proceed with all Work to be performed. The Contractor will retain all rights under contract or law pertaining to resolution of disputes and protests between contracting parties.

5-1.02 Excavation of Five Feet or More. In accordance with California Labor Code Section 6705, contractors performing contracts exceeding \$25,000 in cost and involving excavation five or more feet deep must submit for the City's acceptance, prior to excavation, 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 excavation. If the plan varies from the shoring system standards, it must be prepared by a registered civil or structural engineer.

5-1.03 Utility Relocation Costs.

- a. In accordance with California Government Code Section 4215, the City assumes the responsibility for the timely removal, relocation or protection of existing main or trunk line utility facilities located on the Work site if such utilities are not identified by the City in the Special Provisions and/or Project Plans. The City will compensate the Contractor for the costs of locating, repairing damage not due to the Contractor's failure to exercise reasonable care, and removing or relocating existing main or trunk line utility facilities located at the Work site and not identified with reasonable accuracy in the Special Provisions and/or Project Plans. The City will also compensate the Contractor for the cost of equipment on the Project necessarily idled during such work. The Contractor will not be assessed liquidated damages for Work completion delays caused by the City's failure to provide for removal or relocation of such main or trunk line utility facilities.
- b. Nothing in this provision or the Contract Documents will be deemed to require the City to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Work site can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, cleanouts, on or adjacent to the Work site; provided, however, that nothing in this provision or the Contract

Documents will relieve the City from identifying main or trunk lines in the Special Provisions and/or Project Plans.

- c. Nothing in this provision or the Contract Documents will preclude the City from pursuing any appropriate remedy against the utility for delays, which are the responsibility of the utility.
- d. Nothing in this provision or the Contract Documents will be construed to relieve the utility from any obligation as required either by law or by contract to pay the cost of removal or relocation of existing utility facilities.
- e. If the Contractor while performing the Work discovers utility facilities not identified by the City in the Special Provisions and/or Project Plans, the Contractor must immediately notify the City and utility in writing.
- f. Either the City or the utility, whichever owns existing main or trunk line utility facilities located on the Work site, will have sole discretion to effect repairs or relocation work or to permit the Contractor to perform such repairs or relocation work at a reasonable price.

5-1.04 Protection of Existing Facilities and Property.

The Contractor must notify Underground Service Alert (USA) for marking the locations of existing underground facilities.

The Contractor must take all necessary measures to avoid injury to existing surface and underground utility facilities in and near the Work site. No error or omission of utility markouts will be construed to relieve the Contractor from his responsibility to protect all underground pipes, conduits, cables or other structures affected by the work.

The existing underground facilities in the area of Work may include telephone, television and electrical cables, gas mains, water mains, sewer pipe and drainage pipe. The various utility companies must be notified before trenching begins and at such other times as required to protect their facilities. All underground facilities must be located and exposed ahead of trenching to prevent damage to the facilities, and to determine the depth and character of all facilities that cross or infringe on the trench prism. The Contractor must immediately notify the Engineer of any facilities found. If damage should occur to the existing facilities, the utility company and the City must be notified immediately and, repairs acceptable to the utility company must be made at the Contractor's expense.

The Project Plans show the underground utilities on the site of the construction insofar as they are known to the City. The drawings may not show facilities apparent from visual inspection of the site or service laterals or appurtenances, the existence of which can be inferred from the presence of other visible facilities such as buildings, meters, junction boxes, etc. on or adjacent to the construction site.

If in the performance of the Work an existing utility is encountered that is not shown on the Project Plans and is not apparent or inferable from visual inspection of the Work site, the Inspector must be notified immediately. The Engineer will determine, whether the

Project Plans or Special Provisions should be modified, or whether the existing utility should be relocated or whether the Contractor must work around the existing utility. The Contractor must replace, at his or her own expense, in as good condition as they were prior to the start of construction, all existing improvements and surroundings damaged by his or her operation. Reconstruction of all existing improvements must conform to Public Works Standard Specifications and Details under the direction of and subject to the acceptance by the Engineer.

Should the Contractor fail to take adequate measures to avoid injury or damage to the facilities described above, the City may take any actions necessary to protect such facilities from the Contractor's operations. Subject to Section 5 of the General Provisions, the City may withhold the cost of injury to existing surface and underground utility facilities in and near the Work site from amounts due or that may become due the Contractor.

Payment for Protection of Existing Facilities and Property shall be considered as included in the prices paid for various other work, except as provided otherwise by law, and shall include full compensation for providing all labor, materials, equipment and incidentals necessary to complete all work as specified herein, including but not limited to notification to USA, performing necessary measures to avoid injury to existing surface and underground utility facilities, locating and exposing all underground facilities ahead of trenching, all notifications to the Engineer and/or inspector, and no additional compensation shall be made therefor.

SECTION 6 Project Facilities

6-1.01 Work Site Offices. Any worksite office facilities used by the Contractor and/or its privities must conform to all applicable codes, ordinances and regulations. The cost of such Work site office facilities will be paid from and included in the Contract Price.

6-1.02 City Rights of Access and Ownership. The City and its authorized representatives will at all reasonable times while such office facilities are located at the Work site (including, at a minimum, all times during which the Work is performed), have access to any such Work site office facilities used by the Contractor and/or its privities. With respect to the right of access of the City and its authorized representatives, neither the Contractor nor its privities will have a reasonable expectation of privacy pursuant to the Fourth Amendment to the Unites States Constitution or other applicable law concerning such Work site office facilities used by the Contractor and/or its privities. Without exception, any and all Project related materials located at such Work site facilities will be deemed at all times to be City property subject to inspection and copying by the City and its authorized representatives at all reasonable times while such facilities are located at the Work site (including, at a minimum, all times during which the Work is performed). Any interference by the Contractor or its privities with the City's rights of access and/or ownership pursuant to this Section 6 will constitute a material breach of the Contract subject to any and all remedies available pursuant to the Contract Documents and at law and equity.

SECTION 7 Prosecution and Progress of the Work

7-1.01 Liquidated Damages. For the purposes of this Contract time is of the essence. The City and the Contractor agree that it will be difficult and/or impossible to determine the actual damage which the City will sustain in the event of the Contractor's failure to fully perform the Work or to fully perform all of the Contractor's obligations that have accrued pursuant to the Contract by the Time for Completion. Accordingly, the City and the Contractor agree in accordance with California Government Code Section 53069.85 that the Contractor will forfeit and pay to the City liquidated damages in the sum of \$1000 per day for each and every calendar day completion of the Work and/or performance of all of the Contractor's obligations that have accrued pursuant to the Contract is delayed beyond the Time for Completion. The City and the Contractor further agree 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 the Contract 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 under the Contract.

7-1.02 No Damage for Avoidable Delays. All delays in the Work that might have been avoided by the exercise of care, prudence, foresight and diligence of the Contractor or any privities of the Contractor will be deemed avoidable delays. Delays in the Work that may be unavoidable but that do not necessarily affect other portions of the Work or prevent completion of all Work within the Time for Completion, including, but not limited to, reasonable delays in Engineer approval of shop drawings, placement of construction survey stakes, measurements and inspection, and such interruption as may occur in prosecution of the Work due to reasonable interference of other contractors of the City, will be deemed avoidable delays. The Contractor will not be awarded a change in the Project schedule, the Time for Completion, and/or additional compensation in excess of the contract price for avoidable delays.

7-1.03 Unavoidable Delays. All delays in the Work that result from causes beyond the control of the Contractor and that the Contractor could not have avoided through exercise of care, prudence, foresight, and diligence will be deemed unavoidable delays. Orders issued by the City changing the amount of Work to be done, the quantity of materials to be furnished, or the manner in which the work is to be prosecuted, and unforeseen delays in the prosecution of the Work due to causes beyond the Contractor's control, such as strikes, lockouts, labor disturbances, fires, epidemics, earthquakes, acts of God, neglect by utility owners or other contractors that are not privities of the Contractor will be deemed unavoidable delays to the extent they actually delay the Contractor's completion of the Work. The Contractor will be awarded a change in the Project schedule, the Time for Completion, and/or additional compensation in excess of the contract price for unavoidable delays to the extent such delays actually delay the Contractor's completion of the Work and/or result in the Contractor incurring additional costs in excess of the Contract Price.

Delay due to normal, adverse weather conditions will not be deemed unavoidable. The Contractor should understand that normal adverse weather conditions are to be expected and plan the Work accordingly, such as by incorporating into the Project schedule normal, adverse weather delays as reflected in historical data of the National Oceanic and

Atmospheric Administration of the U.S. Department of Commerce for the weather station most applicable to the Work site.

7-1.04 No Damage for Contractor Caused Delay. Contractor will not be entitled to additional compensation for extended field or home office overhead, field supervision, costs of capital, interest, escalation charges, acceleration costs or other impacts for any delays to the extent such delays are caused by the failure of the Contractor or any subcontractor or other entity engaged in performance of the Work to perform the Work in accordance with the Contract Documents.

7-1.05 No Damage for Delay Not Caused By the City, Delay Contemplated by the Parties, or other Reasonable Delay. Contractor will not be entitled to damages for delay to the Work caused by the following, which the City and Contractor agree will be deemed for purposes of California Public Contract Code Section 7102 either not caused by the City, and/or within the contemplation of the City and the Contractor, and/or reasonable under the circumstances:

- a. Exercise of the City's right to sequence the Work in a manner that would avoid disruption to the City and other contractors based on: the failure of the Contractor or any subcontractor or other entity engaged in the performance of the Work to perform the Work in accordance with the Contract Documents, enforcement by the City or any other governmental agency of competent jurisdiction of any government act or regulation, or enforcement by the City of any provisions of the Contract.
- b. Requests for clarification or information concerning the Contract Documents or proposed change orders or modifications to the Contract Documents, including extensive and/or numerous such requests for clarification or information or proposed change orders or modifications, provided such clarifications or information or proposed change orders or modifications are processed by the City or its representatives in a reasonable time in accordance with the Contract Documents.

7-1.06 Delays Caused by the City and/or Its Privities. Delay caused by the City and/or other contractors of the City will be deemed unavoidable delays. Either the City or the Contractor may propose a change in the Time for Completion and/or the Project schedule for delays that are purported to be caused by the City and/or its privities and that are not reasonable under the circumstances involved and/or that are not within the contemplation of the City and the Contractor. Such proposed changes in the Time for Completion will constitute change order proposals subject to Section 4. In accordance with Section 4, the City and the Contractor may agree upon pricing for the cost impacts, if any, resulting from such delays. If such pricing and/or changes in the Time for Completion and/or the Project schedule are in anticipation of impacts that may, but have not yet occurred, the City will be obligated to pay the Contractor for such anticipated impacts or to award a change in the Time for Completion and/or the Project schedule in accordance with the Contract and any applicable, approved change orders only to the extent the Contractor actually incurs the anticipated impacts. Notwithstanding anything to the contrary in Section 4, the City and the Contractor may agree to a daily rate or cap or lump sum that will apply to the cost impacts, if any, resulting from delay purportedly caused by the City and/or its privities subject to this provision. However, if such daily rate or cap or lump sum is in anticipation of cost impacts that have not yet occurred, the City will be obligated to pay such daily rate or cap or lump sum only to the extent the Contractor actually incurs such cost impacts.

7-1.07 Delay Claims. Whenever the Contractor claims a delay for which the Time for Completion may be extended, the Contractor must request an extension of time within five (5) days of the start of the delay. The request must be in writing and describe in detail the cause for the delay, and, if possible, the foreseeable extent of the delay.

7-1.08 Contractor Coordination of the Work.

- a. The City reserves the right to do other work in connection with or in the vicinity of the Project by contract or otherwise, and Contractor must at all times conduct the Work so as to impose no hardship on the City, others engaged in the Work or other contractors working at the Work site. The Contractor will adjust, correct and coordinate the Work with the work of others so that no delays result in the Work or other work at or near the Work site.
- b. If any part of the Work depends for proper execution or results upon the work of the City or any other contractor, the Contractor will, before proceeding with such Work, promptly report to the City any apparent discrepancies or defects in such other Work. Failure of the Contractor to promptly report any apparent discrepancy or defect will be deemed an acceptance of the City's or other contractor's Work as fit and proper.
- c. The Contractor will anticipate the relations of the various trades to the progress of the Work and will ensure that required anchorage or blocking is furnished and set at proper times. Anchorage and blocking necessary for each trade will be part of the Work except where stated otherwise.
- d. The Contractor will provide proper facilities at all times for access of the City, the Engineer, Architect, and other authorized City representatives to conveniently examine and inspect the Work.

SECTION 8 Contractor Responsibilities

8-1.01 Eligibility. By executing the Contract, the Contractor certifies that the Contractor is not ineligible to perform work on public works projects pursuant to California Labor Code Sections 1777.1 or 1777.7. In accordance with California Public Contract Code Section 6109(a), contractors who are ineligible to perform work on public works projects pursuant to California Labor Code Sections 1777.1 or 1777.7 may neither bid on, be awarded or perform the Work. To the full extent permitted by law the Contractor will hold harmless, indemnify and defend the City from and against any and all damages, costs, and liability arising from or as a consequence of any violation of Public Contract Code Section 6109.

8-1.02 Supervision of the Work. The Contractor will be solely responsible for the performance of the Work, including portions of the Work to be performed by subcontractors. The Contractor is charged with ensuring that all orders or instructions from the City, Engineer or Architect are disseminated to and followed by all subcontractors engaged in performance of the Work. The Contractor will supervise the Work using the Contractor's best skill and attention. At any time during the progress of the Work, the City, the Engineer, or the Architect may require the Contractor and/or subcontractors engaged in performance of the Work to attend a Project meeting and the Contractor will attend, and ensure the attendance of any subcontractors whose attendance is required by the City and/or advisable in light of the matters to be addressed at the meeting.

8-1.03 Contractor's Superintendent. The Contractor will keep on the Work, throughout its progress, a competent superintendent and any necessary assistants, all satisfactory to the City. The superintendent may not be changed without the consent of the City. The superintendent will represent the Contractor and all directions given by the City to the superintendent will bind the Contractor in accordance with the Contract. Superintendent time included in Contractor's completed bid schedule and/or in approved change orders, if any, must be included in Contractor's approved overhead rate and may not be charged as a direct cost.

8-1.04 Competent Employees. The Contractor must at all times enforce strict discipline and good order among the Contractor's employees and may not employ on the Work any unfit person or anyone not skilled in the Work assigned, or anyone incompetent or unfit for the duties of that person. When the City determines that a Contractor employee does not satisfy the requirements of this provision, upon notice from the City, the Contractor must ensure that employee performs no further Work and is no longer present at the Work site. Any such Contractor employee may not again be employed on the Work without City approval.

8-1.05 Items Necessary for Proper Completion of the Work. Except as otherwise noted in the Contract Documents, the Contractor will provide and pay for all labor, materials, equipment, permits, fees, licenses, facilities and services necessary for the proper execution and timely completion of the Work in accordance with the Contract Documents.

8-1.06 Subcontracting.

- a. The Contractor must perform with his or her own organization, a value of work amounting to not less than fifty percent (50%) of the contract amount, except that the bid amount for subcontracted "Specialty Items" if so designated in any Special

Provisions may be eliminated from the contract amount and not considered as subcontracted for the purposes of calculating the value of work to be performed by the Contractor. For the purposes of determining the value of work to be performed by the Contractor pursuant to this provision, materials, equipment, incidentals, etc., shall be considered to have been purchased by the contractor or subcontractor that is to install them. Where a portion of an item is subcontracted, the value of work subcontracted will be based on the estimated cost of such portion of the subcontracted item, as determined from information submitted by the Contractor, subject to approval by the Engineer.

- b. By executing the Contract, the Contractor certifies that no subcontractor included on the list of proposed subcontractors submitted with the Contractor's bid is ineligible to perform work on public works projects pursuant to California Labor Code Sections 1777.1 or 1777.7. In accordance with California Public Contract Code Section 6109(a), subcontractors who are ineligible to perform work on public works projects pursuant to California Labor Code Sections 1777.1 or 1777.7 may neither bid on, be awarded or perform as a subcontractor on the Work. In accordance with California Public Contract Code Section 6109(b), any contract on a public works project entered into between a contractor and a debarred subcontractor is void as a matter of law. The Contractor will ensure that no debarred subcontractor receives any public money for performing the Work, and any public money that may have been paid to a debarred subcontractor for the Work is returned to the City. The Contractor will be responsible for payment of wages to workers of a debarred subcontractor who has been allowed to perform the Work.
- c. The Contract and the performance of the Work are subject to the requirements of the Subletting and Subcontracting Fair Practices Act codified at California Public Contract Code Section 4100 and following. If the Contractor fails to specify a subcontractor or specifies more than one subcontractor for the same portion of the Work in excess of one-half of 1 percent of the Contractor's total bid, the Contractor agrees that the Contractor is fully qualified to perform that portion of the Work with the Contractor's own forces, and that the Contractor will perform that portion of the Work with the Contractor's own forces. If after award of the Contract the Contractor subcontracts, except as provided for in California Public Contract Code Sections 4107 or 4109, any such portion of the Work, the Contractor will be subject to the penalties set forth in California Public Contract Code Sections 4110 and 4111, including cancellation of the Contract, assessment of a penalty of up to 10 percent of the amount of the subcontract, and disciplinary action by the Contractors State License Board.
- d. No contractual relationship exists between the City and any subcontractor engaged in performance of the Work.
- e. Incorporation of Contract Documents. Contractor agrees to include with all subcontractors in their subcontract 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. Subcontractors hired by Contractor agree to be bound to Contractor and City in the same manner and to the same extent as Contractor is bound to City under the Contract Documents. Subcontractor further agrees to include these same provisions with any sub-subcontractor. A copy of the City's Contract Document indemnity and insurance provisions will be furnished to the

subcontractor upon request. The Contractor shall require all sub-contractors to provide a valid certificate of insurance and the required endorsements included in the agreement prior to commencement of any work and contractor will provide proof of compliance to the City. The Contractor will be solely responsible for any delay or additional costs incurred as a result of its failure to provide adequate or accurate Project information to a subcontractor that results in improper submittals and/or Work, or time or other impacts. The Contractor will have all of the obligations and the City will have all of the remedies that are specified in Section 11 concerning any delay or additional costs incurred due to failure of the Contractor to provide adequate and accurate Project information to subcontractors.

- f. Coordination of Subcontract Work: The Contractor is responsible for scheduling the Work of subcontractors so as to avoid delay or injury to either Work or materials.
- g. Subcontractor agrees to be bound to Contractor and City in the same manner and to the same extent as Contractor is bound to City under the Contract Documents. Subcontractor further agrees to include the same requirements and provisions of this agreement, including the indemnity and Insurance requirements, with any sub-subcontractor to the extent they apply to the scope of the sub-subcontractor's work. A copy of the City's Contract Document indemnity and insurance provisions will be furnished to the Subcontractor upon request.

8-1.07 Insurance. Contractor shall procure and maintain for the duration of the contract, and for 2 years thereafter, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees, or subcontractors.

- a. Minimum Scope and Limit of Insurance. Coverage shall be at least as broad as:
 - 1. Commercial General Liability (CGL): Insurance Services Office (ISO) Form CG 00 01 covering CGL on an "occurrence" basis, including products and completed operations, property damage, bodily injury and personal & advertising injury with limits no less than \$3,000,000 per occurrence. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (ISO CG 25 03 or 25 04) or the general aggregate limit shall be twice the required occurrence limit.
 - 2. Automobile Liability: Insurance Services Office Form CA 0001 covering Code 1 (any auto), with limits no less than \$2,000,000 per accident for bodily injury and property damage.
 - 3. Workers' Compensation insurance as required by the State of California, with Statutory Limits, and Employers' Liability insurance with a limit of no less than \$1,000,000 per accident for bodily injury or disease.
 - 4. Surety Bonds. Contractor shall provide the following Surety Bonds:
 - 1. Bid bond
 - 2. Performance bond
 - 3. Payment bond
 - 4. Maintenance bond (based on final contract amount at time of completion)

The Payment Bond and the Performance Bond shall be in a sum equal to the contract price. If the Performance Bond provides for a one-year warranty a separate Maintenance Bond is not necessary. If the warranty period specified in the contract is for longer than one year, a Maintenance Bond equal to 10% of the contract price is required. Bonds shall be duly executed by a responsible corporate surety, authorized to issue such bonds in the State of California and secured through an authorized agent with an office in California.

5. Professional Liability (if Design/Build), with limits no less than \$2,000,000 per occurrence or claim, and \$2,000,000 policy aggregate. The retroactive date must be shown, and this date must be before the execution date of the contract or the beginning of contract work. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of contract work. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the contract effective, or start of work date, the Contractor must purchase extended reporting period coverage for a minimum of five (5) years after completion of contract work. A copy of the claims reporting requirements must be submitted to the City of Sebastopol for review.
 6. Contractors' Pollution Legal Liability and/or Asbestos Legal Liability and/or Errors and Omissions (if project involves environmental hazards) with limits no less than \$1,000,000 per occurrence or claim, and \$2,000,000 policy aggregate. If the services involve lead-based paint or asbestos identification/remediation, the Contractors Pollution Liability policy shall not contain lead-based paint or asbestos exclusions. If the services involve mold identification/remediation, the Contractors Pollution Liability policy shall not contain a mold exclusion, and the definition of Pollution shall include microbial matter, including mold.
 7. If the contractor maintains broader coverage and/or higher limits than the minimums shown above for all policies, the City of Sebastopol requires, and shall be entitled to, the broader coverage and/or higher limits maintained by the contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City of Sebastopol.
- b. Self-Insured Retentions. Self-insured retentions must be declared to and approved by the City of Sebastopol. At the option of the City of Sebastopol, either: the contractor shall cause the insurer to reduce or eliminate such self-insured retentions as respects the City of Sebastopol, its officers, officials, employees, and volunteers; or the Contractor shall provide a financial guarantee satisfactory to the City of Sebastopol guaranteeing payment of losses and related investigations, claim administration, and defense expenses. The policy language shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or the City of Sebastopol.

c. Other Insurance Provisions:

1. Additional Insured. The City of Sebastopol, its officers, officials, employees, and volunteers are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations and automobiles owned, leased, hired, or borrowed by or on behalf of the Contractor. General liability coverage can be provided in the form of an endorsement to the Contractor's insurance at least as broad as one of the following ISO ongoing operations Forms: CG 20 10 or CG 20 26 or CG 20 33 (not allowed from subcontractors), or CG 20 38; and one of the following ISO completed operations Forms: CG 20 37, 2039 (not allowed from subcontractors), or CG 20 40.
2. Primary Insurance. For any claims related to this project, the Contractor's insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as respects the City of Sebastopol, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the City of Sebastopol, its officers, officials, employees, or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.
3. Notice of Cancellation. Contractor shall provide immediate written notice if (1) any of the required insurance policies is terminated; (2) the limits of any of the required policies are reduced; (3) or the deductible or self-insured retention is increased. In the event of any cancellation or reduction in coverage or limits of any insurance, Contractor shall forthwith obtain and submit proof of substitute insurance.
4. Acceptability of Insurers. Insurance is to be placed with insurers authorized to conduct business in the state with a current A.M. Best rating of no less than A: VII, unless otherwise acceptable to the City of Sebastopol.
5. Waiver of Subrogation. Contractor hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation, but this provision applies regardless of whether or not the City of Sebastopol has received a waiver of subrogation endorsement from the insurer. However, the Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the City of Sebastopol for all work performed by the Contractor, its employees, agents and subcontractors.
6. Verification of Coverage. Contractor shall furnish the City of Sebastopol with original Certificates of Insurance including all required amendatory endorsements (or copies of the applicable policy language effecting coverage required by this clause) and a copy of the Declarations and Endorsement Page of the CGL policy listing all policy endorsements to City of Sebastopol before work begins. However, failure to obtain the required documents prior to the work beginning shall not waive the Contractor's obligation to provide them. The City of Sebastopol reserves the right to require complete, certified copies of all required insurance policies, including endorsements, required by these specifications, at any time.

7. Subcontractors. Contractor shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, and Contractor shall ensure that the City of Sebastopol is an additional insured on insurance required from subcontractors. For CGL coverage subcontractors shall provide coverage with a form at least as broad as CG 20 38 04 13.
8. Special Risks or Circumstances. The City of Sebastopol reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other circumstances.

8-1.08 Indemnities. The Contractor shall defend, indemnify and hold the City of Sebastopol, its officials, officers, employees, volunteers and agents free and harmless from any and all claims, demands, causes of action, costs, expenses, liability, loss, damage or injury, in law or equity, to property or persons, including wrongful death, in any manner which actually or allegedly arise out of or are incident to any alleged acts, omissions, negligence or willful misconduct of Contractor, its officials, officers, employees, agents, and subcontractors arising out of or in connection with the performance of the Services, the Project or this Agreement, including without limitation the payment of all consequential damages and attorney's fees and other related costs and expenses except where caused by the active negligence, sole negligence, or willful misconduct of the City, its officers, officials, employees and volunteers. The Contractor shall defend, at Contractor's own cost, expense, and risk, any and all such aforesaid suits, actions or other legal proceedings of every kind that may be brought or instituted against the City, its directors, officials, officers, employees, agents, or volunteers. The Contractor shall pay and satisfy any judgment, award or decree that may be rendered against the City or its directors, officials, officers, employees, agents, or volunteers, in any such suit, action or other legal proceeding. The Contractor shall reimburse the City and its directors, officials, officers, employees, agents and/or volunteers, for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. The Contractor's obligation to indemnify shall not be restricted to insurance proceeds, if any, received by the City, its directors, officials, officers, employees, agents or volunteers.

8-1.09 Licenses/Permits. The Contractor must, without additional expense to the City, obtain all licenses, permits and other approvals required for the performance of the Work. This includes a valid City Business license.

8-1.10 California Labor Code and Prevailing Wage Requirements.

- a. In accordance with California Labor Code Section 1810, eight (8) hours of labor in performance of the Work will constitute a legal day's work under the Contract.
- b. In accordance with California Labor Code Section 1811, the time of service of any worker employed in performance of the Work is limited to eight hours during any one calendar day, and forty hours during any one calendar week, except in accordance with California Labor Code Section 1815, which provides that work in excess of eight hours during any one calendar day and forty hours during any one calendar week is permitted upon compensation for all hours worked in excess of eight hours during any one calendar day and forty hours during any one calendar week at not less than one-and-one-half times the basic rate of pay.

- c. The Contractor and its subcontractors will forfeit as a penalty to the City \$25 for each worker employed in the performance of the Work for each calendar day during which the worker is required or permitted to work more than eight (8) hours in any one calendar day, or more than forty (40) hours in any one calendar week, in violation of the provisions of California Labor Code Section 1810 et seq.
- d. In accordance with California Labor Code Section 1773.2, the City has determined the general prevailing wages in the locality in which the Work is to be performed for each craft or type of work needed to be as published by the State of California Department of Industrial Relations, Division of Labor Statistics and Research, a copy of which is on file in the Public Works Department and will be made available on request. The Contractor and subcontractors engaged in the performance of the Work must pay no less than these rates to all persons engaged in performance of the Work.
- e. In accordance with California Labor Code Section 1775, the Contractor and any subcontractors engaged in performance of the Work must comply with Labor Code Section 1775 which establishes a penalty of up to \$50 per day for each worker engaged in the performance of the Work that the Contractor or any subcontractor pays less than the specified prevailing wage. The amount of such penalty will be determined by the Labor Commissioner. The Contractor or subcontractor must pay the difference between the 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 prevailing wage rate. If a subcontractor worker engaged in performance of the Work is not paid the general prevailing per diem wages by the subcontractor, the Contractor is not liable for any penalties therefore unless the Contractor had knowledge of that failure or unless the Contractor fails to comply with all of the following requirements:
 - 1. The contract executed between the Contractor and the subcontractor for the performance of part of the Work must include a copy of the provisions of California Labor Code Sections 1771, 1775, 1776, 1777.5, 1813, and 1815.
 - 2. The Contractor must monitor payment of the specified general prevailing rate of per diem wages by the subcontractor by periodic review of the subcontractor's certified payroll records.
 - 3. Upon becoming aware of a subcontractor's failure to pay the specified prevailing rate of wages, the Contractor must diligently take corrective action to halt or rectify the failure, including, but not limited to, retaining sufficient funds due the subcontractor for performance of the Work.
 - 4. Prior to making final payment to the subcontractor, the Contractor must obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor has paid the specified general prevailing rate of per diem wages employees engaged in the performance of the Work and any amounts due pursuant to California Labor Code Section 1813.
 - 5. In accordance with California Labor Code Section 1776, the Contractor and each subcontractor engaged in performance of the Work, must keep accurate payroll records showing the name, address, social security number, work classification,

straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed in performance of the Work. Each payroll record must contain or be verified by a written declaration that it is made under penalty of perjury, stating that the information contained in the payroll record is true and correct and that the employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by the employer's employees on the public works project. The payroll records required pursuant to California Labor Code Section 1776 must be certified and must be available for inspection by the City and its authorized representatives, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations and must otherwise be available for inspection in accordance with California Labor Code Section 1776.

- f. In accordance with California Labor Code Section 1777.5, the Contractor, on behalf of the Contractor and any subcontractors engaged in performance of the Work, will be responsible for ensuring compliance with California Labor Code Section 1777.5 governing employment and payment of apprentices on public works contracts.
- g. In case it becomes necessary for the Contractor or any subcontractor engaged in performance of the Work to employ on the Work any person in a trade or occupation (except executive, supervisory, administrative, clerical, or other non-manual workers as such) for which no minimum wage rate has been determined by the Director of the Department of Industrial Relations, the Contractor must pay the minimum rate of wages specified therein for the classification which most nearly corresponds to Work to be performed by that person. The minimum rate thus furnished will be applicable as a minimum for such trade or occupation from the time of the initial employment of the person affected and during the continuance of such employment.

8-1.11 Laws and Ordinances. The Contractor and all subcontractors engaged in the performance of the Work must conform to the following specific rules and regulations as well as all other laws, ordinances, rules and regulations that apply to the Work. Nothing in the Special Provisions or Project Plans is to be construed to permit Work not conforming to these codes:

- National Electrical Safety Code, U. S. Department of Commerce
- National Board of Fire Underwriters' Regulations
- California Building Standards Code as adopted by the City
- Manual of Accident Prevention in Construction, latest edition, published by A.G.C. of America
- Industrial Accident Commission's Safety Orders, State of California
- Regulations of the State Fire Marshall (Title 19, California Code of Regulations) and Applicable Local Fire Safety Codes
- Labor Code of the State of California - Division 2, Part 7, Public Works and Public Agencies.
- Federal, state, and local air pollution control laws and regulations applicable to the Contractor and/or the Work.

8-1.12 Guaranty. The Contractor guarantees all of the Work for one year from the date the City accepts the Work. Upon receiving written notice of a need for repairs which are directly attributable to defective materials or workmanship the Contractor must make good any defects arising or discovered in any part of the Work by diligently commencing the necessary repairs within seven (7) days from the date of notice from the City. If the Contractor fails to make good any defects in the Work in accordance with this provision, in addition to any other available remedy under the Contract or at law or equity, the City may make good or have made good such defects in the Work and deduct the cost from amounts that may be due or become due the Contractor, and/or call on the Contractor's maintenance bond for the cost of making good such defects and for the City's reasonable legal costs, if any, of recovering against the bond. The Contractor will remain responsible for repairing any Work found to be defective regardless of when such defect is discovered by the City.

8-1.13 Assignment of Unfair Business Practice Claims. In accordance with California Public Contract Code Section 7103.5, the Contractor and any subcontractors offer and agree to assign to the City all rights, title, and interest in and to all causes of action the Contractor or any subcontractors may have under Section 4 of the Clayton Act (15 U.S.C. § 15) or under the Cartwright Act (Chapter 2 (commencing with § 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services or materials pursuant to this Contract. This assignment will be made and become effective at the time the City tenders final payment to the Contractor, without further acknowledgement by the parties.

SECTION 9 Measurement and Payment

9-1.01 F.O.B. (Freight on Board). All shipments must be F.O.B. destination to the Work site and/or other sites indicated in the Contract Documents. The Contract Price is all-inclusive (including sales tax). There will be no additional compensation paid for containers, packing, unpacking, damage, or insurance.

9-1.02 Payment

1. The Contractor shall submit to the Engineer his or her partial payment estimate by the 15th day of the month, or some other day as agreed to by the Contractor and the Engineer prior to the start of the Work. The partial payment estimate must be a verified application for payment and schedule of values supported by a statement showing all materials installed during the preceding month and the cost of labor expended in the performance of the Work. The Contractor must also provide information with the payment that includes bid item identification and % complete/remaining. Unless otherwise provided in the Contract Documents, no allowances or payments will be made for material or equipment not placed at the Work site.
2. Within ten (10) days after the issuance of the Notice to Proceed, the Contractor shall furnish to the City a detailed Schedule of Values giving a complete breakdown of large lump sum prices and items which include numerous subdivisions of work. The Contractor and City shall jointly review the Schedule of Values and make any adjustments in value allocations if, in the opinion of the City, changes are necessary to establish fair and reasonable allocation of values for the Work components. Front end loading will not be permitted. If, in the City's judgment, more detail (i.e., more items of work) is necessary, the Contractor shall add the additional items identified by the City. The City may also require reallocation of Work components from items in the preliminary schedule if such are allocation is necessary. The Contractor shall submit any necessary revisions for the completed Schedule of Values within 15 days from the Notice to Proceed. The costs indicated in making up this breakdown will be used as a basis for partial payments and shall not be considered as fixing a basis of additions or deductions from the contract.
3. To be eligible for payment the Contractor's applications for payment must be accompanied by certified payroll reports, including "Statement of Non-Performance" for periods where no Work was performed. Certified payroll shall be prepared in accordance with California Labor Code Section 1776 and the Contract for each employee of the Contractor and any subcontractors engaged in the performance of the Work during the preceding months. Applications for payment will not be processed without certified payroll reports.
4. In accordance with California Public Contract Code Section 20104.50, the City will review applications for payment as soon as practicable after receipt. Any application or part of an application that is determined to be improper will be returned to the Contractor as soon as practicable, but no later than seven days after receipt by the City, along with a written description of the reasons why the application is improper. The Contractor's failure to submit a schedule by the time specified in Section 3-1.08, or its submission of a schedule to which the City has taken any uncorrected exception, will serve as a basis for returning an application for payment in its entirety.

5. Unless the Contractor has elected to post securities in lieu of retention in accordance with California Public Contract Code Section 22300 and the Contract, and the Contractor and the City have executed an escrow agreement in accordance with the Public Contract Code and the Contract, the City will make progress payments to the Contractor in accordance with applicable law in the amount of ninety-five (95) percent of the value of the labor actually performed and the material incorporated in the Work as specified in Contractor's verified application for payment upon approval by the City's authorized representative(s). Payment of progress payments will not be construed as acceptance of the Work performed. If the Contractor has elected to post securities in lieu of retention in accordance with Public Contract Code Section 22300 and the Contract and the Contractor and the City have executed an escrow agreement in accordance with the Public Contract Code and the Contract, the City will make payments to the Contractor or the Contractor's escrow agent in accordance with such escrow agreement.
6. Wherever the estimated quantities of Work to be done and materials to be furnished on a unit price basis under this Contract are specified in any of the Contract Documents, including the proposal, such quantities are specified for purposes of comparing bids, and the right is expressly reserved, except as otherwise expressly provided, to increase or diminish such quantities as may be deemed reasonably necessary or desirable by the Engineer to complete the Work. No such increase or diminution will be a basis for claims for adjustments in the Contract Price other than adjustments necessary to reflect the impacts of such changes in quantities based on the applicable contract prices and/or pursuant to Section 4 of this Contract.
7. In accordance with California Public Contract Code Section 20104.50, if the City fails to make a progress payment within thirty (30) days of receipt of an undisputed, properly submitted application for payment, the City will pay the Contractor interest equivalent to the legal rate set forth in subdivision (a) of California Code of Civil Procedure Section 685.010. The number of days available to the City to make a payment without incurring an interest obligation pursuant to this provision and California Public Contract Code Section 20104.50 will be reduced by the number of days, if any, by which the City has delayed return of an application for payment beyond the seven day return requirement set forth in Section 9-1.02(d).
8. The City will pay the Contractor's final invoice in accordance with applicable law and this Section 9 following acceptance of the Work provided that:
 - i. The Contractor has furnished evidence satisfactory to the City that all claims for labor and material have been paid, or the time for filing valid stop notices has passed and no stop notices have been filed, or all stop notices filed have been released by valid release or release bond acceptable to the City.
 - ii. No claim has been presented to the City by any person based upon any acts or omissions of the Contractor or any subcontractor engaged in the performance of the Work.
 - iii. No other claim or dispute exists under the Contract or applicable law concerning payment of the Contractor's final invoice and/or release of the Contract retention.

- iv. The Contractor has filed with the City the Maintenance Bond provided in the Contract Documents with duly notarized signatures of an authorized representative of the Contractor and an attorney-in-fact of an admitted surety insurer acceptable to the City and such Maintenance Bond binds the Contractor as Principal and the Surety in accordance with its terms in the amount of 10% of the final Contract Price.

9-1.03 Non-Allowable Direct Charges. The following costs are not allowable direct charges under the Contract. The following costs may only be paid under the Contract, if at all, as part of any allowance for contractor overhead and/or profit established under the Contract.

- a. Labor costs in excess of applicable prevailing wages pursuant to the Contract and applicable law, liability and workers compensation insurance, social security, retirement and unemployment insurance and other employee compensation and benefits pursuant to bona fide compensation plans in effect at the time specified for the opening of Project bids for contractor and subcontractor employees engaged in the performance of the Work, or in excess of the labor costs specified in provision 4-1.05 of this Contract in the case of cost impacts involving items for which the Contract Documents do not specify prices, and for which no lump sum amount has been approved by the City. However, in no event will allowable direct labor charges under the Contract include employee bonuses, employee vehicles or vehicle allowances, employee telephones or telephone allowances, or employee housing or housing allowances, whether or not such benefits are part of a bona fide compensation plan in effect at the time specified for the opening of Project bids.
- b. Superintendent labor and clerical labor.
- c. Bond premiums
- d. Insurance in excess of that required under Section 8.8
- e. Utility costs
- f. Work Site office expenses
- g. Home office expenses.
- h. Permit or license costs

9-1.04 Retention. The City or its agent may, in accordance with the Contract Documents and applicable law, withhold any payment of monies due or that may become due the Contractor because of:

- a. Defective work not remedied or uncompleted work.
- b. Claims filed or reasonable evidence indicating probable filing of claims.
- c. Failure to properly pay subcontractors or to pay for material or labor.

- d. Reasonable doubt that the Work can be completed for the balance then unpaid.
- e. Damage to another contractor.
- f. Damage to the City.
- g. Damage to a third party.
- h. Delay in the progress of the Work, which, in the City's judgment, is due to the failure of the Contractor to properly expedite the Work.
- i. Liquidated damages or other charges that apply to the Contractor under the Contract.
- j. Any other lawful basis for withholding payment under the Contract.

9-1.05 Securities in Lieu of Retention.

- a. In accordance with Public Contract Code Section 22300, except where federal regulations or polices do not permit substitution of securities, the Contractor may substitute securities for any moneys withheld by the City to ensure performance of the Work. At the Contractor's request and expense, securities equivalent to the amount withheld will be deposited with the City, or with a state or federally chartered bank in California as the escrow agent, who will then pay those moneys to the Contractor under the terms of an Escrow for Security Deposit agreement. The Escrow for Security Deposit agreement is provided in the Contract Documents. Upon satisfactory completion of the Work, the securities will be returned to the Contractor.
- b. Alternatively, at the Contractor's request and expense, the City will pay retentions earned directly to the escrow agent. At the Contractor's expense, the Contractor may direct investment of the payments into securities. Upon satisfactory completion of the Work, the Contractor will receive from the escrow agent all securities, interest, and payments received by the escrow agent from the City pursuant to this provision and the terms of the Escrow for Security Deposit agreement. The Contractor will, within 20 days of receipt of payment, pay to each subcontractor the respective amount of interest earned, less costs of retention withheld from each Subcontractor, on monies withheld to ensure the Contractor's performance of the Work.
- c. Securities eligible for investment in accordance with this provision include those listed in Government Code Section 16430, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the City.
- d. The Contractor will be the beneficial owner of any securities substituted for moneys withheld and will receive any interest thereon.

SECTION 10 Project Acceptance and Closeout

10-1.01 Occupancy. The City reserves the right to occupy or use any part or parts or the entire of the Work before the Work is fully performed. Subject to applicable law, exercising this right will in no way constitute acceptance of any part of the Work so occupied or used or acceptance of the entire Work, nor will such occupancy or use in any way affect the times when payments will become due the Contractor, nor will such occupancy or use in any way prejudice the City's rights under the Contract, any Contract bonds, or at law or equity. Occupancy or use will not waive the City's rights to assess liquidated damages in accordance with Section 7 after the date of such occupancy or use.

10-1.02 Work Completion and Final Inspection. When the Contractor considers the Work is completed, the Contractor will submit written certification to the Engineer specifying that: the Contract Documents have been reviewed; the Work has been inspected for compliance with the Contract Documents; the Work has been completed in accordance with the Contract Documents; and that equipment and systems have been tested in the presence of the City's representative and are operational. The City and/or the City's authorized representatives will make an inspection to verify that the Work is complete and will notify the Contractor in writing of any incomplete or deficient Work. The Contractor will take immediate steps to remedy the stated deficiencies and give notice of correction to the Engineer. Upon receiving a notice of correction, the City or the City's authorized representatives will re-inspect the Work. The Contractor must correct all punch list items within 10 working days after the issuance of the punch list

10-1.03 Work Acceptance.

- a. All finished Work will be subject to inspection and acceptance or rejection by the City, the Engineer, and the Architect or other government agencies having jurisdiction over the Work. Final acceptance of the Work will be at the discretion of the City.
- b. The City will accept the Work in writing only when the Work has been completed to the City's reasonable satisfaction. Progress payments will in no way be construed as acceptance of any part of the Work.
- c. In evaluating the Work, no allowance will be made for deviations from the Special Provisions, Project Plans or other Contract Documents unless already approved in writing in accordance with the requirements of Section 4, above.
- d. The fact that the Work and materials have been inspected from time to time and that progress payments have been made does not relieve the Contractor of the responsibility of replacing and making good any defective or omitted work or materials in accordance with the requirements of the Contract Documents.

SECTION 11 Remedies and Disputes

11-1.01 Failure to Correct Work. Within ten (10) working days of receiving written notice from the City describing Work that is defective or that is otherwise not in accordance with the requirements of the Contract and/or applicable law and directing that such Work be corrected, the Contractor and/or the Contractor's sureties must give the City written notice of the intent of the Contractor and/or the Contractor's sureties to correct such Work and commence correction of such Work in accordance with the City's notice and the Contract. If the Contractor and/or the Contractor's sureties do not give the City written notice of intent to correct such Work and commence correction of such Work within ten (10) working days of receipt of the City's notice, then the City may correct such work and/or have such work corrected for the account and at the expense of the Contractor and/or its sureties, and the Contractor and/or its sureties will be liable to the City for any resulting excess cost. The City may, in addition to all other remedies that the City may have under the Contract and at law or equity, deduct any such excess cost of completing the Work from amounts that are due or that may become due the contractor.

11-1.02 Termination.

- a. In accordance with California Public Contract Code Section 7105, in addition to all other available remedies that the City may have under the Contract, and at law or equity, the City may terminate the Contract:
 1. If the Contractor or any of its subcontractors engaged in the performance of the Work fails to timely perform the Work and/or any of the Contractor's material obligations under the Contract Documents, including but not limited to submission of an acceptable schedule, that have accrued except for due to reasons beyond the control of the Contractor pursuant to the Contract Documents.
 2. If the Contractor is adjudged bankrupt, or if it should make a general assignment for the benefit of creditors, or if a receiver should be appointed on account of its creditors.
 3. If the Contractor or any of the subcontractors engaged in the performance of the Work persistently or repeatedly refuses or fails to supply enough properly skilled workmen or proper materials for the timely completion of the Work.
 4. If the Contractor fails to make prompt payment to subcontractors engaged in the performance of the Work or for material or labor used in the performance of the Work in accordance with the Contract Documents and applicable law.
 5. If the Contractor or any subcontractors engaged in the performance of the Work persistently disregards laws or ordinances applicable to the performance of the Work, or the instructions of the City, the Engineer, the Architect, or other authorized representatives of the City.
 6. For any reason or for no reason, at the City's sole discretion.

- b. If the City intends to terminate the Contractor's control of the Work for any of the reasons specified in Section 11-1.102(a) 1 through 5, above, the City will immediately serve written notice to the Contractor and its sureties in accordance with the Contract Documents. Notice of the City's intent to terminate the Contract will be given by registered or certified mail and specify the grounds for termination, the required cure and the time by which the cure must be effected. Upon receipt of notice of the City's intent to terminate the Contract for any of the reasons specified in Section 11-1.102(a) 1 through 5, the Contractor will have ten (10) days from receipt of the notice or a longer time specified in the notice to cure its default. If the Contractor does not affect the required cure by the time specified in the notice, the City will issue a written notice of termination to the Contractor and its sureties by registered or certified mail. The notice of termination will specify: that upon receipt of the notice the Contractor's right to perform or complete the Work, including on behalf of the Contractor's sureties, is terminated; that the Contractor's sureties will have the right to take over and complete the Work and perform all of the Contractor's remaining obligations that have accrued under the Contract; and that if the Contractor's sureties do not both give the City written notice of their intention to take over and perform the Contract and commence completion of the Work and performance of all of the Contractor's remaining obligations that have accrued under the Contract within ten (10) days after receipt of notice of termination that the City may declare the Contractor's sureties in default and take over the completion of the Work or have the Work completed for the account and at the expense of the Contractor and its sureties, and the Contractor and its sureties will be liable to the City for any resulting excess cost. The City may, in addition to all other available remedies that the City may have under the Contract Documents and at law or equity, deduct any such excess cost of completing the Work from amounts that are due or that may become due the Contractor.
- c. Upon termination of the Contractor's control of the Work for any of the reasons specified in Section 11-1.102(a) 1 through 5, the Contractor will, if so directed by the City, immediately remove from the Work site any and all materials and personal property belonging to the Contractor which have not been incorporated in the Work and the Contractor and its sureties will be liable upon their bond for all damages caused the City by reason of the Contractor's failure to complete the Work.
- d. Upon termination of the Contractor's control of the Work for any of the reasons specified in Section 11-1.102(a) 1 through 5, above, the City reserves the right to refuse tender of the Contractor by any surety to complete the Work.
- e. If the City completes or has completed any portion of, or the whole of the Work, following termination of the Contractor's control of the Work for any of the reasons specified in Section 11-1.102(a) 1 through 5, above, the City will neither be liable for nor account to the Contractor or the Contractor's sureties in any way for the time within which, or the manner in which such Work is performed, or for any changes made in such Work or for the money expended in satisfying claims and/or suits and/or other obligations in connection with completing the Work. If, following termination of the Contractor's control of the Work for any of the reasons specified in Sections Section 11-1.102(a) 1 through 5, above, the unpaid balance of the Contract Price exceeds the expense of completing the Work, including compensation for additional legal, managerial and administrative services and all other amounts due for the completion of the Work and/or satisfaction of claims of the City and/or others arising out of the Contract and any other charges that apply to the Contractor under the Contract, the difference will be paid to the Contractor. If such

expenses of completing the Work exceed the unpaid balance of the Contract Price, the Contractor or its sureties will pay the difference to the City.

- f. If the Contract or Contractor's control of the Work is terminated for any reason, no allowances or compensation will be granted for the loss of any anticipated profit by the Contractor.
- g. In accordance with California Government Code Section 4410, in the event a national emergency occurs, and public work being performed by contract is stopped, directly or indirectly, because of the freezing or diversion of materials, equipment or labor, as the result of an order or a proclamation of the President of the United States, or of an order of any federal authority, and the circumstances or conditions are such that it is impracticable within a reasonable time to proceed with a substantial portion of the work, then the City and the Contractor may, by written agreement, terminate the Contract. In accordance with California Government Code Section 4411, such an agreement will include the terms and conditions of the termination of the contract and provision for the payment of compensation or money, if any, which either party will pay to the other or any other person, under the facts and circumstances in the case. Compensation to the Contractor will be determined on the basis of the reasonable value of the work done, including preparatory work. As an exception to the foregoing, in the case of any fully completed separate item or portion of the Work for which there is a separate contract price, the Contract price will control. The parties may in any other case adopt the Contract price as the reasonable value of the work or any portion of the work done.

11-1.03 Disputes.

- a. In accordance with California Public Contract Code Section 20104.2, the following procedures apply to claims of \$375,000 or less between the Contractor and the City:
 - 1. The claim must be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.
 - 2. For claims of less than fifty thousand dollars (\$50,000), the City will respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the City may have against the Contractor.
 - 3. If additional information is thereafter required, it will be requested and provided pursuant to this subdivision, upon mutual agreement of the City and the Contractor.
 - 4. The City's written response to the claim, as further documented, will be submitted to the Contractor within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information, whichever is greater.

5. For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the City will respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the City may have against the Contractor.
 6. If additional information is thereafter required, it will be requested and provided pursuant to this subdivision, upon mutual agreement of the City and the Contractor.
 7. The City's written response to the claim, as further documented, will be submitted to the Contractor within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.
 8. If the Contractor disputes the City's written response, or the City fails to respond within the time prescribed, the Contractor may so notify the City, in writing, either within 15 days of receipt of the City's response or within 15 days of the City's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the City will schedule a meet and confer conference within 30 days for settlement of the dispute.
 9. Following the meet and confer conference, if the claim or any portion remains in dispute, the Contractor may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed will be tolled from the time the Contractor submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.
 10. This section does not apply to tort claims and nothing in this article is intended nor will be construed to change the time periods for filing tort claims or actions specified by Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.
- b. In accordance with California Public Contract Code Section 20104.4, the following procedures apply to civil actions to resolve claims of \$375,000 or less between the City and the Contractor:
1. Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court will submit the matter to non-binding mediation unless waived by mutual stipulation of both parties. The mediation process will provide for the selection within 15 days by both parties of a disinterested third person as mediator, will be commenced within 30 days of the submittal, and will be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

2. If the matter remains in dispute, the case will be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) will apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.
 3. Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of this article will be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators will be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses will be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event will these fees or expenses be paid by state or county funds.
 4. In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party who after receiving an arbitration award requests a trial de novo but does not obtain a more favorable judgment must, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other party arising out of the trial de novo.
 5. The court may, upon request by any party, order any witnesses to participate in the mediation or arbitration process.
- c. In accordance with California Public Contract Code Section 20104.6:
1. The City will not fail to pay money as to any portion of a claim, which is undisputed except as otherwise provided in the Contract.
 2. In any suit filed under Public Contract Code Section 20104.4 concerning this Contract, the City will pay interest at the legal rate on any arbitration award or judgment. Such interest will accrue from date the suit was filed.

SECTION 12 Additional Provisions

12-1.01 Description of Work. The Work in general consists of constructing a new 2-room unisex public restroom facility in a historical matching appearance at the Luther Burbank Experiment Farm and revising the current path from nearby parking to the new restroom. All work is to be ADA-compliant, and other such items of work as are required to complete the Project in accordance with this Contract, the Project Plans and Special Provisions.

All Work shall conform to the requirements of the City of Sebastopol Standard Details and Specification Details as they apply, and any modifications or additions herein and/or on the Project Plans.

Work shown on the plans and/or described within the Contract Documents that is not specifically referenced or contained on the bid item list shall be considered as paid for by the various items of work and no additional compensation will be provided.

The estimate of the quantities of Work to be done is approximate only, being as a basis for the comparison of bids, and the City does not expressly or by implication agree that the actual amount of work will correspond therewith but reserves the right to increase or decrease the amount or any portion of the work as directed by the Engineer.

Incidental items of construction necessary to complete the Work in a satisfactory and acceptable manner as shown on the Project Plans and as provided for in the City Special Provisions and not specifically referred to in this section, shall be considered part of the Work and will be understood to be furnished by the Contractor at no additional cost.

12-1.02 Construction Limitations. The Contractor will be expected to conduct his or her operations in a manner which creates a minimum to no disturbance to the natural vegetation and landscape. Ingress and egress must be via the existing paved right of way where existing. Care must be exercised to avoid hazards that may cause injury to persons, animals or property either during working or after work hours, which will include dust control, backfilling trenches immediately following pipe laying and temporary fencing as required. Excavation made under this Contract must be backfilled before leaving the worksite for the night.

Receptacles for construction residue, including oil, cleaning fluids, and litter, must be covered. Such residues must be disposed of in a proper manner.

The Contractor will be responsible for obtaining permission from the property owners for any construction outside of the Work site or easements as shown on the plans. Equipment will be restricted to the immediate area of construction; pipe trenches will be backfilled as soon as possible.

Access to the project site shall be from Bodega Avenue to Gold Ridge Farm, which is a private street. All construction traffic, including equipment and materials delivery, workers, inspection, materials testing, visitations, etc. shall be restricted to the route shown on Figure 1 below.

Construction activity within the existing right-of-way must be scheduled to minimize traffic inconvenience and safety hazards to motorists, pedestrians and cyclists.

Figure 1. Restricted construction access on Gold Ridge Farms is shown as yellow dashed line.



12-1.03 Order of Work. Work as shown on the project plans and described herein shall be constructed in a sequence that is satisfactory to and approved by the Engineer. Additional Order of work requirements may be found on the project plans or within the Special Provisions.

12-1.04 Storm Water Pollution Prevention. The Contractor must perform the Work in compliance with all applicable requirements of the California State Water Resources Control Board pursuant to Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002 ("General Permit") adopted pursuant to regulations adopted by the U.S. Environmental Protection Agency (USEPA) on November 16, 1990 and codified in 40 Code of Federal Regulations Parts 122, 123, 124. The General Permit applies to storm water discharges from construction sites that disturb land equal to or greater than one acre, and to construction activity that results in soil disturbances of less than one acre if the construction activity is part of a larger common plan of development that encompasses one or more acre of soil disturbance or if there is significant water quality impairment resulting from the activity. The General Permit requirements that may apply to the Contractor's performance of the Work include, but are not limited to:

- a. Development and implementation of a Storm Water Pollution Prevention Plan ("SWPPP") that specifies Best Management Practices ("BMPs") that will prevent all construction pollutants from contacting storm water and with the intent of keeping all products of erosion from moving off site into receiving waters.

- b. Elimination or reduction of non-storm water discharges to storm sewer systems and other waters of the nation.
- c. Inspection of all BMPs.

Portions of the Work that may be subject to the General Permit include, but are not limited to clearing, grading, stockpiling and excavation.

Prior to commencing performance of the Work, the Contractor must prepare and file a Notice of Intent to obtain coverage under the General Permit, a vicinity map, and the applicable fee, with the California State Water resources Control Board, Division of Water Quality, Storm Water Permit Unit, P.O. Box 1977, Sacramento, California 95812-1977.

Prior to commencing performance of the Work the Contractor must also prepare an SWPPP in accordance with all applicable requirements of the General Permit and submit the SWPPP to the Engineer for approval.

The Contractor must also develop and implement a monitoring program to verify compliance with the General Permit.

The SWPPP must include a Work site map. Geometric equations, notes, details, and all data not related to water pollution control work shall be removed to provide clarity. A copy of the Project Plans must be used as a base plan, with the pertinent stage of construction shown as an overlay to accurately reflect Project site conditions at various phases of construction.

The Contractor must revise and update the SWPPP whenever there is a change in construction operations that may affect the site drainage patterns or discharge of pollutants to surface waters, ground waters, or a separate municipal storm sewer system.

Any fines, damages, Work delays or other impacts that result from failure of the Contractor or privities or agents of the Contractor to fully comply with the requirements of the General Permit or to fully implement the SWPPP will be solely the responsibility of the Contractor.

The Contractor must keep a copy of the General Permit, together with updates and revisions, at the Project site and provide copies of the SWPPP at the request of the City.

12-1.05 Maintaining Traffic and Pedestrian Operations. The Contractor must conduct his or her operations so as to cause the least possible obstruction and inconvenience to public traffic. Unless otherwise approved by the Engineer, all traffic must be permitted to pass through the Work.

Due to the need to accommodate and minimize inconvenience to the public, unless expressly specified or approved in writing by the Engineer, no road closures will be permitted. Public vehicular and pedestrian traffic must be allowed to travel through the Work area with an absolute minimum of interruption or impedance unless otherwise provided for in the Contract or approved in writing by the Engineer. The Contractor must

make provisions for the safe passage of pedestrians around the area of Work at all times. Residents affected by construction must be provided passage and access through the Work area to the maximum extent possible. Where existing driveways occur on the street, the Contractor must make provisions for the trench crossings at these points, either by means of backfill or by temporary bridges acceptable to the Engineer, so that the length of shut-down of any driveway is kept to a minimum. In addition, all driveways must be accessible at the end of each workday, and no driveway or property access may be closed for more than four (4) hours during the workday. Access to driveways, houses, and buildings along the road or street must be as convenient as possible and well maintained, and all temporary crossings must be maintained in good condition. To minimize the need for and complexity of detours, not more than one crossing or street intersection or road may be closed at any one time without the written approval of the Engineer.

The Contractor must provide multiple, advance written notices of closures to all affected property owners in a form approved by the Engineer.

Except as otherwise approved by the Engineer, the stockpiling or storing of material in City streets or right of way shall be prohibited. Where this is unavoidable, all such materials must be piled or stored in a manner that will not obstruct sidewalks, driveways, or pedestrian crossings. Gutters and drainage channels must be kept clear and unobstructed at all times. All such materials shall be stored and handled in a manner that protects City streets, sidewalks, or other facilities from damage.

Where approved in advance by the Engineer, the Contractor must construct and maintain detours for the use of public traffic at his or her own expense. Failure or refusal of the Contractor to construct and maintain detours so approved at the proper time will be a material breach of the Contract subject to any and all remedies available pursuant to the Contract Documents and at law and equity. Such remedies include, but are not limited to, termination pursuant to Section 11.

Throughout performance of the Work the Contractor must construct and adequately maintain suitable and safe crossings over trenches and such detours as are necessary to care for the public and private traffic at all times including Saturdays, Sundays and holidays.

The Contractor will be responsible for keeping all emergency services, including the Sebastopol police and fire departments informed of obstructions to, or detours around any public or private roads caused by reasons of his or her operations.

The Contractor must comply with the State of California, Department of Transportation Manual of warning signs, lights, and devices for use and performance of work within the job site.

The fact that rain or other causes, either within or beyond the control of the Contractor, may force suspension or delay of the Work, shall in no way relieve the Contractor of his or her responsibility of maintaining traffic through the Project and providing local access as specified in this section. The Contractor must, at all times, keep on the job such materials, force and equipment as may be necessary to keep roads, streets and driveways within the Project open to traffic and in good repair and shall expedite the passage of such traffic, using such force and equipment as may be necessary.

Full compensation for conforming to the requirements of this section will be deemed included in the prices paid or the various Contract items of Work and no additional allowances will be made therefore.

- 12-1.06 Public Safety.** The Contractor must at all times conduct the Work in accordance with Construction Safety Orders of the Division of Industrial Safety, State of California, to ensure the least possible obstruction to traffic and inconvenience to the general public, and adequate protection of persons and property in the vicinity of the work.

No pedestrian or vehicle access way may be closed to the public without first obtaining permission of the Engineer.

Should the Contractor fail to provide public safety as specified or if, in the opinion of the Engineer, the warning devices furnished by the Contractor are not adequate, the City may place any warning lights or barricades or take any necessary action to protect or warn the public of any dangerous condition connected with the Contractor's operations and the Contractor will be liable to the City for, and the City may deduct from amounts due or that may become due the Contractor under the Contract, all costs incurred including, but not limited to, administrative costs.

Nothing in this section will be construed to impose tort liability on the City or Engineer.

- 12-1.07 Preconstruction Conference.** A pre-construction conference will be scheduled, at which time the Contractor must present his or her proposed work schedule in accordance with Section 3-1.08 of the General Provisions, information concerning offsite yards, subcontractors, location of disposal and stockpile areas, and traffic control plans. All such schedules will be subject to the approval of the Engineer and the applicable agencies

- 12-1.08 Owner Notification.** The Contractor must notify all property owners and businesses affected by the Work at least 48 hours before Work is to begin. The notice must be in writing in the form of a door hanger, and must indicate the Contractor's name and phone number, type of work, day(s) and time when Work will occur. Notices must be reviewed in advance and approved by the Engineer.

- 12-1.09 Emergency Service Providers Notifications.** The Contractor must furnish the name and phone number of the Safety Supervisor appointed in Section 13 to the City Police Department dispatcher for contact in the event of an emergency and shall keep such information updated as required to provide 24-hour phone access.

- 12-1.10 Clean up.** Section 4-1.02 of the Caltrans Standard Specifications is made a part of this Contract.

Before final inspection of the work, the Contractor must clean the construction site and all ground occupied by him in connection with the work, of all rubbish, excess material, falsework, temporary structures and equipment. All parts of the work shall be left in a neat and presentable condition.

Nothing herein shall require the Contractor to remove warning, regulatory, and guide signs prior to formal acceptance by the Engineer.

12-1.11 Obstructions. Section 15, "Existing Highway Facilities", of the Caltrans Standard Specifications, is made a part of this Contract; except that measurement and payment shall be as described herein.

Attention is directed to the possible existence of overhead and underground power, telephone, and television cable poles, underground sewer mains and laterals, underground gas mains, and underground water mains and laterals within the area in which construction is to be performed.

Prior to starting work (a minimum of 2 working days in advance), the Contractor must call Underground Service Alert (USA), toll free (800) 642-2444 and provide USA with all necessary data relative to the proposed work. USA will accept calls and process information to participating agencies that have underground facilities in the area between the hours of 7:30 a.m. and 5:00 p.m. daily, except Saturdays, Sundays, and holidays. Between the hours of 5:00 p.m. and 7:30 a.m. calls will be recorded and then processed after 7:30 a.m. For emergency situations, after hours and on Saturdays, Sundays and holidays, the Contractor shall contact the organization owning the affected facility. Upon notification, agencies having facilities in the area of the proposed excavation will mark their locations in the field using USA standard colors and codes to identify the facility.

The Contractor will be required to work around public and private utility facilities and other improvements that are to remain in place within the construction area and he will be held liable to the owners of such facilities or interference with service resulting from his operations.

12-1.12 Hours of Work. Unless otherwise specified herein, all construction activity, except for emergency situations, will be confined to Monday through Friday between the hours of 7:00 a.m. and 5:30 p.m. Mufflers and/or baffles will be required on all construction equipment to control and minimize noise. The Contractor must comply with all applicable noise regulations in the City's Municipal Code.

Saturday, Sunday, holidays and overtime shall not be regarded as working days. Work shall not be allowed on non-working days without the expressed approval of the Engineer. The Contractor shall make a request for approval in writing with the stipulation (implied or expressed) that the Contractor shall pay for all overtime labor charges at the City's actual cost recovery rate for the City's contract inspector and/or resident engineer. All overtime labor charges shall be deducted from the final payment along with any liquidated damages.

Work necessary for the proper care and protection of work already performed or in case of emergency may be allowed without permission of the Engineer.

12-1.13 Dust Control. The Contractor must furnish all labor, equipment, and means required and carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance. The Contractor will be responsible for any damage resulting from any dust originating from the performance of the Work. The use of water resulting in mud on streets, sidewalks, or driveways, will not be permitted as a substitute for sweeping or other methods of dust control. The Contractor may not discharge smoke, dust, or any other air contaminants into the atmosphere in such

quantity as will violate the regulations of any legally constituted authority.

Dust control must conform to the provisions in Section 10-5, "Dust Control", of the Caltrans Standard Specifications, which section is made a part of this Contract.

No separate payment will be made to the Contractor for controlling dust, whether caused by construction traffic or by public traffic only. Full compensation for dust control will be considered as included in the Contract Price paid for the various items of work and no additional compensation will be allowed, therefore.

12-1.14 Water For Construction And Dust Control. Contractors may obtain water from a filler line located at the City Corporation Yard, 714 Johnson Street, or from an alternate source approved by the Public Works Superintendent prior to the start of construction. Contact the Sebastopol Public Works Department for information. Unauthorized use of City hydrants or water outlets is not allowed and will result in legal proceedings by the City of Sebastopol.

12-1.15 Sanitary Provisions. The Contractor must maintain such camps, as he or she may establish for the housing and feeding of the laborers, employed by him or her for the Work, in accordance with the status and general health laws of the State of California pertaining to the sanitation of dwelling and camps and in conformity with such rules and regulations pertaining to labor camps, as have been or may hereafter be prescribed by the State Board of Health or by the Commission of Emigration and Housing of California acting in conjunction with said State Board of Health.

12-1.16 Protection And Restoration Of Vegetation. Trees, lawns, shrubbery and vegetation that are not to be removed must be protected from damage or injury. Existing trees, shrubs, and other plants, that are not to be removed and are injured or damaged by reason of the Contractor's operations, must be replaced by the Contractor in accordance with the requirements in Section 20-3.01C(4), "Replacement Plants", of the Caltrans Standard Specifications. Section 20-3.01C(4) of the Caltrans Standard Specifications is made a part of this Agreement.

When it is necessary to excavate adjacent to existing trees, shrubs, or hedges, the Contractor must use all possible care to avoid injury to the trees, shrubs, or hedges and their roots. No roots or limbs two inches (2") or larger in diameter may be cut without the express approval of the Engineer.

All roots two inches (2") in diameter and larger left in place must be wrapped with burlap to prevent scarring or excessive drying. When it is necessary to cut limbs and branches of trees to provide clearance for equipment used in construction, the Contractor must repair the damaged areas by properly painting with an emulsified asphalt type seal. All cuts through 1/2" or larger roots and limbs must be hand trimmed and cleanly cut before being repaired.

12-2.01 Cultural Resources. In accordance with the National Historic Preservation Act of 1966 (U.S.C. 470), the following procedures are implemented to insure historic preservation and fair compensation to the Contractor for delays attendant to the cultural resources investigation. Contractor hereby agrees to comply with these procedures.

12-2.02 Surplus Material. All material removed or excavated during the course of construction will be surplus. All surplus material will be the property of the Contractor and be disposed of outside the right-of-way, unless the City elects to salvage certain objects that are determined to be of historical interest. The City reserves the right of ownership of all objects that it elects to salvage, and the Contractor must protect such objects from subsequent damage until delivered unto the care of the owner.

12-2.03 Historical Finds. In the event potential historical, architectural, archeological, or cultural resources (hereinafter called cultural resources) are discovered during subsurface excavations at the site of construction, the following procedures will apply:

1. The Contractor must immediately notify the Engineer and stop any Work which may jeopardize the find pending an investigation of its significance;
2. The Engineer will select a qualified archeologist (such as through the Northwest Information Center at Sonoma State University or other official contact) and wait for an archaeologist to complete an evaluation of significance before continuing Work in that area.
3. The Engineer will supply the Contractor with a "Stop Work Order" directing the Contractor to cease all portions of the Work that the Engineer determines may impact the find. The "Stop Work Order" will be effective until a qualified archaeologist assesses the value of the potential cultural resources. The "Stop Work Order" will contain the following:
 - a. A clear description of the Work to be suspended;
 - b. Any instructions regarding issuance of further orders by the Contractor for materials services;
 - c. Guidance as to action to be taken regarding subcontractors;
 - d. Any direction to the Contractor to minimize costs; and
 - e. Estimated duration of the temporary suspension.
4. If the archaeologist determines the potential find is a bona fide cultural resource, the Engineer may extend the duration of the "Stop Work Order" in writing, and if so the "Stop Work Order" will remain in effect and Work subject to the "Stop Work Order" may not resume work until authorized by the Engineer.

12-2.04 Cultural Resources Defined. Possible indicators that a cultural resource has been found include, but are not limited to the following:

1. Prehistoric-era archaeological site indicators: obsidian tools, tool manufacture waste flakes, grinding and other implements, dwelling sites, animal or human bones, fossils, and/or locally darkened soil containing dietary debris such as bone fragments and shellfish remains.
2. Historic-era site indicators: ceramic, glass, and/or metal.

12-2.05 Engineer's Discretion. Once possible cultural resources are found at the Work site, the Engineer may use discretion to continue the work, regardless of the cultural resource find, if the Engineer determines that there are overriding considerations such as the instability of the excavation site, that there are weather or other conditions which would preclude leaving the site exposed, or if the site would be unsafe to workers who would retrieve cultural resource items from therein.

SECTION 13 Safety Rules and Requirements

13-1.01 General

- a. Within ten (10) working days following notice of award the Contractor must submit to the City a safety program for the Work site ("Contractor's Safety Program") and provide evidence that the Contractor's safety policies and procedures relevant to the Work.
- b. The Contractor shall insure that its employees and subcontractors, as well as visitors and others brought onto the Work site under the authority of the Contractor, shall, at all times, observe all applicable Local, State and Federal safety requirements as well as the safety rules and requirements contained in this Contract including, but not limited to, the Contractor's Safety Program.
- c. In accordance with generally accepted construction practices and applicable law, the Contractor will be solely and completely responsible for conditions at the Work site, including safety of all persons and property during performance of the Work. This requirement will apply continuously and not be limited to normal working hours. For purposes of California Labor Code Section 6400 and related provisions of law, the Contractor and the Contractor's privities and any other entities engaged in the performance of the Work will be "employers" responsible for furnishing employment and a place of employment that is safe and healthful for all employees of any such entities engaged in the performance of the Work. Neither the City nor its officials, officers, employees, agents, volunteers or consultants will be "employers" pursuant to California Labor Code Section 6400 and related provisions of law with respect to the Contractor, the Contractor's privities or other entities engaged in the performance of the Work.
- d. The Contractor agrees with respect to the Work, and the Work site, the Contractor will be responsible for not creating hazards and for having hazards corrected and/or removed, for taking appropriate, feasible steps to protect the Contractor's employees from such hazards and that the Contractor has instructed and/or will instruct its employees to recognize such hazards and how to avoid the associated dangers.
- e. The Contractor will be solely responsible for the implementation and maintenance of safety programs to ensure that the Work site is maintained and the Work is performed in a safe manner in accordance with the Contract and applicable law. If the Contractor damages City equipment or property, the Contractor shall report the incident to the Engineer on or before the next calendar day and provide such information as necessary for the City to evaluate the damage.
- f. The Contractor shall submit a written request to the Engineer in order to obtain keys or other devices to gain access to City facilities. Keys and other devices shall not be copied or otherwise replicated and shall remain in the possession of

the Contractor and its employees or subcontractors at all times and shall be returned to the City when no longer required to complete the Work.

- g. The Contractor must furnish and place proper guards and systems for the prevention of accidents, including, but not limited to, those systems required pursuant to Title 8, Section 1670 et seq. of the California Code of Regulations concerning safety belts and nets. The Contractor must provide and maintain any other necessary systems or devices required to secure safety of life or property at the Work site in accordance with accepted standards of the industry and applicable law. The Contractor must maintain during all night hours sufficient lights to prevent accident or damage to life or property.
- h. Examination, inspection, investigation, and review by the City and or its employees and representatives, of the Contractor's Safety Plan or the Contractor's performance of the Work will not constitute review or approval of the adequacy of the Contractor's safety measures in, on, or near the Work site and shall not relieve the Contractor of any of the Contractor's obligations under the Contract and applicable law to ensure that the Work site is maintained and the Work is performed in a safe manner.

13-1.02 Safety Supervisor; Hazardous Substances

- a. The Contractor shall designate an individual who is qualified and authorized to supervise and enforce compliance with the Contractor's Safety Program ("Safety Supervisor"). The Contractor shall notify the Engineer in writing prior to the commencement of the Work of the name and contact information of the Safety Supervisor. The Safety Supervisor shall be either a full-time employee of the Contractor or a contracted safety consultant with experience and/or professional certifications indicating experience in construction safety. The Safety Supervisor shall provide the City, upon request, with weekly safety inspection reports identifying hazards found and corrective actions taken. The Safety Supervisor shall also be responsible for supervising compliance with applicable safety requirements on the Work site and to develop and implement safety training for all job personnel. The City shall have the authority, but not the duty, to require the Contractor replace the Safety Supervisor if the Supervisor's performance is judged by the City to be improper or inadequate.

13-1.03 Non-Compliance with Safety Rules and Regulations

- a. In the event the Contractor fails to comply with applicable Local, State and Federal safety requirements, or the safety rules and requirements contained in this Contract including the provisions of the Contractor's Safety Plan, the City reserves the right to (i) notify the Contractor of its failure to comply, and the reasons therefore, and require that the Contractor immediately undertake, at Contractor's own expense, all actions necessary to bring the Contractor and/or the Project into compliance and (ii) exercise the right to suspend all or part of the Work if the Contractor fails or refuses to undertake and complete such corrective action within the time specified in the notice.

- b. No extension of time or additional compensation will be granted as a result of any suspension of the Work and any issuance by the City of any notice or suspension order shall not operate to waive or otherwise diminish the (i) Contractor's obligations under this Contract to provide a safe Work site or (ii) City's right to pursue or enforce any remedy, power or right under the Contract or otherwise available at law.

13-1.04 Accidents and Safety Emergencies

- a. In accidents or emergencies affecting the safety or protection of persons, the Work, the Work site, or property adjacent thereto, the Contractor shall immediately act to prevent threatened damage, injury or loss and notify the Engineer as soon as possible of the facts and circumstances surrounding the emergency including the involvement of any emergency responders (police, fire, medical, etc.).
- b. The City reserves the right to conduct an investigation of the accident or emergency either in conjunction with, or separate of, the Contractor, and the Contractor shall provide the City all access necessary to permit the City to perform a full and complete investigation, the scope of which shall be at the sole discretion of the City.
- c. Within 24 hours of accidents or emergencies involving in-patient hospitalization or a fatality, the Contractor shall provide the Engineer with a completed Contractor's Injury/Fatality Incident Report (*form(s) provided at Project's Pre-Construction meeting*). The Contractor shall also notify the Engineer in writing of any claims brought against the Contractor, or any subcontractor, judicial or otherwise, related to any such injuries and/or fatalities including a copy of such claim(s).

PART 3 SPECIFICATIONS

SECTION 022301

CLEARING AND GRUBBING.

PART 1 - GENERAL

Clearing and grubbing shall conform to the provisions in Section 16, "Clearing and Grubbing," of the Standard Specifications and these Special Provisions.

This work generally includes removal and disposal of all existing improvements and facilities within the work area, which removal is either shown on the drawings or required for the installation of a new improvement shown on the plans.

PART 2 – PRODUCTS

PART 3 - EXECUTION

All topsoil encountered shall be stripped prior to any grading activities, and stockpiled for reuse on site, or completely removed if deemed unsuitable for reuse in the work, and shall not be combined with any other material generated from demolition or grading activities.

Tree roots shall be ground to 3 feet below the finish grade, and all voids as a result of tree and bush removal shall be backfilled and compacted to 90% minimum relative compaction.

Where concrete removal is adjacent to existing trees, care shall be taken to protect the roots. All root pruning, if required, shall create a clean and precise cut on the tree side. No tearing or ripping of roots from the tree will be allowed. Acceptable equipment may include stump grinders, trenchers, chain saws, or other pre-approved equipment which achieves a clean and precise cut. Tearing roots from the ground followed by clean cutting will not be accepted. No sealer is to be used on cut roots. If cut roots are to be exposed to sunlight for more than 24 hours, they shall be temporarily protected by a single layer of wet burlap and maintained in a wet condition until permanently covered by soil or concrete.

The Contractor shall restore at his/her expense all landscaping, irrigation lines, miscellaneous concrete and/or other item of work to preconstruction status, in like kind or better, damaged by his/her operations. All activities controlled by the Contractor, except cleanup or other required work, shall be confined to the project site.

Nothing herein shall be construed as relieving the Contractor of his responsibility for final cleanup of the highway as provided in Section 4-1.02, "Final Cleaning Up," of the Standard Specifications.

All limits of removals shall be checked by the contractor and verified by the Engineer prior to any demolition activities. Any discrepancies between that which is shown on the drawings, and encountered in the field, or any conflicts between existing items and proposed shall be brought to the Engineer's attention immediately.

END SECTION 022301

SECTION 023101

EARTHWORK

PART 1 - GENERAL

Attention is called to the possibility of inclement weather conditions from the months of October through April. The Contractor shall be aware of these conditions while doing subgrade work during this time. No earthworks activities will be permitted during unfavorable weather conditions, and work shall not be allowed to resume until such time as the Engineer determines the site is in a condition suitable for resumption of the grading work.

PART 2 – PRODUCTS

Select Fill material shall consist of clean, well-graded soil with little or no potential for expansion. The material shall have a plasticity index of 15 percent or less, and a maximum liquid limit of 40 percent. Select Fill shall be approved by the Engineer prior to incorporation into the work.

Bedding material shall be used under the footings and concrete structures and shall be ¾-inch clean, crushed rock.

Structure backfill shall conform to Section 19-3.06 of the Standard Specifications.

PART 3 - EXECUTION

The Contractor shall conduct his operations so as to minimize the development of unstable subgrade areas. Specifically, the Contractor shall limit hauling to certain areas of the roadway and, if necessary, use a tractor instead of rubber-tire loading equipment. Hauling shall be done away from the work areas on unexcavated old pavement, constructed asphalt base, or on firm stabilized subgrade as approved by the Engineer.

If objectionable material is encountered after subgrade has been excavated and said material is determined to be unsuitable by the Engineer, the Contractor shall excavate, remove, and dispose of the material from the job site. The horizontal and vertical limits shall be as determined by the Engineer.

Compaction equipment or methods, which may cause displacement or may damage structures, shall not be used.

Full compensation for controlling and removing water from excavations and for furnishing and installing or constructing all cofferdams and all other facilities necessary to the operations and their subsequent removal shall be considered as included in the work, and no additional compensation shall be allowed therefore.

Selected excavated material, as approved by the Engineer, can be used for fill as embankment and shall comply with Section 19-2.06, "Surplus Material," and Section 19-2.07, "Selected Material," of the Standard Specifications. The Contractor shall satisfy himself that there is sufficient material available for the completion of the embankments before disposing of any material inside or outside the right of way. Any shortage of material by the Contractor shall be replaced by him and no compensation will be allowed the Contractor for such replacement. It is anticipated that on-site soils, with the exception of topsoil, will be suitable for re-use as general fill in areas not requiring Select Fill. Any lumps larger than 6" should be removed from the general fill prior to being incorporated back in the work.

Excavation for trenches and utility work shall conform the project plans and details, and the standards of the respective utility company listed as having authority over the work. Notwithstanding the above noted

provisions, trenches shall not be constructed in such a manner as to prevent adequate pipe installation or backfill compaction.

Compaction shall conform to Section 19-5 of the Standard Specifications.

The backfill shall not be placed until the structure footings or other portions of the structure have been inspected by the Engineer and approved for backfilling.

Whenever muddy wet material is hauled on paved streets, watertight trucks will be required.

END SECTION 023101

SECTION 025301

SANITARY SEWER

PART 1 - GENERAL

This work consists of furnishing all labor, materials, tools, equipment and incidental work necessary to build, test, clean and inspect gravity sewer facilities.

PART 2 – PRODUCTS

Gravity sewer pipe and fittings shall be PVC conforming to AWWA C900 Class 150, DR18 with integral bell gasket joints. Rubber gaskets shall be factory installed and conform to ASTM D3212. Submit for approval all materials proposed to be incorporated in the work prior to having said materials delivered to site.

Contractor shall install one-way cleanouts where shown on the plans. Cleanouts shall be per City of Sebastopol Water & Wastewater Standards. Clean outs shall be installed such that the cover is flush with the finished grade at the clean out location.

All connections to existing sewers shall be with suitable, approved adapters, and the work shall include all fittings and modifications required to complete an approved connection to the satisfaction of the City of Sebastopol Water & Wastewater Department.

PART 3 – EXECUTION

It shall be the contractor's responsibility to coordinate the supervision, construction, completion and acceptance of the sewer work with the City of Sebastopol Water & Wastewater. All work shall be in accordance with the City of Sebastopol Water & Wastewater Standard Specifications and Drawings and the project plans and specifications.

The Contractor shall test, in the presence of the City of Sebastopol Water & Wastewater all new sewer lines, including laterals installed with this project. The test may be air or water to the City of Sebastopol Water & Wastewater standards, and shall be successfully completed prior to paving any sewer trenches.

END SECTION 025301

SECTION 027701

MISCELLANEOUS CONCRETE CONSTRUCTION

PART 1 - GENERAL

PART 2 – PRODUCTS

All miscellaneous concrete shall be State Class B-6 sack mix with 1" maximum aggregate and shall contain 2 pounds of lamp black or approved equal per cubic yard.

Where steel reinforcement is called for, reinforcement shall conform to the provisions in Section 52 of the Standard Specifications and shall be Grade 60.

PART 3 - EXECUTION

The Contractor shall be required to use whatever grade-setting methods that are necessary, such as grades surveyed by instrument, to achieve results as shown on the plans and to maintain drainage.

No concrete shall be poured until formwork is checked by City Inspector or Engineer. The Contractor shall bring to the attention of the City Inspector or Engineer any proposed concrete work that will result in grades flatter than 0.5%, or which may lead to poor drainage prior to concrete pour. The Contractor shall be fully responsible for removal and replacement of any concrete work that results in water ponding or impedes drainage.

If the Contractor elects to use the curing compound method for curing the concrete for miscellaneous concrete construction, the curing compound shall be the clear or translucent type containing a fugitive dye conforming to the specifications of AASHTO Designation M 148, Type 1-D, except that the loss of water in the water retention test shall not exceed 0.040 gram per square centimeter of surface. The curing compound shall be applied at the approximate rate of 1 gallon per 150 square feet of area.

The curing compound shall be applied in a manner that will provide a complete coating of all exposed faces of the concrete surface.

Existing improvements not limited to hedges, plantings, fences, irrigation, signs, non-structural walls, etc that are in conflict with the proposed driveway / sidewalk/ curb installation shall be removed and replaced (or trimmed, where appropriate) , by the Contractor, behind the subject concrete work to accommodate the new improvements.

Replacement concrete work within the public right-of-way and not connected to the building does not require the excavation below subgrade specified for the work adjacent to the building. However, in these locations, where subgrade is removed as a result of the Contractor's concrete demolition operations, the subgrade shall be replaced with Class 2 aggregate base or Portland cement concrete. All replacement concrete work installed within the City right-of-way shall be doweled into new site concrete work per the construction joint details on the plans.

END SECTION 027701

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Footings.
 - 2. Foundation walls.
 - 3. Concrete toppings.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Welding certificates.
- E. Qualification Data: For Installer, manufacturer, testing agency.
- F. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

G. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Curing compounds.
6. Floor and slab treatments.
7. Bonding agents.
8. Adhesives.
9. Vapor retarders.
10. Semirigid joint filler.
11. Joint-filler strips.
12. Repair materials.

H. Field quality-control test and inspection reports.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- C. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code-Reinforcing Steel."
- D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Products: Subject to compliance with requirements, provide one of the products specified.
 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- E. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- F. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- G. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
 2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of pre-consumer recycled content is not less than 25 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

2.4 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut bars true to length with ends square and free of burrs.
- B. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.
- C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
 - 3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.5 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type II: Use the following cementitious materials, of the same type, brand, and source, throughout the project;
 - a. Fly Ash: ASTM C 618, Class F.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3 Coarse aggregate or better, graded. Provide aggregates from a single source[with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials].
 - 1. Maximum Coarse-Aggregate Size: Varies, 1 inch (25 mm), 3/4 inch (19 mm) nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

- C. Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.
 - 1. Products:
 - a. Boral Material Technologies, Inc.; Boral BCN.
 - b. Euclid Chemical Company (The); Eucon CIA.
 - c. Grace Construction Products, W. R. Grace & Co.; DCI.
 - d. Master Builders, Inc.; Rheocrete CNI.
 - e. Sika Corporation; Sika CNI.
- D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
 - 1. Products:
 - a. Axim Concrete Technologies; Catexol 1000CI.
 - b. Boral Material Technologies, Inc.; Boral BCN2.
 - c. Cortec Corporation; MCI [2000] [2005NS].
 - d. Grace Construction Products, W. R. Grace & Co.; DCI-S.
- E. Plastic Vapor Retarder: ASTM E 1745, Class C. Include manufacturer's recommended adhesive or pressure-sensitive tape.
- F. Pea Gravel: 3/8-inch diameter smooth pit or river run rock.

2.7 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products:
 - a. Axim Concrete Technologies; Cimfilm.
 - b. Burke by Edoco; BurkeFilm.
 - c. ChemMasters; Spray-Film.
 - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. Products:
 - a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
 - b. Burke by Edoco; Aqua Resin Cure.
 - c. ChemMasters; Safe-Cure Clear.
 - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; W.B. Resin Cure.
- G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating.
- H. Products:
 - a. Anti-Hydro International, Inc.; AH Clear Cure WB.
 - b. Burke by Edoco; Spartan Cote WB II.
 - c. ChemMasters; Safe-Cure & Seal 20.
 - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Cure and Seal WB.
- I. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
- J. Products:
 - a. Burke by Edoco; Spartan Cote WB II 20 Percent.
 - b. ChemMasters; Safe-Cure Clear.
 - c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; High Seal.
 - d. Dayton Superior Corporation; Safe Cure and Seal (J-19).
- K. : ASTM C 1315, Type 1, Class A.

1. Products:

- a. Burke by Edoco; Cureseal 1315.
- b. ChemMasters; Spray-Cure & Seal Plus.
- c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315.
- d. Dayton Superior Corporation; Day-Chem Cure and Seal (J-22UV).

J. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Products:

- a. Burke by Edoco; Cureseal 1315 WB.
- b. ChemMasters; Polyseal WB.
- c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315 WB.
- d. Euclid Chemical Company (The); Super Diamond Clear VOX.

2.8 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, [epoxy resin with a Type A shore durometer hardness of 80 aromatic polyurea with a Type A shore durometer hardness range of 90 to 95 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Use fly ash, and pozzolan, as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
 2. Combined Fly Ash and Pozzolan: 25 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to **0.06** percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 3000 psi (20.7 MPa) < at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.45
 3. Slump Limit: 4 inches (100 mm) plus or minus 1 inch (25 mm).
 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch (25-mm), 3/4-inch (19-mm)] nominal maximum aggregate size.
- B. Foundation Walls: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.
 2. Maximum Water-Cementitious Materials Ratio 0.45.
 3. Slump Limit: 4 inches (100 mm)] plus or minus 1 inch (25 mm).
 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch (25-mm), 3/4-inch (19-mm)] nominal maximum aggregate size.
- C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.
 2. Minimum Cementitious Materials Content: [470 lb/cu. yd. (279 kg/cu. m)
 3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
 4. Air Content: [6] <Insert number> percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm)] nominal maximum aggregate size.
 5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
- D. Concrete Toppings: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.
 2. Minimum Cementitious Materials Content: 470 lb/cu. yd. (279 kg/cu. m).
 3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
 4. Air Content: Do not allow air content of troweled finished toppings to exceed 3 percent.

2.11 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M[and ASTM C 1116], and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch (6 mm) < for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.

- J. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- K. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- L. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- M. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.

3.3 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
- B. Granular Course: Cover vapor retarder on soil with 2 inches of pea gravel.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperature.
- F. res.
 - 1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301 and as follows:
 - 1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FINISHING FORMED SURFACES

- A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view.
- B. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

3.9 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations
- C. slightly rounded.

3.10 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least **12 inches (300 mm)**, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project..
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.
5. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.11 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 1. Defer joint filling until concrete has aged at least **[one] [six]** month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.12 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.
- C. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.
 - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 - 5. .
 - 6. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - 7. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 - 8. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- D. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
 - 1. Steel reinforcement placement.
 - 2. Steel reinforcement welding.
 - 3. Headed bolts and studs.
 - 4. Verification of use of required design mixture.
 - 5. Concrete placement, including conveying and depositing.
 - 6. Curing procedures and maintenance of curing temperature.
 - 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
 - 2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
 - 6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 7. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
 - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
12. Nondestructive Testing
13. : Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
14. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
15. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
16. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.

END OF SECTION 033000

SECTION 061000

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Framing with dimension lumber.
 - 2. Framing with engineered wood products.
 - 3. Wood blocking, cants, and nailers.
 - 4. Wood furring and grounds.
- B. Related Sections include the following:
 - 1. Division 06 Section "Sheathing."

1.3 DEFINITIONS

- A. Exposed Framing: Framing not concealed by other construction.
- B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.
- C. Timber: Lumber of 5 inches nominal (114 mm actual) or greater in least dimension.
- D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NLGA: National Lumber Grades Authority.
 - 2. RIS: Redwood Inspection Service.
 - 3. WCLIB: West Coast Lumber Inspection Bureau.
 - 4. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 3. For fire-retardant treatments specified to be High-Temperature (HT) type, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
- B. Fastener Patterns: Full-size templates for fasteners in exposed framing.
- C. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- D. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
1. Wood-preservative-treated wood.
 2. Engineered wood products.
 3. Metal framing anchors.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Engineered Wood Products: Obtain each type of engineered wood product through one source from a single manufacturer.
- B. Forest Certification: For the following wood products, provide 70% of materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":
1. Dimension lumber framing.
 2. Timber.
 3. Laminated-veneer lumber.
 4. Rim boards.
 5. Miscellaneous lumber.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 4. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPAC2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPAC31 with inorganic boron (SBX)].
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat all rough carpentry, unless otherwise indicated. Items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.

4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

- A. Maximum Moisture Content: 15 percent (Kiln dried) for all studs, blocking, nailers, etc to be used in all existing walls, floors and attic spaces. 19 percent for 2-inch nominal (38-mm actual) thickness or less, 15 percent for more than 2-inch nominal (38-mm actual) thickness, 15 percent for 2-inch nominal (38-mm actual) thickness or less.
- B. Exterior and Load-Bearing Walls: No. 1 grade and of the following species:
 1. Hem-fir (north); NLGA.
 2. Douglas fir-south; WWPA.
 3. Hem-fir; WCLIB or WWPA.
 4. Douglas fir-larch (north); NLGA.
- C. Joists, Rafters, and Other Framing Not Listed Above: No. 1 grade and the following species:
 1. Hem-fir (north); NLGA.
 2. Douglas fir-larch; WCLIB or WWPA.
 3. Douglas fir-south; WWPA.
 4. Hem-fir; WCLIB or WWPA.
 5. Douglas fir-larch (north); NLGA.
- D. Joists, Rafters, and Other Framing Not Listed Above: Any species and grade with a modulus of elasticity of at least 1,500,000 psi (10 350 MPa) and an extreme fiber stress in bending of at least 1000 psi (6.9 MPa) for 2-inch nominal (38-mm actual) thickness and 12-inch nominal (286-mm actual) width for single-member use.
- E. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research/evaluation report for I-joists.
 1. Manufacturer: Provide products by same manufacturer as I-joists.
 2. Material: All-veneer product, glued-laminated wood or product made from any combination solid lumber, wood strands, and veneers. Provide rim boards made without urea formaldehyde.
 3. Provide performance-rated product complying with APA PRR-401, rim board grade, factory marked with APA trademark indicating thickness, grade, and compliance with APA standard.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 1. Blocking.
 2. Nailers.
 3. Cants.

4. Furring.
 5. Grounds.
- B. For items of dimension lumber size, provide No. 2 grade lumber with 15 percent maximum moisture content of any species.
- C. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber with 15 percent maximum moisture content and[any of] the following species:
1. Hem-fir (north); NLGA.
 2. Hem-fir; WCLIB, or WWPA.
 3. Western woods; WCLIB or WWPA.
 4. Northern species; NLGA.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M] [of Type 304 stainless steel].
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- D. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- E. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

2.6 METAL FRAMING ANCHORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Products: Subject to compliance with requirements, provide products indicated on Drawings or comparable products by one of the following:
 - 1. Alpine Engineered Products, Inc.
 - 2. Cleveland Steel Specialty Co.
 - 3. Harlen Metal Products, Inc.
 - 4. KC Metals Products, Inc.
 - 5. Simpson Strong-Tie Co., Inc.
 - 6. Southeastern Metals Manufacturing Co., Inc.
 - 7. USP Structural Connectors.
- D. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of basis-of-design products of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- E. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 - 1. Use for interior locations where stainless steel is not indicated.
- F. Stainless-Steel Sheet: ASTM A 666, Type 304 or 316.
 - 1. Use for exterior locations and where indicated.

2.7 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- C. Flexible Flashing: Self-adhesive, rubberized-asphalt compound, bonded to a high-density, polyethylene film to produce an overall thickness of not less than 0.025 inch (0.6 mm).
- D. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- D. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.
- E. Do not splice structural members between supports, unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than **16 inches (406 mm)** o.c.
- G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than **96 inches (2438 mm)** o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than **96 inches (2438 mm)** o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and **2-inch nominal- (38-mm actual-)** thickness.
 - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than **100 sq. ft. (9.3 sq. m)** and to solidly fill space below partitions.
 - 4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than **20 feet (6 m)** o.c.
- H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.

2. Use copper naphthenate for items not continuously protected from liquid water.
- J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 1. NES NER-272 for power-driven fasteners.
 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's Uniform Building Code.
 4. Table 2305.2, "Fastening Schedule," in BOCA's BOCA National Building Code.
 5. Table 2306.1, "Fastening Schedule," in SBCCI's Standard Building Code.
 6. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 7. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in ICC's International One- and Two-Family Dwelling Code.
- K. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.2 WOOD GROUND, SLEEPER, BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for screeding **or** attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.
- C. Where wood-preserved-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- D. Provide permanent grounds of dressed, pressure-preserved-treated, key-beveled lumber not less than **1-1/2 inches (38 mm)** wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.4 WALL AND PARTITION FRAMING INSTALLATION

- A. General: Provide single bottom plate and double top plates using members of 2-inch nominal (38-mm actual) thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions[and for load-bearing partitions where framing members bearing

on partition are located directly over studs]. Fasten plates to supporting construction, unless otherwise indicated.

1. For exterior walls, provide [2-by-6-inch nominal- (38-by-140-mm actual-)] [2-by-4-inch nominal- (38-by-89-mm actual-)] size wood studs spaced [24 inches (610 mm)] [16 inches (406 mm)] [600 mm] [400 mm] o.c., unless otherwise indicated.
 2. For interior partitions and walls, provide [2-by-6-inch nominal- (38-by-140-mm actual-)] [2-by-4-inch nominal- (38-by-89-mm actual-)] [2-by-3-inch nominal- (38-by-64-mm actual-)] size wood studs spaced [24 inches (610 mm)] [16 inches (406 mm)] [600 mm] [400 mm] o.c., unless otherwise indicated.
 3. Provide continuous horizontal blocking at midheight of partitions more than 96 inches (2438 mm) high, using members of 2-inch nominal (38-mm actual) thickness and of same width as wall or partitions.
- B. Construct corners and intersections with three or more studs[, except that two studs may be used for interior non-load-bearing partitions].
- C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.
1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal (89-mm actual) depth for openings 48 inches (1200 mm) and less in width, 6-inch nominal (140-mm actual) depth for openings 48 to 72 inches (1200 to 1800 mm) in width, 8-inch nominal (184-mm actual) depth for openings 72 to 120 inches (1800 to 3000 mm) in width, and not less than 10-inch nominal (235-mm actual) depth for openings 10 to 12 feet (3 to 3.6 m) in width.
 2. For load-bearing walls, provide double-jamb studs for openings 60 inches (1500 mm) and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated[or, if not indicated, according to Table R502.5(1) or Table R502.5(2), as applicable, in ICC's International Residential Code for One- and Two-Family Dwellings].

3.5 CEILING JOIST AND RAFTER FRAMING INSTALLATION

- A. Ceiling Joists: Install ceiling joists with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.
1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal- (19-by-184-mm actual-) size or 2-by-4-inch nominal- (38-by-89-mm actual-) size stringers spaced 48 inches (1200 mm) o.c. crosswise over main ceiling joists.
- B. Rafters: Notch to fit exterior wall plates and[**toe nail or**] use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against valley rafters.

2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and **2 inches (50 mm)** deeper. Bevel ends of jack rafters for full bearing against hip rafter.
- C. Provide collar beams (ties) as indicated or, if not indicated, provide **1-by-6-inch nominal- (19-by-140-mm actual-)** size boards between every third pair of rafters, but not more than **48 inches (1219 mm)** o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.
- D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions, if any.

3.6 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 061600

SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Wall sheathing.
 - 2. Roof sheathing.
 - 3. Underlayment.
 - 4. Weather Resistive Barrier (Building wrap).
 - 5. Self Adhered (Flexible) Flashings - SAF.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry, Miscellaneous Rough Carpentry" for plywood backing panels.
 - 2. Division 07 Section "Insulation" for weather resistive barrier used on the inside of existing exterior wood siding.
 - 3. Division 8 Sections for exterior doors and windows for special considerations and procedures for flashing.

1.3 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preserved treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. For building wrap, include data on air-/moisture-infiltration protection based on testing according to referenced standards.

1.4 QUALITY ASSURANCE

- A. Forest Certification: For the following wood products, provide minimum 70% materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":

1. Plywood.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL

- A. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
- B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- C. Factory mark panels to indicate compliance with applicable standard.

2.2 WALL SHEATHING

- A. Plywood Wall Sheathing: Exterior, Structural I.

2.3 ROOF SHEATHING

- A. Plywood Roof Sheathing: Exterior, Structural I sheathing.
 1. Span Rating: Not less than 24/0 .
 2. Nominal Thickness: Not less than 1/2 inch (13 mm).

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 150r or of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.

- E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
 - 1. For wall and roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
- F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
 - 1. For steel framing less than 0.0329 inch (0.835 mm) thick, attach sheathing to comply with ASTM C 1002.
 - 2. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, attach sheathing to comply with ASTM C 954.
- G. Screws for Fastening Oriented-Strand-Board-Surfaced, Polyisocyanurate-Foam Sheathing to Metal Roof Deck: Steel drill screws, in type and length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117. Provide washers or plates if recommended by sheathing manufacturer.

2.5 WEATHER-RESISTIVE BARRIER

- A. Building Wrap: ASTM E 1677, Type I air retarder; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Chemical Company (The); Styrofoam Weathermate Plus Brand Housewrap.
 - b. DuPont (E. I. du Pont de Nemours and Company); Tyvek CommercialWrap.
 - c. Pactiv, Inc.; GreenGuard Ultra Wrap.
 - d. Reemay, Inc.; Typar HouseWrap.
- B. Building-Wrap Tape for weather resistive barrier seams: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.6 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.
 - 1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- B. Self Adhered (Flexible) Flashing - SAF: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.025 inch (0.6 mm).
 - 1. Products: Subject to compliance with requirements and acceptance by weather resistive barrier manufacturer, provide one of the following:
 - a. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
 - b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Vycor Plus Self-Adhered Flashing.
 - c. MFM Building Products Corp.; Window Wrap.
 - d. Polyguard Products, Inc.; Polyguard 300.
 - e. Protecto Wrap Company; BT-20 XL.
- C. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
 - 3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's "Uniform Building Code."
 - 4. Table 2305.2, "Fastening Schedule," in BOCA's "BOCA National Building Code."
 - 5. Table 2306.1, "Fastening Schedule," in SBCCI's "Standard Building Code."
 - 6. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."
 - 7. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in ICC's "International One- and Two-Family Dwelling Code."
- D. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30S, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Wall and Roof Sheathing:
 - a. Nail to wood framing
 - 2. Underlayment:
 - a. Nail to subflooring.
 - b. Space panels 1/32 inch (0.8 mm) apart at edges and ends.
 - c. Fill and sand edge joints of underlayment receiving resilient flooring right before installing flooring.

3.3 WEATHER-RESISTIVE BARRIER INSTALLATION

- A. General: All new exterior cladding shall be applied over weather-resistive barrier.
 - 1. Cut back barrier 1/2 inch (13 mm) on each side of the break in supporting members at expansion- or control-joint locations.
 - 2. Apply barrier to cover vertical flashing with a minimum 4-inch (100-mm) overlap, unless otherwise indicated.
- B. Building Wrap: Comply with manufacturer's written instructions.
 - 1. Seal seams, edges, fasteners, and penetrations with tape (self-adhered flashing – SAF).

3.4 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturers written instructions.
 - 1. Prime substrates as recommended by flashing manufacturer.
 - 2. Lap seams and junctures with other materials at least 4 inches (100 mm), except that at flashing flanges of other construction, laps need not exceed flange width.
 - 3. Lap flashing over weather-resistive barrier at bottom and sides of openings.
 - 4. Lap weather-resistive barrier over flashing at heads of openings.
 - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

B. Penetrations

1. Fully integrate window, door, louver and other wall penetration installation with weather resistive barrier and flexible flashings for an installation that is waterproof if tested according to ASTM E 1105 at 6 lbs/sf prior to installation of exterior cladding. See window, door and louver specification sections for additional information.

END OF SECTION 061600

SECTION 062013

EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Exterior standing and running trim.
 - 2. Lumber siding.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
 - 2. Division 06 Section "Sheathing" for weather resistive barriers and flexible flashings.

1.3 DEFINITIONS

- A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NLGA: National Lumber Grades Authority.
 - 2. RIS: Redwood Inspection Service.
 - 3. WCLIB: West Coast Lumber Inspection Bureau.
 - 4. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
- B. Samples for Initial Selection: For each type of siding indicated.
- C. Samples for Verification:

1. For each species and cut of lumber and panel products, with 1/2 of exposed surface finished; 50 sq. in. (300 sq. cm) for lumber and 8 by 10 inches (200 by 250 mm) for panels.

1.5 QUALITY ASSURANCE

- A. Forest Certification: For the following w
- B. ood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":
 1. Exterior standing and running trim.
 2. Exterior lumber siding.
 3. Exterior plywood soffits.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials against weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation within and around stacks and under temporary coverings.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC's Board of Review.
 1. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
 2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.

- B. Softwood Plywood: DOC PS 1.

2.2 STANDING AND RUNNING TRIM

- A. Lumber Trim for Painted Finish:

1. Species and Grade: Redwood, Clear; RIS.
2. Species and Grade: Western red cedar, Grade A; NLGA, WCLIB, or WWP.
3. Maximum Moisture Content: 19percent with at least 85 percent of shipment at 12 percent or less.
4. Finger Jointing: Not allowed.
5. Face Surface: Surfaced (smooth).

- B. Moldings for Painted Finish: WMMPA WM 4, P-grade wood moldings. Made from kiln-dried stock to patterns included in WMMPA WM 12.

1. Species: Redwood or Western red cedar .
2. Finger Jointing: Not allowed.

2.3 LUMBER SIDING

- A. Provide kiln-dried lumber siding complying with DOC PS 20.
- B. Species and Grade: Clear All Heart redwood; RIS.
- C. Species and Grade: Grade A western red cedar; NLGA, WCLIB, or WWP.
- D. Pattern: Match existing.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.
 1. For face-fastening siding, provide ringed-shank siding nails unless hot-dip galvanized nails are used.
 2. For redwood and cedar, provide stainless-steel fasteners.
 3. For pressure-preservative-treated wood, provide stainless-steel fasteners.
 4. For applications not otherwise indicated, provide stainless-steel, hot hot-dip galvanized steel or aluminum fasteners.
- B. Wood Glue: Waterproof resorcinol glue recommended by manufacturer for exterior carpentry use.
- C. Flashing: Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim" for flashing materials installed in exterior finish carpentry.
- D. Insect Screening for Soffit Vents: Stainless steel, 18-by-18 (1.4-by-1.4-mm) mesh.

1. Net Free Area: 4 sq. in./linear ft. (280 sq. cm/m) .
2. Finish: Mill finish .

2.5 FABRICATION

- A. Back out or kerf backs of standing and running trim wider than 5 inches (125 mm), except members with ends exposed in finished work.
- B. Ease edges of lumber less than 1 inch (25 mm) in nominal thickness to 1/16-inch (1.5-mm) radius and edges of lumber 1 inch (25 mm) or more in nominal thickness to 1/8-inch (3-mm) radius.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Prime lumber to be painted, including both faces and edges. Cut to required lengths and prime ends. Comply with requirements in Division 09 Section "Exterior Painting."

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 1. Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 2. Coordinate exterior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install flat grain lumber with bark side exposed to weather.
- B. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long except where necessary.
 - 1. Use scarf joints for end-to-end joints.
 - 2. Stagger end joints in adjacent and related members.
- C. Fit exterior joints to exclude water. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.
- D. Unless otherwise indicated, countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.

3.5 SIDING INSTALLATION

- A. Install siding to comply with manufacturer's or industry association's written instructions.
- B. Plywood Soffits: Install panels with edges over framing or blocking. Nail at 6 inches (150 mm) o.c. at panel perimeter and 12 inches (300 mm) o.c. at intermediate supports unless manufacturer recommends closer spacing. Leave 1/16-inch (1.5-mm) gap between adjacent panels and 1/8-inch (3-mm) gap at perimeter, openings, and horizontal joints unless otherwise recommended by panel manufacturer.
 - 1. Seal butt joints at inside and outside corners and at trim locations.
 - 2. pattern or by concealing with applied trim or battens as detailed.
- C. Flashing: Install metal flashing as indicated on Drawings and as recommended by siding manufacturer.
- D. Finish: Apply finish within two weeks of installation.

3.6 ADJUSTING

- A. Replace exterior finish carpentry that is damaged or does not comply with requirements. Exterior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.7 CLEANING

- A. Clean exterior finish carpentry on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.8 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062013

SECTION 062023

INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior standing and running trim.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
 - 2. Division 06 Section "Interior Architectural Woodwork" for shop-fabricated interior woodwork.
 - 3. Division 09 Section "Interior Painting" for priming and backpriming of interior finish carpentry.

1.3 DEFINITIONS

- A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NLGA: National Lumber Grades Authority.
 - 2. WCLIB: West Coast Lumber Inspection Bureau.
 - 3. WWPA: Western Wood Products Association.
- B. MDF: Medium-density fiberboard.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
- B. Samples for Initial Selection: For each type of paneling indicated.

1.5 QUALITY ASSURANCE

- A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":
 - 1. Interior standing and running trim.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials against weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation within and around stacks and under temporary coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or blotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Forest Certification: Provide interior architectural woodwork produced from minimum 50% wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- B. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC's Board of Review.
 - 1. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
 - 2. For exposed lumber, mark grade stamp on end or back of each piece.

- C. MDF: ANSI A208.2, Grade 130, made with binder containing no urea-formaldehyde resin.

2.2 STANDING AND RUNNING TRIM

- A. Lumber Trim for Opaque Finish (Painted):
1. Species and Grade: Idaho white, lodgepole, ponderosa, radiata, or sugar pine; D Select (Quality) ; NLGA or WWPA.
 2. Species and Grade: White woods, D Select ; WWPA.
 3. Species and Grade: Douglas fir-larch or Douglas fir south, Superior or C & Btr finish; NLGA, WCLIB, or WWPA.
 4. Species and Grade: Spruce-pine-fir, 1 Common; NeLMA, NLGA, WCLIB, or WWPA.
 5. Maximum Moisture Content: 15 percent.
 6. Finger Jointing: Allowed.
 7. Face Surface: Surfaced (smooth).
 8. Optional Material: Primed MDF of same actual dimensions as lumber indicated may be used in lieu of lumber.
- B. Moldings for Opaque Finish (Painted): Made to patterns included in WMMPA WM 12.
1. Softwood Moldings: WMMPA WM 4, P-grade.
 - a. Species: Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.
 - b. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
 2. Optional Material: Primed MDF.
 3. Finger Jointing: Allowed.
- C. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- D. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
1. Use wood glue that has a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.
1. Use adhesive that has a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 FABRICATION

- A. Back out or kerf backs of the following members except those with ends exposed in finished work:
1. Interior standing and running trim except shoe and crown molds.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
 - 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 2. Countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.
 - 3. Install to tolerance of **1/8 inch in 96 inches (3 mm in 2438 mm)** for level and plumb. Install adjoining interior finish carpentry with **1/32-inch (0.8-mm)** maximum offset for flush installation and **1/16-inch (1.5-mm)** maximum offset for reveal installation.
 - 4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than **24 inches (610 mm)** long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.

1. Install trim after gypsum board joint finishing operations are completed.

- B. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.5 CLEANING

- A. Clean interior finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.6 PROTECTION

- A. Protect installed products from damage from weather and other causes during remainder of the construction period.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

SECTION 072100

THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Cavity-wall insulation.
- B. Related Sections include the following:
 - 1. Division 22 Section "Plumbing Insulation."
 - 2. Division 23 Section "HVAC Insulation."

1.3 DEFINITIONS

- A. Mineral-Fiber Insulation: Insulation composed of rock-wool fibers, slag-wool fibers, or glass fibers; produced in boards and blanket with latter formed into batts (flat-cut lengths) or rolls.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.

3. Combustion Characteristics: ASTM E 136.

- C. Recycled Content: Provide glass -fiber insulation with recycled content so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 35 percent.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect plastic insulation as follows:
1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Products: Subject to compliance with requirements, provide one of the products specified.
 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 GLASS-FIBER BLANKET INSULATION

- A. Available Manufacturers:
1. CertainTeed Corporation.
 2. Guardian Fiberglass, Inc.
 3. Johns Manville.
 4. Knauf Fiber Glass.
 5. Owens Corning.

- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- C. Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (blankets with reflective membrane facing), Class A (membrane-faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil-scrim-kraft, foil-scrim, or foil-scrim-polyethylene vapor-retarder membrane on 1 face.
- D. Where glass-fiber blanket insulation is indicated by the following thicknesses, provide blankets in batt or roll form with thermal resistances indicated:
 - 1. 3-1/2 inches (89 mm) thick with a thermal resistance of 11 deg F x h x sq. ft./Btu at 75 deg F (1.9 K x sq. m/W at 24 deg C).
 - 2. 5-1/2 inches (140 mm) thick with a thermal resistance of 19 deg F x h x sq. ft./Btu at 75 deg F (3.3 K x sq. m/W at 24 deg C).
 - 3. 9-1/2 inches (241 mm) thick with a thermal resistance of 30 deg F x h x sq. ft./Btu at 75 deg F (5.2 K x sq. m/W at 24 deg C).

2.3 MISCELLANEOUS MATERIALS

- A. Weather Resistive Barrier for inside of siding on previously uninsulated exterior walls without an existing weather resistive barrier.
 - 1. 60-minute Grade D Building Paper.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness
- F. s.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions.
- B. In previously uninsulated exterior walls without an existing weather resistive barrier, cut to fit and install strips of weather resistive barrier tightly between studs from sole plate to top plate.
- C. Set vapor-retarder-faced units with vapor retarder to warm-in-winter side of construction, unless otherwise indicated.
 - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- D. Install mineral-fiber insulation in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures unless recessed lighting fixtures are rated for contact with insulation .
 - 4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 - 5. For wood-framed construction, install mineral-fiber blankets according to ASTM C 1320 and as follows:
 - a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.

- b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
- E. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

3.5 PROTECTION

- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.6 INSULATION SCHEDULE

- A. Insulation Type I for ceilings: Unfaced, glass-fiber blanket insulation.
- B. Insulation Type 2 for walls : Faced, glass-fiber blanket insulation.

END OF SECTION 072100

SECTION 076100

SHEET METAL ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Factory-formed corrugated metal roof panels
- 2. Associated trims, flashings, closures, and accessories
- 3. Underlayment, fasteners, sealants, and related materials

B. Related Sections:

- 1. Division 07 Section "Joint Sealants" for field-applied sealants adjoining sheet metal roofing.

1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Sheet metal roofing system including, but not limited to, metal roof panels, cleats, clips, anchors and fasteners, sheet metal flashing integral with sheet metal roofing, fascia panels, trim, underlayment, and accessories shall comply with requirements indicated without failure due to defective manufacture, fabrication, installation, or other defects in construction. Sheet metal roofing shall remain watertight.
- B. Thermal Movements: Provide sheet metal roofing that allows for thermal movements from ambient and surface temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

1.5 Shop Drawings: Show fabrication and installation layouts of sheet metal roofing, including plans, elevations, expansion joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:

1. Details for forming sheet metal roofing, including seams and dimensions.
2. Details for joining and securing sheet metal roofing, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
3. Details of termination points and assemblies, including fixed points.
4. Details of expansion joints, including showing direction of expansion and contraction.
5. Details of roof penetrations.
6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counter flashings.
7. Details of special conditions.
8. Details of connections to adjoining work.
9. Detail the following accessory items, at a scale of not less than **3 inches per 12 inches (1:5)**:

- a. Flashing and trim.

- B. Portable Roll-Forming Equipment Certificate: Issued by UL for equipment manufacturer's portable roll-forming equipment capable of producing panels that comply with UL requirements. Show expiration date no earlier than two months after scheduled completion of sheet metal roofing.

1. Submit certificates indicating recertification of equipment whose certification has expired during the construction period.

- C. Maintenance Data: For roofing sheet metals and accessories to include in maintenance manuals.

- D. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

- A. Custom-Fabricated Sheet Metal Roofing Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal roofing similar to that required for this Project and whose products have a record of successful in-service performance.

- B. Roll-Formed Sheet Metal Roofing Fabricator Qualifications: Fabricator authorized by portable roll-forming equipment manufacturer to fabricate and install sheet metal roofing units required for this Project, and who maintains current UL certification of its

- C. portable roll-forming equipment.

- D. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing roofing panels for sheet metal roofing assemblies that comply with UL 580 for Class 90 wind-uplift resistance. Maintain UL certification of portable roll-forming equipment for duration of sheet metal roofing work.
- E. Sheet Metal Roofing Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
- F. Copper Roofing Standard: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal roofing materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal roofing materials away from uncured concrete and masonry.

1.8 COORDINATION

- A. Coordinate sheet metal roofing with rain drainage work, flashing, trim, and construction of sheathing, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

- A. Special Warranty: Warranty form at the end of this Section in which Installer agrees to repair or replace components of sheet metal roofing that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including but not limited to rupturing, cracking, or puncturing.
 - b. Wrinkling or buckling.
 - c. Loose parts.
 - d. Failure to remain weathertight, including uncontrolled water leakage.
 - e. Deterioration of metals, metal finishes, and other materials beyond normal weathering, including non-uniformity of color or finish.
 - f. Galvanic action between sheet metal roofing and dissimilar materials.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers (or approved equal):

1. Berridge Manufacturing Company (S-Deck Panel – basis of design)
2. Matal Sales Manufacturing Company
3. AEP Span
4. PAC-CLAD

2.2 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum **30 to 40 mils (0.76 to 1.0 mm)** thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: ASTM D 1970; stable after testing at **240 deg F (116 deg C)**.
 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus **20 deg F (29 deg C)**.
 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Metal-Fab Manufacturing, LLC; MetShield.
 - e. Owens Corning; WeatherLock Metal High-Temperature Underlayment.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for a complete roofing system and as recommended by fabricator for sheet metal roofing.
- B. Fasteners: Wood screws, annular-threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
1. General:
 - a. Exposed Fasteners: Heads matching color of sheet metal roofing using plastic caps or factory-applied coating.
 - b. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - c. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape **1/2 inch (13 mm)** wide and **1/8 inch (3 mm)** thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant as recommended by portable roll-forming equipment manufacturer for installation indicated; low modulus; of type,

grade, class, and use classifications required to seal joints in sheet metal roofing and remain watertight.

- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

2.4 ACCESSORIES

- A. Sheet Metal Accessories: Provide components required for a complete sheet metal roofing assembly including trim, copings, fasciae, corner units, clips, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items. Match material and finish of sheet metal roofing unless otherwise indicated.
 - 1. Provide accessories as recommended by portable roll-forming equipment manufacturer to produce sheet metal roofing assemblies that comply with UL 580 for wind-uplift resistance classification specified in "Quality Assurance" Article.
 - 2. Cleats: For mechanically seaming into joints and formed from the following materials:
 - 3. Clips: Minimum 0.0625-inch- (1.6-mm-) thick, stainless-steel panel clips designed to withstand negative-load requirements.
 - 4. Backing Plates: Plates at roofing splices, fabricated from material recommended by SMACNA.
 - 5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible-closure strips; cut or premolded to match sheet metal roofing profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
 - 6. Flashing and Trim: Formed from same material and with same finish as sheet metal roofing, minimum 0.018 inch (0.46 mm) thick.

2.5 FABRICATION

- A. General: Fabricate roll-formed sheet metal roofing panels with UL-certified, portable roll-forming equipment capable of producing roofing panels for sheet metal roofing assemblies that comply with UL 580 for wind-uplift resistance classification specified in "Quality Assurance" Article. Fabricate roll-formed sheet metal according to equipment manufacturer's written instructions and to comply with details shown.
- B. Fabrication Tolerances: Fabricate sheet metal roofing that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."
- C. Form exposed sheet metal work to fit substrates without excessive oil canning, buckling, and tool marks; true to line and levels indicated; and with exposed edges folded back to form hems.
 - 1. Lay out sheet metal roofing so transverse seams, if required, are made in direction of flow with higher panels overlapping lower panels.
 - 2. Offset transverse seams from each other 12 inches (300 mm) minimum.
 - 3. Fold and cleat eaves and transverse seams in the shop.

4. Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings, and other components of metal roofing to profiles, patterns, and drainage arrangements shown on Drawings and as required for leakproof construction.
- D. Expansion Provisions: Fabricate sheet metal roofing to allow for expansion in running work sufficient to prevent leakage, damage, and deterioration of the Work. Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
- E. Sealant Joints: Where movable, nonexpansion-type joints are indicated or required to produce weathertight seams, form metal to provide for proper installation of elastomeric sealant in compliance with SMACNA standards.
- F. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering sheet underlayment to each contact surface, or by other permanent separation as recommended by fabricator of she
- G. et metal roofing or manufacturers of the metals in contact.
- H. Sheet Metal Accessories: Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.
 1. Form exposed sheet metal accessories without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 2. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 3. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 5. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
 1. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking, that tops of fasteners are flush with surface, and that installation is within flatness tolerances required for finished roofing installation.

2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored, and that provision has been made for drainage, flashings, and penetrations through sheet metal roofing.
- B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

3.3 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on roof sheathing under sheet metal roofing. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply over entire roof, in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.
- B. Install flashings to cover underlayment to comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim."

3.4 INSTALLATION, GENERAL

- A. General: Anchor sheet metal roofing and other components of the Work securely in place, with provisions for thermal and structural movement. Install fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for a complete roofing system and as recommended by fabricator for sheet metal roofing.
 1. Field cutting of sheet metal roofing by torch is not permitted.
 2. Provide metal closures at peaks and eaves .
 3. Flash and seal sheet metal roofing with closure strips at eaves, hips and, and perimeter of all openings. Fasten with self-tapping screws.
 4. Locate and space fastenings in uniform vertical and horizontal alignment. Predrill panels for fasteners.
 5. Install ridge and hip caps as sheet metal roofing work proceeds.
 6. Locate roofing splices over, but not attached to, structural supports. Stagger roofing splices and end laps to avoid a four-panel lap splice condition. Install backing plates at roofing splices.
 7. Install sealant tape where indicated.
 8. Lap metal flashing over sheet metal roofing to allow moisture to run over and off the material.
- B. Thermal Movement. Rigidly fasten metal roof panels to structure at only one location for each panel. Allow remainder of panel to move freely for thermal expansion and contraction.

1. Point of Fixity: Fasten each panel along a single line of fixing located at center of panel length .
 2. Avoid attaching accessories through roof panels in a manner that will inhibit thermal movement.
- C. Fasteners: Use fasteners of sizes that will penetrate wood sheathing not less than **1-1/4 inches (32 mm)** for nails and not less than **3/4 inch (19 mm)** for wood screws .
- D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- E. Fasciae: Align bottom of sheet metal roofing and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal sheet metal roofing with closure strips where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

3.5 CUSTOM-FABRICATED SHEET METAL ROOFING INSTALLATION

- A. Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks, considering temper and reflectivity of metal. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant. Fold back sheet metal to form a hem on concealed side of exposed edges unless otherwise indicated.
1. Install cleats to hold sheet metal panels in position. Attach each cleat with two fasteners to prevent rotation.
 2. ion.
 3. Fasten cleats not more than **12 inches (300 mm)** o.c. Bend tabs over fastener head.
 4. Provide expansion-type cleats and clips for roof panels that exceed **30 feet (9.1 m)** in length.
- B. Seal joints as shown and as required for watertight construction. For roofing with 3:12 slopes or less, use cleats at transverse seams.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than **1 inch (25 mm)** into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between **40 and 70 deg F (4 and 21 deg C)**, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below **40 deg F (4 deg C)**.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- C. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of **1-1/2 inches (38 mm)**, except reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
 2. Copper Roofing: Tin edges of uncoated copper sheets, using solder for copper.

- D. Standing-Seam Roofing: Attach standing-seam metal panels to substrate with cleats, double fastened at **12 inches (305 mm)** o.c. Install panels reaching from eave to ridge before moving to adjacent panels. Before panels are interlocked, apply continuous bead of sealant to top of flange of lower panel. Lock standing seams by folding over twice so cleat and panel edges are completely engaged.
1. Lock each panel to panel below with soldered transverse seam.
 2. Loose-lock panels at eave edges to continuous cleats and flanges at roof edge at gutters.
 3. Leave seams upright after locking at ridges and hips.

3.6 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete sheet metal roofing assembly including trim, copings, seam covers, flashings, sealants, gaskets, fillers, metal closures, closure strips, and similar items.
 2. Install accessories integral to sheet metal roofing that are specified in Division 07 Section "Sheet Metal Flashing and Trim" to comply with that Section's requirements.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weath-
- C. er resistant.
1. Install flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
 2. Install continuous strip of self-adhering underlayment at edge of continuous flashing overlapping self-adhering underlayment, where "continuous seal strip" is indicated in SMACNA's "Architectural Sheet Metal Manual," and where indicated on Drawings.
 3. Install exposed flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 4. weather-resistant performance.
 5. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of **10 feet (3 m)** with no joints allowed within **24 inches (600 mm)** of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than **1 inch (25 mm)** deep, and filled with butyl sealant concealed within joints.

3.7 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal roofing within installed tolerance of **1/4 inch in 20 feet (6 mm in 6 m)** on slope and location lines as indicated and within **1/8-inch (3-mm)** offset of adjoining faces and of alignment of matching profiles.

- B. Installation Tolerances: Shim and align sheet metal roofing within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.8 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal roofing is installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal roofing installation, clean finished surfaces as recommended by sheet metal roofing manufacturer. Maintain sheet metal roofing in a clean condition during construction.
- E. Replace sheet metal roofing components that have been damaged or have deteriorated beyond successful repair by finish touchup or similar
- F. minor repair procedures.

3.9 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 - 1. Owner: <Insert name of Owner>.
 - 2. Address: <Insert address>.
 - 3. Building Name/Type: <Insert information>.
 - 4. Address: <Insert address>.
 - 5. Area of Work: <Insert information>.
 - 6. Acceptance Date: <Insert date>.
 - 7. Warranty Period: <Insert time>.
 - 8. Expiration Date: <Insert date>.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work
- D. and as are necessary to maintain said work in a watertight condition.
- E. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. Lightning;
 - b. Peak gust wind speed exceeding **<Insert wind speed> mph (m/sec);**
 - c. Fire;
 - d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. Vapor condensation on bottom of roofing; and
 - g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
 6. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
 8. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
 9. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.
 10. Contractor.
- F. IN WITNESS THEREOF, this instrument has been duly executed this **<Insert day>** day of **<Insert month>**, **<Insert year>**.
1. Authorized Signature: **<Insert signature>**.
 2. Name: **<Insert name>**.
 3. Title: **<Insert title>**.

Luther Burbank Gold Ridge Experiment Farm
Restroom and Access Path Addition
7777 Bodega Avenue, Sebastopol, CA
IR Project 2022-033-01
9/19/2025

END OF SECTION 076100

SECTION 076200

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Formed Products:

- a. Formed roof drainage sheet metal fabrications.
- b. Formed wall sheet metal fabrications.
- c. Attic wall vents

B. Related Sections:

- 1. Division 06 Section "Rough Carpentry " for wood nailers, curbs, and blocking.
- 2. Division 07 Section "Manufactured Slate Shingles Incorporating Photovoltaic Modules" for installing sheet metal flashing and trim integral with roofing.
- 3. Division 07 Section " Asphalt Shingles" for installing sheet metal flashing and trim integral with roofing.
- 4. Division 07 Section "Sheet Metal Roofing" for custom-formed sheet metal flashing and trim integral with sheet metal roofing.
- 5. Division 07 Section "Roof Specialties" for manufactured roof specialties not part of sheet metal flashing and trim.
- 6. Division 07 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
- 7. Division 07 Section "Expansion Control" for manufactured sheet metal expansion-joint covers.

C. Base Bid and Alternates

- 1. Base bid includes galvanized sheet metal except for stainless steel sheet metal for window sill pans.
- 2. Alternate 2 includes copper sheet metal except for stainless steel sheet metal for window sill pans.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identification of material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - 4. Details of termination points and assemblies, including fixed points.
 - 5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
 - 6. Details of edge conditions, including eaves, ridges, rakes, crickets, and counterflashings as applicable.
 - 7. Details of special conditions.
 - 8. Details of connections to adjoining work.

1.5 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
- B. Copper Sheet Metal Standard: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- C. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.

2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Review special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect sheet metal flashing.
5. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper.
 1. Non-Patinated Exposed Finish: Mill.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed.
 1. Finish: 2D (dull, cold rolled) or 2B (bright, cold rolled) .
 2. Surface: Smooth, flat.
- C. Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process.
 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
 2. Surface: Smooth, flat and mill phosphatized for field painting.

2.2 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).

2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).
3. Products: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Metal-Fab Manufacturing, LLC; MetShield.
 - e. Owens Corning; WeatherLock Metal High Temperature Underlayment.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 2. Fasteners for CopperSheet: Copper, hardware bronze or Series 300 stainless steel.
 3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
 4. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
- C. Solder:
 1. For Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
 2. For Stainless Steel: ASTM B 32, Grade Sn60, with an acid flux of type recommended by stainless-steel sheet manufacturer.
 3. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.4 ATTIC WALL VENTS

- A. Galvanized sheet metal, size as indicated, with flashing flange continuous at perimeter, Basis of Design Famco "Gable Vent," with ¼ inch galvanized wire screen and return angle design on louver blades to prevent water penetration, 649 N., Ralstin Street, Meridian, ID, www.famcomfg.com.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of **1/4 inch in 20 feet (6 mm in 6 m)** on slope and location lines as indicated and within **1/8-inch (3-mm)** offset of adjoining faces and of alignment of matching profiles.
- C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."
- D. Solder all multiplane joints.
- E. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- F. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than **1 inch (25 mm)** deep, filled with butyl sealant concealed within joints.
- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- H. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.
- I. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- J. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum **96-inch- (2400-mm-)** long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.
1. Gutter Style: SMACNA Figure 1-3A, half round.
 2. Expansion Joints: Butt type with cover plate.
 3. Accessories: Manufactured gutter support/hanger, GutterSupply.com #10 combo shank and circle hanger. .
 4. Gutters with Girth up to **15 Inches (380 mm)**: Fabricate from the following materials:
 - a. Copper: **16 oz./sq. ft. (0.55 mm thick)**.
 - b. Galvanized Steel: **0.022 inch (0.56 mm)** thick.
- B. Downspouts: Fabricate round downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
1. Fabricated Hanger Style: SMACNA figure designation 1-35D .
 2. Fabricate from the following materials:
 - a. Copper: **16 oz./sq. ft. (0.55 mm thick)**.
 - b. Galvanized Steel: **0.022 inch (0.56 mm)** thick.

2.7 WALL SHEET METAL FABRICATIONS

- A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend **4 inches (100 mm)** beyond wall openings. Form head and sill flashing with **2-inch- (50-mm-)** high, end dams. Fabricate from the following materials:
1. Stainless Steel: **0.016 inch (0.40 mm)** thick.
 2. Galvanized Steel: **0.022 inch (0.56 mm)** thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
1. Verify compliance with requirements for installation tolerances of substrates.
 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. General: Install underlayment as indicated on Drawings.
- B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 - 5. Install sealant tape where indicated.
 - 6. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
 - 1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws .

- E. Seal joints as shown and as required for watertight construction.
1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than **1 inch (25 mm)** into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between **40 and 70 deg F (4 and 21 deg C)**, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below **40 deg F (4 deg C)**.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of **1-1/2 inches (38 mm)**, except reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
 2. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
 3. Copper Soldering: Tin edges of uncoated copper sheets using solder for copper.

3.4 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets spaced not more than **36 inches (900 mm)** apart. Provide end closures and seal watertight with sealant. Slope to downspouts.
1. Fasten gutter spacers to front and back of gutter.
 2. Loosely lock straps to front gutter bead and anchor to roof deck.
 3. Install gutter with expansion joints at locations indicated, but not exceeding, **50 feet (15.24 m)** apart. Install expansion-joint caps.
- C. Downspouts: Join sections with **1-1/2-inch (38-mm)** telescoping joints.
1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately **60 inches (1500 mm)** o.c. in between.
 2. Provide elbows at base of downspout to direct water away from building.
 3. Connect downspouts to underground drainage system indicated.

3.5 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal

Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

- B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with sealant. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant interlocking folded seam or blind rivets and sealant anchor and washer at 36-inch (900-mm) centers.
- D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.6 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.7 CRAWL SPACE AND ATTIC VENT INSTALLATION

- A. Follow manufacturer's instructions.
- B. Provide sufficient crawl space vents to provide net ventilation area equal to 1/1,500 of ground surface.
- C. Flash installation fins with 12 inch self-adhered flashing installed shingle style with weather resistive barrier.

3.8 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.9 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 079200

JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Urethane joint sealants.
 - 2. Latex joint sealants.
- B. Related Sections:
 - 1. Division 09 Section "Gypsum Board" for sealing perimeter joints.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

1.5 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
 - 2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Building Systems; Omnipolus.
 - b. Dow Corning Corporation; 786 Mildew Resistant.
 - c. GE Advanced Materials - Silicones; Sanitary SCS1700.

- d. May National Associates, Inc.; Bondaflex Sil 100 WF.
- e. Tremco Incorporated; Tremsil 200 Sanitary.

2.3 URETHANE JOINT SEALANTS

- A. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. BASF Building Systems; Sonolastic NP1 .
- b. Bostik, Inc.; Chem-Calk 900.
- c. May National Associates, Inc.; Bondaflex PUR 25 .
- d. Pacific Polymers International, Inc.; Elasto-Thane 230 Type II.
- e. Pecora Corporation; Dynatrol I-XL.
- f. Polymeric Systems, Inc.; Flexiprene 1000.
- g. Schnee-Morehead, Inc.; Permthane SM7100 .
- h. Sika Corporation, Construction Products Division; Sikaflex - 1a.
- i. Tremco Incorporated; Vulkem 116.

- B. Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. BASF Building Systems; Sonolastic NP 2.
- b. LymTal International, Inc.; Iso-Flex 885 SG.
- c. May National Associates, Inc.; Bondaflex PUR 2 NS.
- d. Pacific Polymers International, Inc.; Elasto-Thane 227 High Shore Type II.
- e. Pecora Corporation; Dynatred.
- f. Sika Corporation, Construction Products Division; Sikaflex - 2c NS.
- g. Tremco Incorporated; Vulkem 227.

2.4 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. BASF Building Systems; Sonolac.
- b. Bostik, Inc.; Chem-Calk 600.
- c. May National Associates, Inc.; Bondaflex 600.
- d. Pecora Corporation; AC-20+.
- e. Schnee-Morehead, Inc.; SM 8200.
- f. Tremco Incorporated; Tremflex 834.

2.5 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type O (open-cell material) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and

- approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
- G. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions. Retain first paragraph below if acoustical sealants are retained in Part 2.
- H. CLEANING
- I. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.4 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.5 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Joints between different materials listed above.
 - 2. Urethane Joint Sealant: Multicomponent, nonsag, traffic grade, Class 50.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:
 - a. Perimeter joints and frames of doors, windows and louvers.
 - b. Other joints as indicated.
2. Urethane Joint Sealant: Single component, nonsag, Class 25 .
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings where indicated.
 - c. Perimeter joints between interior wall surfaces and frames of interior doors and windows..
 - d. Other joints as indicated.
2. Joint Sealant: Latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Sealant Location:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated.
2. Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, Silicone .
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

E. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Location:
 - a. Acoustical joints where indicated.
 - b. Other joints as indicated.
2. Joint Sealant: Acoustical.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION 079200

SECTION 081113

HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Standard hollow metal frames.
- B. Related Sections:
 - 1. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
 - 2. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, and finishes.
- B. Shop Drawings: Include the following:
 - 1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 2. Locations of reinforcement and preparations for hardware.
 - 3. Details of each different wall opening condition.
 - 4. Details of anchorages, joints, field splices, and connections.
 - 5. Details of accessories.
- C. Other Action Submittals:

1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.
- B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to wood windows including, but not limited to, the following:
 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 2. Review, discuss, and coordinate the interrelationship of wood windows with other exterior wall components. Include provisions for structural anchorage, glazing, flashing, weeping, sealants, and protection of finishes.
 3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope, including the materials, installation and integration of sill pans, weather resistive barriers and flexible flashings. A prototype of each type of window installation will be installed and approved by the window manufacturer's representative and the architect and shall provide the standard for subsequent installations.
 4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 1. Provide additional protection to prevent damage to finish of factory-finished units.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Amweld Building Products, LLC.
 2. Benchmark; a division of Therma-Tru Corporation.
 3. Ceco Door Products; an Assa Abloy Group company.
 4. Curries Company; an Assa Abloy Group company.
 5. Deansteel Manufacturing Company, Inc.
 6. Firedoor Corporation.
 7. Fleming Door Products Ltd.; an Assa Abloy Group company.
 8. Habersham Metal Products Company.
 9. Karpen Steel Custom Doors & Frames.
 10. Kewanee Corporation (The).
 11. Mesker Door Inc.
 12. Pioneer Industries, Inc.
 13. Security Metal Products Corp.
 14. Steelcraft; an Ingersoll-Rand company.
 15. Windsor Republic Doors.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum [A40 (ZF120)] [G60 (Z180) or A60 (ZF180)] metallic coating.
- D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. cold- or hot-rolled steel sheet.

2.3 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

- B. Interior Frames: Fabricated from cold-rolled steel sheet unless metallic-coated sheet is indicated.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames as knocked down unless otherwise indicated.
 - 3. Fabricate knocked-down, drywall slip-on frames for in-place gypsum board partitions.
 - 4. Frames for Wood Doors: 0.042-inch- (1.0-mm-) thick steel sheet.
- C. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.4 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
 - 2. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.

2.5 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- C. Hollow Metal Doors:
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 2. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 3. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.

- 5) Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal-stud partitions.
4. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.
- G. Stops and Moldings: Provide stops where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

2.6 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
- B. Galvanized Finish: Provide for toilet room door frames.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - 2. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus **1/16 inch (1.6 mm)**, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus **1/16 inch (1.6 mm)**, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus **1/16 inch (1.6 mm)**, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus **1/16 inch (1.6 mm)**, measured at jambs at floor.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

SECTION 081416

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Solid-core doors with wood-veneer faces.
- 2. Factory finishing flush wood doors.
- 3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Sections:

- 1. Division 06 Section "Interior Finish Carpentry" for wood door frames.

1.3 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.

- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

- 1. Indicate dimensions and locations of mortises and holes for hardware.
- 2. Indicate dimensions and locations of cutouts.
- 3. Indicate requirements for veneer matching.
- 4. Indicate doors to be factory finished and finish requirements.
- 5. Indicate fire-protection ratings for fire-rated doors.

- C. Samples for Initial Selection: For factory-finished doors.

D. Samples for Verification:

- 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.

- E. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Source Limitations: Obtain flush wood doors from single manufacturer.
- C. Quality Standard: In addition to requirements specified, comply with WI's "Manual of Millwork."
 - 1. Provide WI-Certified Compliance Certificate indicating that doors comply with requirements of grades specified.
 - 2. Provide WI-Certified Compliance Certificate for installation.
- D. Forest Certification: Provide doors made with cores veneers not less than 70 percent of wood products all wood products obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
- E. Comply with requirements of referenced standard and manufacturer's written instructions.
- F. Package doors individually in plastic bags or cardboard cartons.
- G. Mark each door on bottom rail with opening number used on Shop Drawings.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Algoma Hardwoods, Inc.
 2. Ampco, Inc.
 3. Buell Door Company Inc.
 4. Chappell Door Co.
 5. Eagle Plywood & Door Manufacturing, Inc.
 6. Eggers Industries.
 7. Graham; an Assa Abloy Group company.
 8. Haley Brothers, Inc.
 9. Ideal Architectural Doors & Plywood.
 10. Ipik Door Company.
 11. Lambton Doors.
 12. Marlite.
 13. Marshfield Door Systems, Inc.
 14. Mohawk Flush Doors, Inc.; a Masonite company.
 15. Oshkosh Architectural Door Company.
 16. Poncraft Door Company.
 17. Vancouver Door Company.
 18. VT Industries Inc.

2.2 DOOR CONSTRUCTION, GENERAL

- A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.
- B. WDMA I.S.1-A Performance Grade:
1. Heavy Duty unless otherwise indicated.
 2. Extra Heavy Duty: public toilets janitor's closets.
- C. Particleboard-Core Doors:
1. Particleboard: Straw-based particleboard complying with ANSI A208.1, Grade LD-2 or M-2, except for density.
 2. Provide doors with either glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- D. Structural-Composite-Lumber-Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: 700 lbf (3100 N).
 - b. Screw Withdrawal, Edge: 400 lbf (1780 N).

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

1. Grade: Premium, with Grade AA faces.
2. Species: Red oak.
3. Cut: Quarter sliced or Rift cut.
4. Match between Veneer Leaves: Slip match.
5. Assembly of Veneer Leaves on Door Faces: Center-balance match.
6. Room Match: Match door faces within each separate room or area of building. Corridor-door faces do not need to match where they are separated by 20 feet (6 m) or more.
7. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.
8. Exposed Vertical and Top Edges: Same species as faces.
9. Core: Particleboard, Either glued wood stave or structural composite lumber.
10. Construction: Seven plies, either bonded or nonbonded construction.

2.4 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

2.5 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Finish doors at factory.

C. Transparent Finish:

1. Grade: Premium.
2. Finish: WI System 4 clear conversion varnish.
3. Effect: Open-grain finish.
4. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 1. Clearances: Provide **1/8 inch (3.2 mm)** at heads, jambs, and between pairs of doors. Provide **1/8 inch (3.2 mm)** from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide **1/4 inch (6.4 mm)** from bottom of door to top of threshold unless otherwise indicated.
 - 2. Bevel non-fire-rated doors **1/8 inch in 2 inches (3-1/2 degrees)** at lock and hinge edges.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083113

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Access doors and frames for walls and ceilings; provide wherever required for access to mechanical, electrical or plumbing equipment..
- B. Related Sections include the following:
 - 1. Division 08 Section "Door Hardware" for mortise or rim cylinder locks and master keying.
 - 2. Division 23 Section "Air Duct Accessories" for heating and air-conditioning duct access doors.

1.3 SUBMITTALS

- A. Product Data: For each type of access door and frame indicated. Include construction details, materials, individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.
- C. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of access door(s) and frame(s) through one source from a single manufacturer.
- B. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.5 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
 - 1. ASTM A 123/A 123M, for galvanizing steel and iron products.
 - 2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
- B. Steel Sheet: cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS) with A60 (ZF180) zinc-iron-alloy (galvannealed) coating or G60 (Z180) mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924/A 924M.
- D. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
 - 2. Surface Preparation for Metallic-Coated Steel Sheet: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
 - a. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
 - 3. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.
- E. Drywall Beads: Edge trim formed from 0.0299-inch (0.76-mm) zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.2 STAINLESS-STEEL MATERIALS

- A. Rolled-Stainless-Steel Floor Plate: ASTM A 793, manufacturer's standard finish.

- B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304 or 316. Remove tool and die marks and stretch lines or blend into finish.

- 1. Finish: Manufacturer's standard.

2.3 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1. Acudor Products, Inc.
 - 2. Babcock-Davis; A Cierra Products Co.
 - 3. Bar-Co, Inc. Div.; Alfab, Inc.
 - 4. Cendrex Inc.
 - 5. Dur-Red Products.
 - 6. Elmdor/Stoneman; Div. of Acorn Engineering Co.
 - 7. Jensen Industries.
 - 8. J. L. Industries, Inc.
 - 9. Karp Associates, Inc.
 - 10. Larsen's Manufacturing Company.
 - 11. MIFAB, Inc.
 - 12. Milcor Inc.
 - 13. Nystrom, Inc.
 - 14. Williams Bros. Corporation of America (The).

- B. Flush Access Doors and Trimless Frames: Fabricated from metallic-coated steel and stainless-steel sheet.

- 1. Locations: Wall and ceiling surfaces.
 - a. Use stainless steel for Toilet Rooms and janitor Room.
 - 2. Door: Minimum 0.060-inch- (1.5-mm-) thick sheet metal, set flush with surrounding finish surfaces.
 - 3. Frame: Minimum 0.060-inch- (1.5-mm-) thick sheet metal with drywall bead flange.
 - 4. Hinges: Spring-loaded, concealed-pin type.
 - 5. Latch: Cam latch operated by screwdriver with interior release.
 - 6. Lock: Cylinder.
 - a. Lock Preparation: Prepare door panel to accept cylinder specified in Division 08 Section "Door Hardware."

2.4 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
 - 1. For trimless frames with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
 - 2. Provide mounting holes in frames for attachment of units to metal or wood framing.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
 - 1. For cylinder lock, furnish two keys per lock and key all locks alike.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 085200

WOOD WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes fixed wood-framed windows of the following type:
 - 1. Fiberglass reinforced plastic-clad wood.

1.3 DEFINITIONS

- A. Performance class designations according to AAMA/WDMA 101/I.S.2/NAFS:
 - 1. LC: Light Commercial.
- B. Performance grade number according to AAMA/WDMA 101/I.S.2/NAFS:
 - 1. Design pressure number in **pounds force per square foot (pascals)** used to determine the structural test pressure and water test pressure.
- C. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.
- D. Minimum Test Size: Smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide wood windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of test size indicated below:
 - 1. Size required by AAMA/WDMA 101/I.S.2/NAFS for gateway performance .

1.5 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, installation instructions and operating instructions for each type of wood window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, installation details, and the following:
 - 1. Mullion details, including reinforcement and stiffeners.
 - 2. Joinery details.
 - 3. Expansion provisions.
 - 4. Flashing and drainage details.
 - 5. Weather-stripping details.
 - 6. Glazing details.
 - 7. Window cleaning provisions.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
 - 1. Include similar Samples of hardware and accessories involving color selection.
- D. Samples for Verification: For wood windows and components required, prepared on Samples of size indicated below.
 - 1. Main Framing Member: ~~12-inch-~~ (300-mm-) long, full-size sections of window frame with factory-applied color finish.
 - 2. Window Corner Fabrication: ~~12--by-12-inch-~~ (300--by-300-mm-) long, full-size window corner including full-size sections of window frame with factory-applied color finish, weather stripping, and glazing.
 - 3. Operable Window: Full-size unit with factory-applied finish.
 - 4. Hardware: Full-size units with factory-applied finish.
 - 5. Weather Stripping: ~~12-inch-~~ (300-mm-) long sections.
- E. Product Schedule: For wood windows. Use same designations indicated on Drawings.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency for each type, class, grade, and size of wood window. Test results based on use of downsized test units will not be accepted.
- G. Maintenance Data: For operable window sash operating hardware weather stripping and finishes to include in maintenance manuals.
- H. Warranty: Special warranty specified in this Section.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An installer acceptable to wood window manufacturer for installation of units required for this Project.

- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of wood windows and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- C. Fenestration Standard: Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Provide AAMA or WDMA-certified wood windows with an attached label.
- D. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.
- E. Preinstallation Conference and Prototype Installation: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to wood windows including, but not limited to, the following:
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review, discuss, and coordinate the interrelationship of wood windows with other exterior wall components. Include provisions for structural anchorage, glazing, flashing, weeping, sealants, and protection of finishes.
 - 3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope, including the materials, installation and integration of sill pans, weather resistive barriers and flexible flashings.
 - 4. Depending on the ultimate products and manufacturers chosen for windows and doors, weather resistive barriers and flexible flashings, installation methods may not exactly conform to those shown on the drawings. In order to resolve any conflicts, a prototype of each type of window installation shall be installed and approved by the window manufacturer's representative, the weather resistive barrier manufacturer's representative, the self-adhered flexible flashing manufacturer's representative and the architect and shall provide the standard for subsequent installations. The architect will provide a graphic and written description of the approved procedure.
 - 5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify wood window openings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating wood windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace wood windows that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Failure to meet performance requirements.
 - b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
 - c. Faulty operation of movable sash and hardware.
 - d. Deterioration of wood, metals, vinyl, other materials, and finishes beyond normal weathering.
 - e. Failure of insulating glass.
 2. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Ultrex manufactured by Marvin. <https://www.marvin.com/c/explore-ultrex>

2.2 MATERIALS

- A. Wood: Clear ponderosa pine or another suitable fine-grained lumber; kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than **1/32 inch (0.8 mm)** deep by **2 inches (51 mm)** wide; water-repellent preservative treated.
- B. Exterior Cladding: fiberglass reinforced plastic 0.074 inch (2 mm) thick.
- C. Wood Trim and Glazing Stops: Material and finish to match frame members.
- D. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with wood window members, cladding, trim, hardware, anchors, and other components.
1. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.
- E. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

- F. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action and for complete concealment when wood window is closed.
 - 1. Weather-Stripping Material: Manufacturer's standard system and materials complying with AAMA/WDMA 101/I.S.2/NAFS.
- G. Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701/702.

2.3 WINDOWS

- A. AAMA/WDMA Performance Requirements: Provide wood windows of performance indicated that comply with AAMA/WDMA 101/I.S.2/NAFS unless more stringent performance requirements are indicated.
 - 1. Performance Class and Grade: H-LC40 for double hung units.
 - 2. Performance Class and Grade: F-LC40 for fixed units.
- B. Condensation-Resistance Factor (CRF): Provide wood windows tested for thermal performance according to AAMA 1503, showing a CRF of 45.
- C. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA 101/I.S.2/NAFS, Air Infiltration Test.
 - 1. Maximum Rate: 0.3 cfm/sq. ft. (5 cu. m/h x sq. m) of area at an inward test pressure of 1.57 lbf/sq. ft. (75 Pa).

2.4 GLAZING

- A. Glass: Opaque (frosted), insulating-glass units, with low-E II coating argon gas filled
- B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.5 HARDWARE

- A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with wood and frp cladding; designed to smoothly operate, tightly close, and securely lock wood windows, and sized to accommodate sash or ventilator weight and dimensions. Do not use aluminum in frictional contact with other metals. Where exposed, provide solid bronze extruded, cast, or wrought aluminum or nonmagnetic stainless steel.
- B. Counterbalancing Mechanism: Comply with AAMA 902.
- C. Locks and Latches: Designed to allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.

2.6 INSECT SCREENS

- A. General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Fabricate insect screens to fully integrate with window frame. Locate screens on outside of window and provide for each operable exterior sash or ventilator.
- B. Aluminum Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
 - 1. Aluminum Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet with minimum wall thickness as required for class indicated.
 - 2. Finish: Manufacturer's standard.
- C. Glass-Fiber Mesh Fabric: **18-by-14 (1.1-by-1.4-mm)** or **18-by-16 (1.0-by-1.1-mm)** mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration; in the following color. Comply with ASTM D 3656.
 - 1. Mesh Color: Charcoal gray .

2.7 ACCESSORIES

- A. Dividers (Simulated Divided Lights): Provide dividers in designs indicated for each sash lite, two per sash, removable from the exposed surfaces of interior and exterior lites of the sash .
 - 1. Material: Exterior: extruded FRP; Interior: Prefinished wood.
 - 2. Color: White.

2.8 FABRICATION

- A. Fabricate wood windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Fabricate wood windows that are reglazable without dismantling sash or ventilator framing.
- C. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator, unless otherwise indicated.
- D. Factory-Glazed Fabrication: Except for light sizes in excess of **100 united inches (2500 mm width plus length)**, glaze wood windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 08 Section "Glazing" and with AAMA/WDMA 101/I.S.2/NAFS.
- E. Glazing Stops: Provide nailed or snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

- F. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

2.9 WOOD FINISHES

- A. Factory-Primed Windows: Provide manufacturer's standard factory-prime coat complying with WDMA T.M. 11 on exposed interior wood surfaces.
 - 1. Color: White.
- B. CLADDING FINISH
 - 1. Factory baked on acrylic urethane, color selected by Architect from manufacturer's standard range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.
 - 1. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within **3 inches (76 mm)** of opening.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components. Default installation comply with ASTM E 2112. Final installation shall match approved prototype.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

END OF SECTION 085200

SECTION 087100

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Commercial door hardware for the following:
 - a. Swinging doors.
 - 2. Cylinders for doors specified in other Sections.
- B. Related Sections include the following:
 - 1. Division 08 Section "Hollow Metal Doors and Frames" for door silencers provided as part of hollow-metal frames.
 - 2. Division 08 Section "Sound Control Door Assemblies" for sound control door hardware, except cylinders.

1.3 SUBMITTALS

- A. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.
- C. Warranty: Special warranty specified in this Section.

1. QUALITY ASSURANCE

- D. Installer Qualifications: An employer of workers trained and approved by lock manufacturer.
 - 1. Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
 - 2. Installer shall have warehousing facilities in Project's vicinity.

3. Scheduling Responsibility: Preparation of door hardware and keying schedules.

- E. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- D. Deliver keys to Owner by registered mail or overnight package service.

1.5 COORDINATION

- A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Coordinate with Owner's security vendor to make sure any installation work requiring preparation

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Structural failures including excessive deflection, cracking, or breakage.
- b. Faulty operation of operators and door hardware.
- c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion

1.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in door and frame schedule.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products .
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Sets" Article. Products are identified by using door hardware designations, as follows:
- C. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 HINGES, GENERAL

- A. Quantity: Provide the following, unless otherwise indicated:
 - 1. Three Hinges: For doors with heights 61 to 90 inches (1549 to 2286 mm).
- B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- C. Hinge Base Metal: Unless otherwise indicated, provide the following:
 - 1. Exterior Hinges: Brass, with stainless-steel pin body and brass protruding heads.
- D. Hinge Options: Where indicated in door hardware sets or on Drawings:
 - 1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors .
- E. Fasteners: Comply with the following:
 - 1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
 - 2. Wood Screws: For wood doors and frames.
 - 3. Screws: Phillips flat-head; machine screws (drilled and tapped holes) for metal doors wood screws for wood doors and frames, flathead, countersunk, full-thread. Finish screw heads to match surface of hinges.

2.3 HINGES

- A. Butts and Hinges: BHMA A156.1.
- B. Template Hinge Dimensions: BHMA A156.7.
- C. Available Manufacturers:
 - 1. Hager Companies (HAG).
 - 2. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - 3. McKinney Products Company; an ASSA ABLOY Group company (MCK).
 - 4. Stanley Commercial Hardware; Div. of The Stanley Works (STH).

2.4 LOCKS AND LATCHES, GENERAL

- A. Accessibility Requirements: Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG). And CBC."
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22 N).
- B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf (67 N) to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- C. Lock Trim:
 - 1. Levers:
 - a. "Sparta"
 - 2. Escutcheons (Roses): Minimum 3 7/16 diameter for coverage of ANSI/DHI A115.18, 1994 door preparation, through bolt lugs on both spring cages to fully engage this pattern.
 - 3. Lockset Designs: Schlage ND series
- D. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.
 - 2. Deadbolts: Minimum 1-inch (25-mm) bolt throw.
- E. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
- F. Strikes: Manufacturer's standard strike with 1" deep strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, and as follows:
 - 1. Strikes for Bored Locks and Latches: BHMA A156.2.

2.5 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
 - 1. Bored Locks: BHMA A156.2.
- B. Bored Locks: BHMA A156.2; Series 4000.
 - 1. Manufacturers:
 - a. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).

2.6 DOOR BOLTS

- A. Bolt Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Mortise Flush Bolts: Minimum 3/4-inch (19-mm) throw.
- B. Dustproof Strikes: BHMA A156.16, Grade 1.
- C. Manual Flush Bolts: BHMA A156.16, Grade 1; designed for mortising into door edge.
 - 1. Available Manufacturers:
 - a. Adams Rite Manufacturing Co. (ARM).
 - b. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
 - c. Hager Companies (HAG).
 - d. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - e. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
 - f. Trimco (TBM).
- D. Outside Trim: Pull with cylinder; material and finish to match locksets, unless otherwise indicated.

2.7 Manufacturer: LOCK CYLINDERS

- A. Standard Lock Cylinders: BHMA A156.5, Grade 1 .
- B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
 - 1. Number of Pins: Six.
 - 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
- C. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:

1. Interchangeable Cores: Core insert, removable by use of a special key; usable with other manufacturers' cylinders.

D. Construction Keying: Comply with the following:

1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
 - a. Furnish permanent cores to Owner for installation.

E. Manufacturer: Same manufacturer as for locks and latches.

F. Manufacturer:

1. Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).

2.8 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference, and as follows:

1. Master Key System: Cylinders are operated by a change key and a master key.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."
2. Quantity: In addition to one extra key blank for each lock, provide the following:
 - a. Cylinder Change Keys: Three.
 - b. Master Keys: Five.

2.9 OPERATING TRIM

A. Standard: BHMA A156.6.

B. Materials: Fabricate from brass, bronze, or stainless steel, unless otherwise indicated.

2.10 CLOSERS

A. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Comply with the following maximum opening-force requirements:

- a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
- B. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
- C. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
- D. Surface Closers: BHMA A156.4, Grade 1. Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.
 - 1. Manufacturer:
 - a. LCN Closers; an Ingersoll-Rand Company (LCN).

2.11 PROTECTIVE TRIM UNITS

- A. Size: 1-1/2 inches (38 mm) less than door width on push side and 1/2 inch (13 mm) less than door width on pull side, by height specified in door hardware sets.
- B. Fasteners: Manufacturer's standard machine or self-tapping screws.
- C. Metal Protective Trim Units: BHMA A156.6; beveled top and 2 sides; fabricated from the following materials:
 - 1. Material: 0.050-inch- (1.3-mm-) thick bronze or stainless steel as required to match other hardware.
 - 2. Available Manufacturers:
 - a. Hager Companies (HAG).
 - b. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - c. Trimco (TBM).

2.12 STOPS AND HOLDERS

- A. Stops and Bumpers: BHMA A156.16, Grade 1.
 - 1. Provide floor stops for doors unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.
- B. Combination Floor and Wall Stops and Holders: BHMA A156.8, Grade 1.
- C. Silencers for Wood Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum 5/8 by 3/4 inch (16 by 19 mm); fabricated for drilled-in application to frame.
- D. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.

- E. Available Manufacturers:
 - 1. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
 - 2. Hager Companies (HAG).
 - 3. IVES Hardware; an Ingersoll-Rand Company (IVS).
 - 4. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
 - 5. Trimco (TBM).

2.13 DOOR GASKETING

- A. Standard: BHMA A156.22; Listed under Category J in BHMA's "Certified Product Directory."
- B. General: Provide continuous weather-strip gasketing on exterior doors
 - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 - 3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- C. Air Leakage: Not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Gasketing Materials: ASTM D 2000 and AAMA 701/702.
- G. Available Manufacturers:
 - 1. Hager Companies (HAG).
 - 2. National Guard Products (NGP).
 - 3. Pemko Manufacturing Co. (PEM).
 - 4. Zero International (ZRO).

2.14 THRESHOLDS

- A. Standard: BHMA A156.21;. Listed under Category J in BHMA's "Certified Product Directory."
- B. Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."
 - 1. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
- C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch (13 mm) high.

D. Available Manufacturers:

1. Hager Companies (HAG).
2. National Guard Products (NGP).
3. Pemko Manufacturing Co. (PEM).
4. Zero International (ZRO).

2.15 FABRICATION

- A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- B. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 2. Steel Through Bolts: For the following fire-rated applications unless door blocking is provided:
 - a. Surface hinges to doors.
 - b. Closers to doors and frames.
 - c. Surface-mounted exit devices.
 3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.16 FINISHES

- A. Standard: BHMA A156.18, as indicated in door hardware sets.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 Series.
 - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A250.6.
- B. Wood Doors: Comply with DHI A115-W Series.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
 - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

3.4 FIELD QUALITY CONTROL

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- B. Occupancy Adjustment: Approximately [six] months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 087100

SECTION 092900

GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior gypsum board.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for wood framing and furring that supports gypsum board.
 - 2. Division 07 Section "Thermal Insulation" for insulation and vapor retarders installed in assemblies that incorporate gypsum board.
 - 3. Division 09 painting Sections for primers applied to gypsum board surfaces.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PANELS, GENERAL

- A. Recycled Content: Provide gypsum panel products with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 10 percent by weight.
- B. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Gypsum Co.
 - b. BPB America Inc.
 - c. G-P Gypsum.
 - d. Lafarge North America Inc.
 - e. National Gypsum Company.
 - f. PABCO Gypsum.
 - g. Temple.
 - h. USG Corporation.
- B. Moisture- and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces.
 1. Core: 5/8 inch (15.9 mm), Type X.
 2. Long Edges: Tapered.

2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet .
 2. Shapes:
 - a. Cornerbead.

- b. LC-Bead: J-shaped; exposed long flange receives joint compound.
- c. L-Bead: L-shaped; exposed long flange receives joint compound.
- d. U-Bead: J-shaped; exposed short flange does not receive joint compound.

2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 - 1. Interior Gypsum Wallboard: Paper.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Recycled Content: Provide blankets with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 10 percent by weight.
- D. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."
 - 1. Provide sealants that have a VOC content of 250g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than **1/16 inch (1.5 mm)** of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than **8 sq. ft. (0.7 sq. m)** in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow **1/4- to 3/8-inch- (6.4- to 9.5-mm-)** wide joints to install sealant.
- F. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide **1/4- to 1/2-inch- (6.4- to 12.7-mm-)** wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- G. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Moisture- and Mold-Resistant Type: In Toilet and Janitor Rooms for walls above tile wainscot.
- B. Single-Layer Application:
 - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
 - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
 - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, **16 inches (400 mm)** minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
 - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 - 3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners, unless otherwise indicated.
 - 2. LC-Bead: Use at exposed panel edges.
 - 3. L-Bead: Use where indicated.

3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in other Division 09 Sections.

3.6 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 099113

EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Steel.
 - 2. Galvanized metal.
 - 3. Wood.
- B. Related Sections include the following:
 - 1. Division 08 Sections for factory priming windows and doors with primers specified in this Section.
 - 2. Division 09 Section "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of topcoat product indicated.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5percent, but not less than 1 gal. (3.8 L) of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. Bennette Paint Mfg. Co., Inc.
 - 3. California Paints.
 - 4. Cloverdale Paint.
 - 5. Sherwin-Williams Company (The).
 - 6. Approved equal

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Colors: As selected by Architect from manufacturer's full range .

2.3 PRIMERS/SEALERS

- A. Bonding Primer (Water Based): MPI #17.
- B. Bonding Primer (Solvent Based): MPI #69.
- C. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint system indicated.

2.4 METAL PRIMERS

- A. Alkyd Anticorrosive Metal Primer: MPI #79.
- B. Waterborne Galvanized-Metal Primer: MPI #134.
- C. Quick-Drying Primer for Aluminum: MPI #95.

2.5 WOOD PRIMERS

- A. Exterior Latex Wood Primer: MPI #6.

2.6 EXTERIOR LATEX PAINTS

- A. Exterior Latex (Flat): MPI #10 (Gloss Level 1).
- B. Exterior Latex (Semigloss): MPI #11 (Gloss Level 5).
- C. Exterior Latex (Gloss): MPI #119 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).

2.7 QUICK-DRYING ENAMELS

- A. Quick-Drying Enamel (Semigloss): MPI #81 (Gloss Level 5).
 - 1. VOC Content: E Range of [E1] [E2] [E3].
- B. Quick-Drying Enamel (High Gloss): MPI #96 (Gloss Level 7).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Plaster: 12 percent.
 - 5. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
- E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- F. Wood Substrates:
 - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces, including countersunk fasteners, with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance of paint materials with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Steel Substrates:
 - 1. Alkyd System: MPI EXT 5.1D.
 - a. Prime Coat: Alkyd anticorrosive metal primer.
 - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
 - c. Topcoat: Exterior alkyd enamel (semigloss).
- B. Galvanized-Metal Substrates:
 - 1. Latex Over Water-Based Primer System: MPI EXT 5.3H.

- a. Prime Coat: Waterborne galvanized-metal primer.
- b. Intermediate Coat: Exterior latex matching topcoat.
- c. Topcoat: Exterior latex (semigloss).

C. Dressed Lumber Substrates: Including architectural woodwork doors, siding.

1. Latex System: MPI EXT 6.3L.

- a. Prime Coat: Exterior latex wood primer.
- b. Intermediate Coat: Exterior latex matching topcoat.
- c. Topcoat: Exterior latex (flat) for siding, (semigloss) for doors and window sash.

D. Wood Panel Substrates: Including soffits.

1. Latex System: MPI EXT 6.4K.

- a. Prime Coat: Exterior latex wood primer.
- b. Intermediate Coat: Exterior latex matching topcoat.
- c. Topcoat: Exterior latex (flat) .

END OF SECTION 099113

SECTION 099123

INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Steel.
 - 2. Galvanized metal.
 - 3. Wood.
 - 4. Gypsum board.
- B. Related Sections include the following:
 - 1. Division 6 Section "Interior Architectural Woodwork" for factory applied casework finishes.
 - 2. Factory- or shop-applied primers applied as Work of other Sections must be coordinated with field-applied finish coats. Review other Sections for factory- or shop-primed products and reference this Section for product requirements.
 - 3. Division 08 Sections for factory priming windows and doors with primers specified in this Section.
 - 4. Division 9 Section "Wood Flooring" for wood flooring finishes.
 - 5. Division 09 Section "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of topcoat product indicated.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. (3.8 L) Insert number of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. California Paints.
 - 3. Cloverdale Paint.
 - 4. Dunn-Edwards Corporation.
 - 5. PPG Architectural Finishes, Inc.
 - 6. Sherwin-Williams Company (The).
 - 7. Approved equal

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
 - 1. Flat Topcoat Paints: VOC content of not more than 50 g/L.
 - 2. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
 - 3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
 - 4. Shellacs, Clear: VOC not more than 730 g/L.
 - 5. Shellacs, Pigmented: VOC not more than 550 g/L.
 - 6. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
- C. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
 - 1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 - 2. Restricted Components: Paints and coatings shall not contain any of the following:

- a. Acrolein.
- b. Acrylonitrile.
- c. Antimony.
- d. Benzene.
- e. Butyl benzyl phthalate.
- f. Cadmium.
- g. Di (2-ethylhexyl) phthalate.
- h. Di-n-butyl phthalate.
- i. Di-n-octyl phthalate.
- j. 1,2-dichlorobenzene.
- k. Diethyl phthalate.
- l. Dimethyl phthalate.
- m. Ethylbenzene.
- n. Formaldehyde.
- o. Hexavalent chromium.
- p. Isophorone.
- q. Lead.
- r. Mercury.
- s. Methyl ethyl ketone.
- t. Methyl isobutyl ketone.
- u. Methylene chloride.
- v. Naphthalene.
- w. Toluene (methylbenzene).
- x. 1,1,1-trichloroethane.
- y. Vinyl chloride.

- D. Colors: As selected by Architect from manufacturer's full range .

2.3 PRIMERS/SEALERS

- A. Interior Latex Primer/Sealer: MPI #50.
- B. Interior Alkyd Primer/Sealer: MPI #45.
- C. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint systems indicated.

2.4 METAL PRIMERS

- A. Alkyd Anticorrosive Metal Primer: MPI #79.
- B. Waterborne Galvanized-Metal Primer: MPI #134.

2.5 WOOD PRIMERS

- A. Interior Latex-Based Wood Primer: MPI #39.

2.6 LATEX PAINTS

- A. Institutional Low-Odor/VOC Latex (Flat): MPI #143 (Gloss Level 1).
- B. Institutional Low-Odor/VOC Latex (Eggshell): MPI #145 (Gloss Level 3).
- C. Institutional Low-Odor/VOC Latex (Semigloss): MPI #147 (Gloss Level 5).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Wood: 15 percent.
 - 2. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
 - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

D. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

E. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:

1. Mechanical Work:

- a. Uninsulated metal piping.
- b. Uninsulated plastic piping.
- c. Pipe hangers and supports.
- d. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
- e. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
- f. Mechanical equipment that is indicated to have a factory-primed finish for field painting.

2. Electrical Work:

- a. Switchgear.

- b. Panelboards.
- c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Steel Substrates:
 - 1. Latex Over Alkyd Primer System: MPI INT 5.1Q.
 - a. Prime Coat: Alkyd anticorrosive metal primer.
 - b. Intermediate Coat: Interior latex matching topcoat.
 - c. Topcoat: Interior latex (semigloss).
- B. Galvanized-Metal Substrates:
 - 1. Institutional Low-Odor/VOC Latex System: MPI INT 5.3N.

- a. Prime Coat: Waterborne galvanized-metal primer.
- b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
- c. Topcoat: Institutional low-odor/VOC interior latex (semigloss).

C. Dressed Lumber Substrates: Including architectural woodwork and doors.

1. Institutional Low-Odor/VOC Latex System: MPI INT 6.3V.

- a. Prime Coat: Interior latex-based wood primer.
- b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
- c. Topcoat: Institutional low-odor/VOC interior latex (semigloss).

D. Gypsum Board Substrates:

1. Institutional Low-Odor/VOC Latex System: MPI INT 9.2M.

- a. Prime Coat: Interior latex primer/sealer.
- b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
- c. Topcoat: Institutional low-odor/VOC interior latex (flat) for ceilings and (eggshell) for walls.

END OF SECTION 099123

SECTION 101400

SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Panel signs.
- B. Related Sections include the following:
 - 1. Division 01 Section "Temporary Facilities and Controls" for temporary Project identification signs and for temporary information and directional signs.
 - 2. Division 22 Section "Identification for Plumbing Piping and Equipment" for labels, tags, and nameplates for plumbing systems and equipment.
 - 3. Division 26 Sections for electrical service and connections for illuminated signs.
 - 4. Division 26 Section "Identification for Electrical Systems" for labels, tags, and nameplates for electrical equipment.

1.3 DEFINITIONS

- A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for signs.
 - 1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
 - 2. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:

- D. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:
 - 1. Panel Signs: Not less than 12 inches (305 mm) square including border.
- E. Sign Schedule: Use same designations indicated on Drawings.
- F. Maintenance Data: For signs to include in maintenance manuals.
- G. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
- B. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines .

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 COORDINATION

- A. Coordinate placement of anchorage devices with templates for installing signs.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of metal and polymer finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors and sign lamination.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANEL SIGNS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide APCO; ADA Process 1, 388 Grant Street SE, Atlanta, Georgia, 30312, USA. Phone; (404) 688-9000. Telex; 752098. Fax; (404) 577-3847.
- B. or a comparable product by one of the following:
1. ACE Sign Systems, Inc.
 2. Advance Corporation; Braille-Tac Division.
 3. Allen Industries Architectural Signage
 4. Allenite Signs; Allen Marking Products, Inc.
 5. APCO Graphics, Inc.
 6. ASI-Modulex, Inc.
 7. Best Sign Systems Inc.
 8. Bunting Graphics, Inc.
 9. Fossil Industries, Inc.
 10. Gemini Incorporated.
 11. Grimco, Inc.
 12. Innerface Sign Systems, Inc.
 13. InPro Corporation
 14. Matthews International Corporation; Bronze Division.
 15. Mills Manufacturing Company.
 16. Mohawk Sign Systems.
 17. Nelson-Harkins Industries.
 18. Seton Identification Products.
 19. Signature Signs, Incorporated.
 20. Supersine Company (The)
- C. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus **1/16 inch (1.5 mm)** measured diagonally from corner to corner, complying with the following requirements:
1. Laminated, Etched Photopolymer: Raised graphics with Braille **1/32 inch (0.8 mm)** above surface with contrasting colors as selected by Architect from manufacturer's full range and laminated to acrylic back.
 2. Phenolic sheet with photopolymer fused to one side, thickness .125"
Clear Lens with ADA Band, a thin photo etched plastic laminated to an area of the Clear Lens. Clear Lens Thickness: 1/8".
 3. Edge Condition: Square cut .
 4. Corner Condition: Rounded to radius indicated.
 5. Mounting: Unframed As indicated.
 - a. Wall mounted with two-face tape.
 6. Color: As selected by Architect from manufacturer's full range .
 7. Tactile Characters: Characters and Grade 2 Braille raised **1/32 inch (0.8 mm)** above surface with contrasting colors.
- D. Panel Sign Schedule:

1. Sign Types:
 - a. Toilet Room Signs

2.2 FABRICATION

- A. General: Provide manufacturer's standard signs of configurations indicated.
 1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.
 2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
 3. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
 4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.3 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
 2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within **3 inches (75 mm)** of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
1. Two-Face Tape: Mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101400

SECTION 102800

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Public-use washroom accessories.
 - 2. Underlavatory guards.
- B. Related Sections include the following:
 - 1. Division 26 for electrical power connections for paper towel dispensers and soap dispensers.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Construction details and dimensions.
 - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Material and finish descriptions.
 - 4. Features that will be included for Project.
 - 5. Manufacturer's warranty.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated on Drawings.
- C. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Source Limitations: For products listed together in the same articles in Part 2, provide products of same manufacturer unless otherwise approved by Architect.

- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

- 1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.
- B. Brass: ASTM B 19 flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch (0.9-mm) minimum nominal thickness.
- D. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: The design for accessories is based on products indicated. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 - 1. A & J Washroom Accessories, Inc.
 - 2. American Specialties, Inc.
 - 3. Bobrick Washroom Equipment, Inc.
 - 4. Bradley Corporation.
 - 5. General Accessory Manufacturing Co. (GAMCO).
- C. Combination Toilet Tissue, Seat-Cover and Sanitary Napkin Disposal (Women's Toilet Accessible Stall and stall adjacent to wall)
 - 1. Basis-of-Design Product: Bobrick B-3574
 - 2. Description: Combination unit with double-roll toilet tissue dispenser and the following:
 - a. Removable sanitary-napkin waste receptacle with self-closing disposal-opening cover.
 - b. Seat-cover dispenser with minimum capacity of 500 single or half-fold seat covers.
 - 3. Mounting: Recessed.
 - 4. Toilet Tissue Dispenser Capacity: 4-1/2- or 5-inch- (114- or 127-mm-) diameter tissue rolls.
 - 5. Toilet Tissue Dispenser Operation: Noncontrol delivery with theft-resistant spindles.
 - 6. Material and Finish: Stainless steel, No. 4 finish (satin).
 - 7. Lockset: Tumbler type.
- D. Combination Toilet Tissue Dispenser (Men's Toilet Accessible stall)
 - 1. Basis-of-Design Product: Bobrick B347
 - 2. Description: Combination unit with double-roll toilet tissue dispenser and the following:
 - a. Seat-cover dispenser with minimum capacity of 500 single or half-fold seat covers.
 - 3. Mounting: Recessed.
 - 4. Toilet Tissue Dispenser Capacity: 4-1/2- or 5-inch- (114- or 127-mm-) diameter tissue rolls.
 - 5. Toilet Tissue Dispenser Operation: Noncontrol delivery with theft-resistant spindles.
 - 6. Material and Finish: Stainless steel, No. 4 finish (satin).
 - 7. Lockset: Tumbler type.
- E. Combination Toilet Tissue Dispenser (Men's Toilet non-Accessible stall not adjacent to wall)
 - 1. Basis-of-Design Product: Bobrick B3474
 - 2. Description: Combination unit with double-roll toilet tissue dispenser and the following:
 - a. Seat-cover dispenser with minimum capacity of 500 single or half-fold seat covers.

3. Mounting: Recessed.
 4. Toilet Tissue Dispenser Capacity: 4-1/2- or 5-inch- (114- or 127-mm-) diameter tissue rolls.
 5. Toilet Tissue Dispenser Operation: Noncontrol delivery with theft-resistant spindles.
 6. Material and Finish: Stainless steel, No. 4 finish (satin).
 7. Lockset: Tumbler type.
 - 8.
- F. Combination Toilet Tissue, Seat-Cover and Sanitary Napkin Disposal (Women's Toilet non-Accessible Stalls not adjacent to wall)
1. Basis-of-Design Product: Bobrick B-357
 2. Description: Combination unit with double-roll toilet tissue dispenser and the following:
 - a. Removable sanitary-napkin waste receptacle with self-closing disposal-opening cover.
 - b. Seat-cover dispenser with minimum capacity of 500 single or half-fold seat covers.
 3. Mounting: Partition mounted, dual access with two tissue rolls per compartment.
 4. Toilet Tissue Dispenser Capacity: 4-1/2- or 5-inch- (114- or 127-mm-) diameter tissue rolls.
 5. Toilet Tissue Dispenser Operation: Noncontrol delivery with theft-resistant spindles.
 6. Material and Finish: Stainless steel, No. 4 finish (satin).
 7. Lockset: Tumbler type.
- G. Paper Towel (Roll) Dispenser:
1. Basis-of-Design Product: Georgia-Pacific
 2. Description: enMotion # 59466 recessed automatic touchless towel dispenser.
 3. Minimum Capacity: 8.250 inch X 700 inch
 4. Material and Finish: Stainless steel, No. 4 finish (satin).
 5. Power: AC power with adapter.
 6. Lockset: Tumbler type.
 7. Special information: This item requires one-time lifetime lease agreement with a GP authorized distributor. Contractor to arrange and pay lease cost.
- H. Waste Receptacle:
1. Basis-of-Design Product: Bobrick B3644
 2. Mounting: Semirecessed.
 3. Minimum Capacity: 12 gal.
 4. Material and Finish: Stainless steel, No. 4 finish (satin).
 5. Liner: Reusable vinyl liner.
 6. Lockset: Tumbler type for waste-receptacle.
- I. Liquid-Soap Dispenser:
1. Basis-of-Design Product: Bobrick B-826 with B-826-B AC Adapter.
 2. Description: Designed for dispensing soap in liquid or lotion form.
 3. Mounting: Deck mounted on lavatory .
 4. Capacity: 27 oz.

5. Materials: Polished chrome plated plastic with polyethylene bottle.
6. Refill Indicator: LED.

J. Grab Bar:

1. Basis-of-Design Product: Bobrick B6806.99 x 36 and B-6806.99x42
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch (1.3 mm) thick.
 - a. Finish: Smooth, No. 4, satin finish on ends and slip-resistant texture in grip area.
4. Outside Diameter: 1-1/2 inches (38 mm).
5. Configuration and Length: Straight, 36 inches and 42 inches long. (

K. Vendor:

1. Basis-of-Design Product: Bobrick B-352 25
2. Type: Sanitary napkin and tampon.
3. Mounting: Semirecessed.
4. Capacity: 30 sanitary napkins and 27 tampons.
5. Operation: Single coin (25 cents) .
6. Exposed Material and Finish: Stainless steel, No. 4 finish (satin)
7. Lockset: Tumbler type with separate lock and key for coin box.

L. Mirror Unit:

1. Basis-of-Design Product: Bobrick B-165 2436
2. Frame: Stainless-steel channel.
 - a. Corners: Manufacturer's standard .
3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
 - a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
4. Size: 24 x 36.

2.3 CHILDCARE ACCESSORIES

A. Basis-of-Design Product: The design for accessories is based on products indicated. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. American Infant Care Products Inc.
2. American Specialties, Inc.
3. Brocar Products, Inc.
4. General Accessory Manufacturing Co. (GAMCO).
5. Koala Corporation.
6. Safe-Strap Company, Inc.

B. Diaper-Changing Station:

1. Basis-of-Design Product: Koala Care KB110-SSRE
2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
 - a. Engineered to support a minimum of 250-lb (113-kg) static load when opened.
3. Mounting: Semirecessed, with unit projecting not more than 1 inches (25 mm) from wall when closed.
4. Operation: By pneumatic shock-absorbing mechanism.
5. Material and Finish: Stainless steel, No. 4 finish (satin), exterior shell with rounded plastic corners; high-density polyethylene interior in manufacturer's standard color.
6. Liner Dispenser: Built in.

2.4 UNDERLAVATORY GUARDS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: The design for accessories is based on products indicated. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 1. Plumberex Specialty Products, Inc.
 2. TCI Products.
 3. Truebro, Inc.
- D. Underlavatory Guard:
 1. Basis-of-Design Product: Truebro Lav Guard 2
 2. Description: Insulating pipe covering for supply and drain piping assemblies, that prevent direct contact with and burns from piping, and allow service access without removing coverings.
 3. Material and Finish: Antimicrobial, molded-plastic, white.
 4. Refill Indicator: Window type.

2.5 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 102800

SECTION 220000

BASIC PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.01 CONDITIONS OF THE CONTRACT:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to Work of this section.
- B. This section is a Division-22 Basic Plumbing Materials and Methods section and is part of each Division-22 section making reference to pipes and pipe-fittings specified herein.
- C. Related work included in other sections and divisions.
 - 1. Rough Carpentry – Section 061000.
 - 2. Exterior Painting – Section 099113.
 - 3. Interior Painting – Section 099123.
 - 4. Electrical – Division 26.

1.02 INCORPORATED DOCUMENTS:

- A. This section consists of General Requirements and Standard Specifications covering certain parts of work under Division 22 and is supplemented by other Division 22 sections covering additional work, requirements, and materials specifically applicable to the work of each section. Requirements of subsequent sections of the specifications, if in conflict with these General Requirements, shall govern.
- B. These General Provisions apply to the entire Division 22.
- C. Published specifications, standards, tests or recommended methods of trade, industry or governmental organizations apply to work of this Section, including those noted below.
 - 1. American National Standards Institute (ANSI).
 - 2. American Society of Mechanical Engineers (ASME).
 - 3. American Society for Testing and Materials (ASTM).
 - 4. Air Conditioning and Refrigeration Institute (ARI).
 - 5. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).
 - 6. National Electrical Manufacturers Association (NEMA).
 - 7. National Fire Protection Association (NFPA).
 - 8. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
 - 9. Underwriters' Laboratories, Inc. (UL).
 - 10. Air Moving and Conditioning Association (AMCA).
 - 11. Air Diffusion Council (ADC).

1.03 REQUIREMENTS OF REGULATORY AGENCIES:

- A. Permit Fees: Refer to General Conditions, Section 007000.

- B. Provide work and materials in full accordance with the latest rules and regulations of the following:
1. California Code of Regulations - Title 24 - Parts 2, 3, 4, 5, and 6
 2. California Code of Regulations - Title 22 - Chapter 7
 3. California Electric Code
 4. National Fire Protection Association
 5. CAL-OSHA
 6. Occupational Safety and Health Administration
 7. State Fire Marshal, Title 19 CCR
 8. California Building Code
 9. California Fire Code
 10. California Mechanical Code
 11. California Plumbing Code
 12. Other applicable state laws
- C. Nothing in Drawings or specifications shall be construed to permit work not conforming to these codes.
- D. Conform to State of California Energy Conservation Standards for all systems, equipment, and construction.
- E. When Contract Documents differ from governing codes, furnish and install larger size or higher standards called for without extra charge.
- F. No material installed as part of this WORK shall contain asbestos in any form.

1.04 WORK INCLUDED:

- A. This Section consists of General Requirements and Standard Specifications covering certain parts of work under Division 22 and is supplemented by other Division 22 sections covering additional work, requirements, and materials specifically applicable to the work of each section. Requirements of subsequent sections of the specifications, if in conflict with these General Requirements, shall govern.

1.05 OWNER-FURNISHED EQUIPMENT:

- A. Refer to Division 1 for specification requirements on mechanical equipment furnished to project by Owner, and to be received, installed and placed in operation as mechanical work.

1.06 PHASE CONSTRUCTION:

- A. Refer to Division 1 provisions for determination of how construction phasing requirements may affect performance of mechanical work.

1.07 SUBMITTALS:

- A. Material List and Substitutions.
- B. Operation and Maintenance instructions.

- C. Shop Drawings.
- D. Record Drawings.
- E. Project Completion Tests and Start-up: The following work shall be completed and submitted for review before project closeout field observations.
 - 1. Startup and operation reports as required throughout Division 22.
 - 2. Test and balance reports.
 - 3. Final observation will not be made until all of the above have been completed and balance report has been submitted and reviewed.

1.08 UTILITY CONNECTIONS:

- A. Contractor shall bear the cost of all construction related to utility services, from the point of connection shown on the Contract Documents. This shall include any piping, excavation, backfill, meters, boxes, check valves, backflow prevention devices, general service valves and the like, whether or not the work is performed by this contractor, the water/sanitation district or any other governmental agencies or assigns.

1.09 FEES, PERMITS, AND UTILITY SERVICES:

- A. Obtain and pay for all permits and service required in installation of this work; arrange for required inspections and secure approvals from authorities having jurisdiction.
- B. Arrange for utility connections and pay charges incurred, including excess service charges, if any.
- C. Prior to the start of construction, contact local gas company representative and coordinate location of gas meter and piping. In addition, coordinate time required for installation, in order to avoid delay to the project.
- D. Charges for permits required will be reimbursed to the contractor.
- E. The Owner will pay all fees required. The Owner will reimburse the Contractor for fees, permits, and utility service charges, other than temporary utility charges unless otherwise indicated, necessary to the completion of the work. Proper documentation of fee, permit, and utility service charges shall be submitted to the Owner through the Architect. No mark-up shall be allowed the Contractor on these reimbursable charges.
- F. Obtain the first permits to operate any compressed air tanks that are required to be furnished under this work, pay all costs, and perform all tests required to obtain permits. Post permits under glass in a conspicuous place on or near the tanks, as required by these authorities.

1.10 SITE EXAMINATION:

- A. Examine site, verify dimensions and locations against Drawings, and inform self of conditions under which work is to be done before submitting proposal. No allowance will be made for extra expense on account of error.

- B. Information shown relative to existing services is based upon available records and data but is approximate only. Make minor deviations found necessary to conform with actual locations and conditions without extra cost. Verify location and elevation of utilities prior to commencement of excavation for new piping or its installation.
- C. Exercise extreme care in excavating near existing utilities to avoid any damage thereto. This Contractor is responsible for any damage caused by his operations.
 - 1. Refer to section 312000 prior to performing any excavating for requirements.

1.11 PLACEMENT OF EQUIPMENT AND WORK:

- A. The placement of equipment and mechanical work in the locations and spaces shown on the Drawings is the Contractor's responsibility.
- B. Move equipment and/or work into spaces through openings provided or located in the spaces during construction, as required.
- C. Do disassembling and reassembling of equipment or other work necessary to accomplish this requirement without extra cost to the Owner.

1.12 MATERIAL LIST AND SUBSTITUTIONS:

- A. Prior to commencement of work, and within time specified in Section 013300, after award of Contract, submit to Architect for review as required by Specification section 013300 a complete list of equipment and materials to be furnished, including all substitutions.
 - 1. Substitutions will be interpreted to be all manufacturers other than those specifically listed by model or catalog number.
 - 2. Identify submittal with Architect's project name, number and with item designation as indicated on drawings and referenced to applicable paragraphs of the specification.
 - 3. Partial or incomplete lists of material will not be considered.
 - 4. Only one request for substitution will be considered on each item of material or equipment. No substitutions will be considered thereafter.
 - 5. Quantities are the Contractor's responsibility and will not be reviewed.
 - 6. Provide materials of the same brand or manufacturer throughout for each class of material or equipment whenever possible.
- B. If Contractor desires to make a substitution, he shall submit complete information or catalog data to show equality of equipment or material offered to that specified. No substitutions will be allowed unless requested and reviewed in writing per specification Section 016000. The Architect shall review and take appropriate action on shop Drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be only for general conformance with the design concept and general compliance with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Architect shall not be required to review and shall not be responsible for any deviations from the Contract Documents not

clearly noted by the Contractor, nor shall the Architect be required to review partial submissions or those for which submissions for correlated items have not been received. Architect reserves right to require originally specified item.

- C. Installation of reviewed substitution is Contractor's responsibility. Any changes required for installation of reviewed substituted equipment must be made without additional cost. Review by the Architect of the substituted equipment and/or dimensional Drawings do not waive these requirements.

1.13 MAINTENANCE AND OPERATING INSTRUCTIONS:

- A. General: Submit to the Architect the lesser of a) a minimum of 30 days prior to start-up or b) within 60 days after submittals are approved. The manual shall be complete and submitted all at one time. Partial or separate data will not be accepted. Data shall consist of the following minimum submissions:
 - 1. Piping Identification Schedule: Copy of charts as specified under valve tags and charts.
 - 2. Equipment: List of nameplates, including nameplate data and system served.
 - 3. Manufacturers Literature: 3 copies of manufacturer's instructions for operation and maintenance of all mechanical equipment, including replacement parts list.
 - 4. Written Instructions: Typewritten instructions for operation and maintenance of these systems composed of Operating Instructions and Maintenance Schedule. 4 copies submittal to the Engineer for review.
 - 5. Operating instructions: A brief description of the system indicating proper setting of switches and other equipment furnished for providing control of the system and its components by the operator. Do not include adjustments requiring the technical knowledge of the service agency personnel.
 - 6. Maintenance Instructions: A list of each item of equipment requiring inspection or lubrication, describing the performance of such maintenance, and the month of the year when each item of equipment should be inspected, serviced, or lubricated. Maintenance Schedule: A list of each item of equipment requiring maintenance, showing the exact type of bearing on every component of each item of equipment, and the frequency when each item of equipment should be inspected or serviced.
- B. Verbal Instructions: Upon completion of the work, and at a time designated by the Architect, instruct the Owner's representative in the operation and maintenance of the equipment supplied by his company. This shall include two 4 hour sessions at site.
- C. Binders: Four complete sets of the above data in loose ring binders with permanent covers, with permanent identification on the back and index.
- D. Provide copies of check test and start reports for each piece of mechanical equipment provided as part of the Work.

1.13 JOB CONDITIONS:

- A. Cooperation with Other Trades: Coordinate Work of this SECTION with that of other SECTIONS to ensure that Work is carried out in an orderly fashion.

- B. Coordinate with other trades all equipment locations, pipe, duct and conduit runs, electrical outlets and fixtures, air inlets and outlets, and structural and architectural features. Provide information on location of piping and seismic bracing to all other trades as required for a completely coordinated project.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT:

- A. Mention herein or on Drawings requires that this Contractor provide each item listed of quality noted or equal.
 - 1. All material shall be new, full weight, standard in all respects, and in first-class condition.
 - 2. Provide materials of the same brand or manufacture throughout for each class of material or equipment wherever possible.
 - 3. Materials shall be tested within the Continental United States by independent, nationally recognized testing agency and shall be listed in accordance with testing agency requirements.
 - 4. All sizes, capacities and efficiency ratings shown are minimum, except gas capacity which is maximum available.
- B. The grade or quality of materials desired is indicated by the trade names or catalog numbers stated herein.
- C. Dimensions, sizes, and capacities shown are a minimum and shall not be changed without permission of the Architect.
- D. Conform to the State Energy Conservation Standards for all material and equipment.

2.02 PRODUCT HANDLING AND PROTECTION:

- A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

2.03 PREPARATORY PROVISIONS:

- A. The Contractor is responsible for the examination and acceptance of all conditions affecting the proper construction and/or installation of the Work of this Section, and shall not proceed until all unsatisfactory conditions have been corrected. Commencing work shall be construed as acceptance of all conditions by the Contractor as satisfactory for the construction and/or installation of the Work.

2.04 MATERIALS FURNISHED:

- A. Identify all materials and equipment by manufacturer's name and model number. Remove unidentified materials and equipment from site.

- B. Equipment specified by manufacturer's number shall include all accessories, controls, etc. listed in catalog as standard with equipment. Furnish optional or additional accessories as specified.
- C. Equipment or material damaged during transportation, installation, or operation is considered as totally damaged. Replace with new equipment. Variance from this permitted only with written consent of the Architect.

PART 3 - EXECUTION

3.02 DRAWINGS AND COORDINATION:

- A. Examine all Drawings prior to bidding of work and report any discrepancies in writing to the Architect.
- B. Drawings showing location of equipment, piping, ductwork, etc., are diagrammatic and job conditions will not always permit their installation in the location shown. The Mechanical Drawings show the general arrangement of all piping, ductwork, equipment, etc., and shall be followed as closely as existing conditions, actual building construction, and the work of other trades will permit. The Architectural and Structural Drawings shall be considered a part of the work insofar as these Drawings furnish the Contractor with information relating to design and construction of the building. Architectural Drawings shall take precedence over Mechanical Drawings.
- C. Because of the small scale of the Mechanical Drawing, it is not possible to indicate all offsets, fittings, and accessories which may be required. The Contractor shall investigate the structural and finish conditions affecting the work and shall arrange his work accordingly providing such fittings, valves, and accessories as may be required to meet conditions.
- D. General arrangement and location of piping, ductwork, equipment, etc. are shown on Drawings or herein specified. Carefully examine other work that may conflict with this work. Install this work in harmony with other crafts and at proper time to avoid delay of work.
- E. In advance of construction, work out minor changes and relocation to suit actual conditions and work of other trades to avoid conflict therewith. This shall not be cause for additional cost.
 - 1. Obtain all necessary information from the other trades regarding centers of partitions, walls, location of plumbing mains, fire sprinkler mains, and electrical conduits, ducts, pipes, etc. in order that pipes, equipment, and ductwork may be placed in their correct positions.
- F. Execute any work or apparatus shown on the Drawings and not mentioned in the specifications, or vice versa, the same as if specifically mentioned by both. Omission from Drawings or specifications of any minor details of construction, installation, materials, or essential specialties does not relieve this Contractor from furnishing same in place complete.

- G. Furnish and install any incidental work not shown or specified which can reasonably be inferred as part of the work and necessary to provide a complete and workable system.
- H. Furnish materials and work at proper time to avoid delay of the work.

3.03 INSTALLATION INSTRUCTIONS:

- A. Where requested by the Architect or Inspector of Record, provide manufacturer's printed installation instructions. This information shall include as a minimum, all information required by the contractor for complete installation of the product.

3.04 ACCESS:

- A. Continuously check Architectural Drawings for clearance and accessibility of equipment specified herein to be placed. No allowance of any kind will be made for negligence on part of Contractor to foresee means of installing his equipment into proper position.

3.05 CLOSING IN OF UNINSPECTED WORK:

- A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected and tested. Should work be enclosed or covered up before it has been inspected and tested, uncover work at own expense. After it has been inspected and tested, make repairs necessary to restore work of other contractors to condition in which it was found at time of cutting.

3.06 PROJECT MODIFICATIONS:

- A. During the progress of construction, if such conditions arise that require revisions, modifications, or relocations to any mechanical equipment or materials incorporated in this project, such alterations shall be immediately called to the attention of the Architect. Contractor shall then prepare necessary Drawings showing proposed changes. Submit proposed changes for review by the Architect prior to actual revision work in the field.
- B. Two sets of Drawings showing all revisions shall be immediately presented to Architect for his records. Maintain additional copies on the project as necessary to comply with "RECORD DRAWINGS" requirement of the General Requirements.
- C. Incorporate all revisions into record Drawings.

3.07 FRAMING, CUTTING AND PATCHING:

- A. Coordinate with other contractors as necessary to provide any special framing, recesses, chases, etc., and provide wood blocking, backing, and grounds as necessary for proper installation of mechanical work.
- B. If this Contractor fails to coordinate with other contractors at proper time or fails to locate items properly, resulting in extra work, then this Contractor is responsible.
- C. This Contractor is responsible for proper placement of pipe sleeves, hangers, inserts, and supports for work.

- D. Cutting, patching, and repairing of existing (old) construction to permit installation of piping, etc. is responsibility of this Contractor. Repair or replace damage to existing work with skilled mechanics for each trade involved in first-class manner in accordance with renewed codes and standards.
- E. Cut existing construction in a neat and workmanlike manner by the use of a concrete saw. Use of pneumatic devices will not be allowed.
 - 1. Do not cut, core or drill structural members without consent of Architect and unless a DSA approved drawing is provided.
- F. Core openings through existing construction as required for the passage of new piping and conduits. Cut holes of the minimum diameter to suit size of pipe installed and associated insulation.

3.08 CARE AND CLEANING:

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.
- B. Drain and flush piping to remove grease and foreign matter.
- C. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.

3.09 SPECIAL JOB CONDITIONS:

- A. The Contractor's attention is directed to the fact that this building area is occupied and operational. Make every effort to minimize noise, dust, and inconveniences to the on-going operations of the building, and avoid any service interruptions.
- B. Perform Work in an orderly and careful manner with due consideration for the safety and protection of all existing surfaces, materials, and equipment that are to remain. Install and maintain protective and dust-protective devices as necessary and as required by State codes.
- C. It is intended that the Contractor provide and maintain dust-protective devices and partitions to contain or enclose all work operations conducted within any occupied room or space or adjacent to any occupied room or space when doors or other openings will permit dust infiltration into such occupied areas. Dust protective partitions shall be airtight. The location of such partitions and construction materials used is subject to the review of the Architect.
- D. Arrange for any interruptions of HVAC, plumbing, electrical, or fire protection work a minimum of 48 hours in advance. Arrange sequence of mechanical work with the Architect before construction is started, and confirm arrangements with all other trades.
- E. All temporary connections required to maintain services, including adequate heating and cooling, during the course of this Contract shall be made without additional cost to the

Owner. The normal function of the building must not be interrupted; notify the Owner's Representative seven (7) days in advance before disturbing any service.

3.10 DEMOLITION AND SALVAGE:

- A. Provide demolition of mechanical work under this SECTION as indicated on Drawings. All mechanical fixtures, materials, and equipment will become the property of the mechanical contractor, unless otherwise directed by the owner, and shall be removed from the job site.

3.11 EXISTING SERVICES:

- A. Provide and install all required connections to existing systems as required by the Drawings and specifications.
- B. Integrate existing systems with all new work to provide a complete working system.
- C. Provide minimum 48-hour notice to Owner of service interruptions. All service interruptions shall be kept to the minimum possible time. When requested by Owner service interruptions shall occur outside of normal working hours.

3.12 STRUCTURAL DESIGN OF EQUIPMENT AND SEISMIC RESTRAINTS:

- A. All mechanical equipment supports shall be designed by a licensed Structural Engineer and shall comply with the California Building Code seismic requirements as well as requirements for direct bearing loads.
- B. Provide all piping and ductwork with seismic restraints using seismic hazard level (SHL) "A" as called for in SMACNA's "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems," prepared by the Sheet Metal Industry Fund of Los Angeles.
- C. In addition, conform to all State of California requirements.

3.13 ASBESTOS ABATEMENT:

- A. Existing systems within the area of this scope of work may have asbestos-bearing materials. Testing, encapsulation, removal, treatment, or correction of existing asbestos-bearing materials is not a part of this scope of work and is not the responsibility of the Mechanical Contractors.

3.14 GUARANTEE:

- A. Be responsible for work done and material installed under these plans and specifications. Repair or replace, as may be necessary, any defective work, material, or part which may show itself within two years of filing of Notice of Completion and be responsible for damage to other materials, furnishing, equipment, or premises caused by such defects during this period, if in the opinion of the Architect said defect is due to imperfection of material or workmanship. Provide all such work and materials at no cost to Owner.
- B. Be responsible for damage to any part of premises during guarantee period caused by leaks or breaks in work furnished and/or installed under this section.

- C. Replace refrigerant, lubricants, or gasses lost as result of defects, breaks, or leaks in work.
- D. The start date of warranty of all items is the recordation date of the project Notice of Completion regardless of phasing schedule and date equipment is first brought into service. The contractor is to perform all manufacturer's and bid document required maintenance after the equipment while it is in use during phased construction.
- E. Material, equipment and workmanship warranty shall be for 2 years.

3.15 RECORD DRAWINGS:

- A. Upon completion of work covered by this Contract, furnish Architect with reproducible sepias, showing all changes of piping, ductwork, etc. within building and installed under this Contract which are not in accord with these Drawings for the work.
- B. In addition, furnish one tracing showing all outside utility connections, piping, etc. installed under this Contract. Locate and dimension all work with reference to permanent landmarks.
- C. Match all symbols and designations used in Contract Drawings when preparing "Record" Drawings.
- D. Properly identify all stubs for future connections as to locations and use by setting of concrete marker at finished grade in manner suitable to Architect.

3.16 PROJECT COMPLETION TESTS AND START-UP:

- A. Upon completion of the mechanical work, or at such time agreed to by the Contractor and Architect, the Contractor shall assemble a mechanical systems start-up team to perform systems start-up. This team shall consist of, as a minimum, the mechanical contractor (air and hydronic), electrical contractor, controls contractor, equipment manufacturer's start-up technician, District Rep, and any others that are deemed necessary to perform satisfactory system start-up. These start-up team members shall all be present throughout the entire system start-up process. In addition to all other Division 22 requirements, it shall be demonstrated that each mechanical system satisfactorily operates throughout its complete and full sequence of operation. Any failures shall be corrected before continuing. This shall be documented in the start-up report including all failures found and the corrective measures taken to correct the failure. Notify the Architect and District at least seven calendar days in advance of starting the above tests. The notification shall include a list of all startup personnel.
- B. Upon completion of the mechanical work, or at such time prior to completion as may be determined by the Architect, operate and test all mechanical equipment and systems for a period of at least five consecutive 8-hour days to demonstrate the satisfactory overall operation of the building or project as a complete unit. Include operation of heating and air conditioning equipment and systems for a period of not less than two 8-hour days at not less than 90 percent of full, specified heating and cooling capacities in tests. Commence tests after preliminary balancing and adjustment to equipment has been checked. Immediately before starting tests, install air filters and lubricate all running equipment. Notify the Architect at least seven calendar days in advance of starting the above tests.

- C. Provide training and orientation of Owners operating staff in proper care and operation of equipment, systems and controls.
- D. Neatly tabulate and deliver to the Architect complete operational data, including air flows, room temperatures, fan speeds, motor currents, plenum and duct static pressures, and other data as required. The Architect reserves the right to spot check results, and if discrepancies or errors are noted, Contractor will be required to redo balancing tests and tabulations entirely.
- E. During test period, make final adjustments and balancing of equipment, systems, controls, and circuits so that all are placed in first-class operating condition.
- F. Final observation will not be made until all of the above have been completed and balance report has been submitted and reviewed.

3.17 CLEANING UP:

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION

SECTION 220500

BASIC PLUMBING MATERIALS AND METHODS

PART 1 – GENERAL

1.01 CONDITIONS OF THE CONTRACT:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to Work of this section.
- B. This section is a Division-22 Basic Plumbing Materials and Methods section and is part of each Division-22 section making reference to pipes and pipe-fittings specified herein.

1.02 WORK INCLUDED:

- A. Types of mechanical related work specified in this section include the following:
 - Valve Boxes
 - Access Doors
 - Cathodic Protection
 - Mechanical Identification
 - Painting and Concrete Work
 - Excavating and Backfill

1.03 PROJECT CONDITIONS:

- A. Existing Utilities: Locate and protect existing utilities and other underground work in manner which will ensure that no damage or service interruption will result from excavating and backfilling.

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical product data and installation instructions for each type of material listed in this SECTION.
- B. Maintenance Data: Submit maintenance data and replacement material lists for each type of material listed in this section. Include this data and product data in maintenance manual.

PART 2 - MATERIALS

2.01 VALVE BOXES:

- A. Provide at each valve or cock in ground a Christy valve box with cover marked for service.
 - 1. Do not locate valve boxes in walks or covered passages unless necessary. Where necessary to locate valve boxes in traffic or paved areas, use Christy G5 with cast-iron ring and cover.
 - 2. Provide valve box extensions as required to set bottom of valve box tight on top of piping in which valve is installed.

3. Provide special valve boxes where required to conform to local codes.
4. Provide Owner with set of special wrenches or tools as required for operation of valves.

2.02 ACCESS DOORS:

- A. Where floors, walls, or ceilings must be penetrated for access to mechanical equipment, provide access doors, 14-inch by 14-inch minimum size in usable opening. Where entrance of a serviceman may be required, provide 18-inch by 24-inch minimum usable opening.
 1. All access doors less than 7'-0" above floors and exposed to public access shall have keyed locks.
- B. Access doors shall match those supplied in **Division 8** in all respects, except as noted herein.
- C. Where panels are located on ducts or plenums, provide neoprene gaskets to prevent air leakage, and use frames to set door out to flush with insulation.
 1. Provide insulated doors where located in internally insulated ducts or casings.
- D. Where specific information or details relating to access panels different from the above is shown or given on the Drawings or other Divisions of work, then that information shall supersede this specification.
- E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering access doors which may be incorporated in the work include the following:

Milcor Style K (plaster)
Style DW (gypsum board)
Style M (Masonry)
Style "Fire Rated" where required.

2.03 CATHODIC PROTECTION:

- A. Furnish and install dielectric unions at all locations described herein, whether shown on Drawings or not, and except as noted herein. Construct couplings and flanges so that the two pipes being connected are completely insulated from each other with no metal-to-metal contact. Heavily line the couplings with a hard, insulating, phenolic plastic threaded in standard pipe sizes. Make up the flanges with insulating components consisting of a hard, phenolic gasket, bolt sleeves, and bolt washers. Supplement the insulating gasket with neoprene faces to form a seal.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers which may be incorporated in the work include the following:

Maloney
Walter C. Vallet

2.04 MECHANICAL IDENTIFICATION:

- A. Each piping system furnished and installed under this work shall be identified and the direction of flow indicated by means of colored stenciled legends and flow arrows, all as specified herein. The markings shall be applied after all painting, priming, and cleaning of the piping and insulation is completed.
- B. All piping that is included in the scope of work that is abandon in place shall be identified by means of colored stenciled legends, all as specified herein, indicating system and "ABANDONED".
- C. Colored stenciling, prefabricated labels on paper or on pressure sensitive self-adhesive cloth tapes may be used, as manufactured by General Painting Company, Westline Products, W.H. Brandy Company, or equal. The labels shall have black lettering and flow arrows on colored backgrounds, and the background colors shall conform to the color schedule shown in this Article. Yellow letters may be used on brown background only for better visibility. If the paper labels are used, they shall be attached to the piping with Adhesive. After the adhesive has dried, the paper label shall be given a protective coating. Comply with ANSI A13.1.
 - 1. The size of the lettering and label shall be such that the lettering can be easily read from the floor and the colors are easily discernible.
 - 2. The installation must be weather proof in exposed areas outdoors.
- D. Provide white lamacoid plate for each and every piece of equipment installed in this work. Lettering on plate shall be black, with size of lettering to suit equipment. Lettering shall be minimum of 3/8-inch in height. Plates shall be riveted or bolted to equipment.
- E. Provide 1 1/2" diameter round or 1 1/8" square plastic, plastic laminate or brass valve tags with sturdy fasteners for all valves installed above ground. Schedule on mountable frame to be located per Owner direction.
- F. Underground marking tape shall be electrically detectable 4-mil inert plastic film for underground use. Shall have continuous message for warning repeated every 16-36 inches. Blue for water, green for sewer/storm and yellow for gas.

PART 3 - EXECUTION

3.01 PRODUCT HANDLING AND PROTECTION:

- A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

3.02 PREPARATORY PROVISIONS:

- A. The Contractor shall be responsible for the examination and acceptance of all conditions affecting the proper construction and/or installation of the Work of this Section and shall not proceed until all unsatisfactory conditions have been corrected. Commencing work shall be construed as acceptance of all conditions by the Contractor as satisfactory for the construction and/or installation of the Work.

3.03 ACCESS DOORS:

- A. Under this Division provide access doors and frames, as specified in Division 8, for access to work for which access must be provided for maintenance or by Code. Final number and location of all doors shall be in accordance with approved shop drawings.
- B. The cost of all access doors required by work under this Division, including installation costs, is included in this Division.

3.04 PAINTING:

- A. Refer to Summary of Work, section 001010, for responsibility to perform painting.
- B. Refer to Exterior Painting Section, section 099113 and Interior Painting Section, section 099123, for items requiring painting and painting procedures.
- C. All new materials installed by Mechanical Prime Contractor, shall be cleaned of grease, oil, rust or dirt in preparation for painting. Spot prim all abraded areas in factory-primed surfaces and / or repair damage finish to match original factory condition.

3.05 CONCRETE WORK:

- A. Where indicated on the Drawings or specified as part of Mechanical Work, this Contractor shall furnish and install concrete work, such as thrust blocks, equipment pads, etc.
- B. Concrete and reinforcing steel shall be equal to that specified for General Construction.
- C. Except as noted above, concrete work will be furnished and installed under General Work. This Contractor shall coordinate requirements accordingly.
- D. Thrust Blocks:
 - 1. Provide concrete anchors or thrust blocks on all PVC and cast iron water lines in the ground. Install thrust blocks at all changes in direction and at all connections to the mains 2" and larger. Form thrust blocks by pouring concrete between the pipes and trench wall. They shall be adequate in size and placed to take all thrusts created by the maximum internal water pressure; sizing and placement shall be per manufacturer's recommendations and current CPC (California Plumbing Code) and IAPMO installation standards.
 - 2. Provide fire protection piping thrust blocks in accordance with the requirements of NFPA 24.

3.06 ACCESS TO MECHANICAL WORK:

- A. Comply with manufacturer's instructions for installation of access doors.
- B. Access panels shall be furnished and installed wherever valves, balance valves, damper operating mechanisms, air terminal boxes, fans, and similar items normally requiring adjustment or servicing are installed in concealed or inaccessible spaces. Coordinate with access doors shown on Architectural Drawings.

- C. Where access panels are detailed on architectural or mechanical Drawings, sizes indicated thereon shall be used.
- D. Where access panels are to be located in acoustic tile ceilings, the size of the access panel required shall be increased to properly fit the tile pattern without cutting into the tile.

3.07 EXCAVATING AND BACKFILL: (Refer also to Section 312000 – Earth Moving):

- A. Do excavating required for installation of piping and service lines and other work that applies as indicated on Drawings. Verify location and elevation of all existing utilities prior to excavation for installation of new piping.
- B. Excavations shall be of open vertical construction of sufficient width to provide free working space at both sides of trench and around pipe as required for caulking, joining, backfilling, and compacting. Where invert elevations are not shown, dig trenches to sufficient depth to give minimum of 1 foot, 6 inches of fill above top of exterior piping, measured from adjoining finished grade, except as follows:
 - 1. Outside water lines - 2 feet, 6 inches minimum cover.
 - 2. PVC pipelines - 2 feet, 0 inch minimum cover.
- C. Dig trenches straight and true to line and grade with holes for bells for bell-and-spigot pipe. Evenly support piping for its entire length upon outside periphery of lower one-third of pipe. Where rock is encountered, undercut trench 3 inches and fill with well-tamped, clean sand and pea gravel to correct pipe elevation.
- D. After pipe lines in excavation have been installed and tested, backfill excavation to point 6 inches above pipe using sand, fine earth, or other materials free of rocks and large lumps. Proceed evenly on both sides of pipe and continuously tamp. Except as hereinafter noted, backfill above 6-inches above top of pipe shall be made by using earth from excavation placed in layers of 8-inch maximum depth. Compaction of each successive layer will be made with mechanical compactor. 90% compaction per ASTM D1557 will be required and test results shall be submitted validating the compaction values. This applies to work under buildings or structures, walkways and roads. Work under planter areas shall be compacted to 80%.
 - 1. Water flooding or ponding may not be used.
- E. Take special care in backfilling over wrapped piping to prevent damage to protective wrapping.
- F. Bed sewers under pavements, wrapped piping, and PVC piping in sand prior to backfilling. Backfill to point 6 inches above pipe with sand.
- G. This Contractor shall replace curbs, pavement, walks, and any other type of existing work or surface disturbed by excavation, using workmen skilled in trade involved.
- H. When pipe or underground conduit with a protective wrapping is to be placed in the trench, sand only shall be used for bedding the pipe or conduit. The sand used shall be certified to have a minimum resistance of 5000 ohms per cubic centimeter when wetted to any moisture content with distilled water and shall consist of clean, natural, washed-sand, hard, and durable particles varying from fine particles to particles of such

size that all will pass through a 3/8-inch screen, not less than 90 percent will pass through a 1/4-inch screen, and not more than 25 percent will pass through a No. 50 screen.

- I. Any backfill placed under this contract which subsides or settles below the adjacent finished grade or paving level during the guarantee period shall be brought to grade by the Contractor by adding compacted backfill. In paved areas, remove paving, re-compact & replace paving to match existing surface adjacent.
- J. Install appropriately labeled and colored underground marking tape installed with printed side up, 18" maximum below grade.
- K. Tracer Wires: Install tracer wire for non-metallic water pipe in ground outside of buildings. Use AWG #12 tracer wire and lay continuously above the centerline of the pipe, so that it is not broken or stressed by backfilling operations. Solder all joints.
 - 1. Terminals: Precast concrete box and cast iron locking traffic cover, Brooks 3TL, or equal; cover marked with name of service; 6 inches of loose gravel below box. Plastic terminal board with brass bolts; identify line direction with plastic tags. Test for continuity between terminals, after backfilling, in presence of Inspector.

3.08 PAINTING:

- A. Refer to section 001010, Summary of Work, for assignment of painting scope. Exposed piping and unfinished portions of equipment to be painted shall be cleaned of grease, oil, rust, or dirt in preparation for painting. Spot prime all factory-primed surfaces to repair damage to finish.
- B. Refer to Exterior Painting Section, section 099113 and Interior Painting Section, section 099123, for painting coordination requirements.

3.09 CONCRETE WORK:

- A. Where specifically indicated on the Drawings or specified as part of Mechanical Work, this Contractor shall furnish and install concrete work, such as thrust blocks or spring isolator bases.
- B. Concrete and reinforcing steel shall be equal to that specified for General Construction.
- C. Except as noted above, concrete work will be furnished and installed under General Work. This Contractor shall coordinate requirements accordingly.

3.10 INSTALLATION OF CATHODIC PROTECTION:

- A. Install dielectric unions in the following locations:
 - 1. In all metallic water service connections into the building within 5 feet of the building wall. Install adjacent to the shut-off valve or cock and above ground where possible.
 - 2. At points in piping where dissimilar metal pipes are connected together.
 - 3. Any special applications shown on the Drawings.

- B. Where steel or cast-iron pipe in the ground connects to copper or brass piping above the ground, the transition from steel or cast- iron pipe to the copper or brass pipe shall be made above ground in all cases and in an accessible location where practicable.
- C. Where copper or brass piping is connected to steel or cast-iron piping and the connection is buried in the ground, the connection shall be covered with coal tar protective tape as specified in SECTION "PIPES AND PIPE FITTINGS" extending outward a minimum of 5 feet on all pipes, from the point of connection. The tape shall have a minimum thickness of 10 mils and a maximum thickness of 12 mils and shall be applied so as to provide at least two full thicknesses of the tape over the piping. A primer, specifically designed for use with the tape, shall be used. The piping shall be thoroughly cleaned before any tape or primer is applied. Ferrous piping installed underground shall be provided with a sacrificial anode in addition to wrap.

3.11 MECHANICAL IDENTIFICATION:

- A. Provide stenciled or plastic-laminate type signs on each access door in ductwork and housings indicating purpose of access and to what equipment.
- B. Identification shall be applied to all piping, except piping located in furred spaces without access to permit entrance of personnel, and piping buried in the ground or concrete.
- C. The legend and flow arrow shall be applied at all valve locations, at all points where piping enters or leaves a wall, partition, cluster of piping, or similar obstruction, and at approximately 20-foot intervals on pipe runs.
- D. Practical variations or changes in locations and spacing may be made with the specific approval of the Architect to meet specific conditions.
- E. Wherever two or more pipes run parallel, the printed legend and other markings shall be applied in the same relative location so that all piping is easily identified.
- F. The marking shall be located so as to be readily conspicuous at all times from any reasonable point of vantage.
- G. The legends and flow arrows shall be in the colors as indicated in the pipe-marking schedule.
- H. The paint shall be prepared enamel brushed on or sprayed from pressurized cans.
- I. Where the pipe marking colors are not easily visible over the background, such as brown on soil pipe, orange on copper pipe, or similar combinations, a neat white or aluminum-colored background shall be painted on the pipe before the markings are applied.
- J. The sizes, in inches, of the stenciled lettering and flow arrows shall be as follows:

<u>Outside Diameter, In Inches of Covering</u>	<u>Size of Stencil Letter</u>	<u>Minimum Length of Flow Arrow</u>
5/8" to 2" include.	1/2"	2-1/2"
to 4" inclusive.	1"	4"

to 7" inclusive.	2"	5"
8" and larger	3"	6"

- K. Where different equipment, such as fire sprinklers, is supplied from a common main, such as domestic water, the main should be identified as "Domestic Water" and each respective branch takeoff as "Domestic Hot Water," etc.

Pipe Marking Schedule:

Legend	Color
Domestic Cold Water	Green
Domestic Hot Water	Yellow
Sewer/Storm	Brown

- L. General: Install pipe markers (stenciled, or plastic type) on each system indicated to receive identification, and include arrows to show normal direction of flow:

- M. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.

1. Near each valve and control device.
2. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
3. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
4. At access doors, manholes and similar access points which permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. On all horizontal pipe runs every 20 feet, at least once in each room, and at each story traversed by piping system.
7. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

- N. Valve Identification: Provide valve tag on every valve, cock and control device in each piping system, exclude check valves, valves within factory- fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibbs, and shut-off valves at plumbing fixtures, HVAC terminal devices and similar rough-in connections of end-use fixtures and units. List each tagged valve in valve schedule for each piping system.

- O. Mechanical Equipment Identification: Install engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:

- 1.
2. Exhaust fans

3.13 FLASHINGS:

- A. Provide pipe flashings as noted on the Drawings.
- B. Flue and duct flashings and storm collars shall be securely clamped around flue or duct storm collar or counterflashing, above flashing.

3.14 CARE AND CLEANING:

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.
- B. Drain and flush piping to remove grease and foreign matter. Thoroughly clean out flush valves, traps, strainers, and pressure-reducing valves.
- C. Keep the interior of all ductwork dry and free of dirt, dust, loose insulation, and other foreign materials at all times. If ductwork is found wet on jobsite it shall be removed and replaced.
- D. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.

3.15 OPERATION TEST:

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.16 CLEANING UP:

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION

SECTION 220503

PIPES AND PIPE FITTINGS

PART 1 - GENERAL

1.01 CONDITIONS OF THE CONTRACT:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to Work of this section.
- B. This section is a Division-22 Basic Plumbing Materials and Methods section and is part of each Division-22 section making reference to pipes and pipe fittings specified herein.

1.02 WORK INCLUDED:

- A. Types of piping systems and specialties specified in this section include the following:
 - Steel Pipes and Fittings
 - Copper Tube and Fittings
 - PVC Water Pipe and Fittings (pressure)
 - Cast Iron Soil Pipes and Fittings
 - PVC Soil Pipes and Fittings
 - Piping Products
 - Miscellaneous Piping Materials/Products

1.03 QUALITY ASSURANCE:

- A. Welders' Qualifications:
 - 1. Welding: Qualify welding procedures, welders and operators in accordance with ASME B31.1, or ASME B31.9, as applicable, for shop and project site welding of piping work.
 - 2. Brazing: Certify brazing procedures and operators in accordance with ASME Boiler and Pressure Vessel Code, Section IX, and an organization/institution that uses brazing standards recognized by the American Welding Society (AWS) for shop and job brazing of pipe work.
 - 3. Heat fusion qualifications:
 - a) Heat fusion joining: Qualify procedures and operators in accordance with the requirements of Title 49 of the Code of Federal Regulations as it applies to heat fusion.
- B. Requirements of Regulatory Agencies:
 - 1. UL and FM Compliance: Provide products which are Underwriters Laboratories listed and Factory Mutual approved.

1.04 SUBMITTALS:

- A. Product Data: Submit catalog cuts, specifications, installation instructions, and dimensioned Drawings for each type of piping listed in this SECTION.
- B. Welding and Brazing Certifications: Submit reports as required for piping Work.

PART 2 - PRODUCTS

2.01 GENERAL:

- A. Provide pipe and tube, joint type, grade, size, and weight for each service and comply with governing regulations and industry standards.

2.02 STEEL PIPES AND PIPE FITTINGS:

- A. Galvanized Steel Pipe: ASTM A 53.
- B. Coatings for Buried Steel Pipe: Factory applied extruded coatings Standard X-Tru-Coat, Plexco Extruded Coating, or equal. Prime field joints with Protecto Wrap No. 1170 primer and wrap with one layer of No. 200 coal tar tape.
 - 1. Wrap all piping buried in the ground and to 6 inches above grade, including piping in conduit with protective coating.
 - 2. Field Joints and fittings shall be covered with Pabco, or equal, polyvinyl chloride tape, double wrapped. Lap pipe wrap a minimum of 1/4 inch and stagger the second layer. Extend wrap a minimum of 4 inches over adjacent pipe covering. Build up with primer to match adjacent covering thickness. Width of tape shall not exceed 3 inches. Tape shall adhere tightly to all surfaces of the fittings without air pockets.
 - 3. At valves, cover pipe flanges, and extend wrap to outer edge of valve flanges or threaded portion of valve body. Cover unwrapped portions of valve body with two heavy coats of coal tar enamel conforming to AWWA Specification C-203. Allow adequate drying time before backfilling.
 - 4. Clean all piping thoroughly before wrapping.
 - 5. Damaged or defective wraps shall be repaired as directed. No wrapped pipe shall be covered until approved by Architect.
 - 6. No rocks or sharp edges shall be backfilled against the wrap. When backfilling with other than sand, protect wrap with an outer wrapping of Kraft paper; leave in place during backfill.
 - 7. Test completed piping with Tinker and Razor Co. test machine (San Gabriel, CA 818-287-5259).
- C. Malleable-Iron Threaded Fittings: ANSI B16.3; plain or galvanized to suit piping. For use above grade only, except where indicated otherwise.

- D. Malleable-Iron Threaded Unions: ANSI B16.39; selected by contractor for proper piping fabrication and service requirements, including style, end connections, and metal-to-metal seats (iron, bronze, or brass); plain or galvanized as indicated.
- E. Forged-Steel Socket Welding and Threaded Fittings: ANSI B16.11, except MSS SP-79 for threaded reducer inserts; rated to match schedule of connected pipe.
- F. Wrought-Steel Butt Welding Fittings: ANSI B16.9, except ANSI B16.28 for short-radius elbows and returns; rated to match connected pipe.
- G. Pipe Nipples: Fabricated from same pipe as used for connected pipe; except do not use less than Schedule 80 pipe where length remaining unthreaded is less than 1-1/2 inches and where pipe size is less than 1-1/2 inches, and do not thread nipples full length (no close-nipples).

2.03 COPPER TUBE AND FITTINGS:

- A. Copper Tube: ASTM B 88; Type L, hard-drawn temper, except as otherwise indicated. Provide wrought-Copper Solder Joint Fittings, with full solder cup: ANSI B16.22.
 - 1. Isolate copper tubing from ferrous materials and hangers with two thicknesses of 1-inch wide 10 mil polyvinyl tape, spiral-wrapped around pipe. Total width shall be a minimum of 3 inches.
- B. DWV Copper Tube: ASTM B 306. Provide wrought-Copper Solder Joint Drainage Fittings: ANSI B16.29.

2.04 PVC (POLYVINYL CHLORIDE) PIPES AND PIPE FITTINGS:

- A. Pressure Pipe for domestic water systems, 2 inches and larger: ASTM D2241, Class 200 polyvinyl chloride with dimension ratio of 21 with Ring-Tite joints. Provide fittings to match piping installed.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering PVC pressure piping which may be incorporated in the Work include the following:
 - Schuller Corporation - Ring-Tite
 - VinylTech Corporation - White Knight
 - PW Pipe - Twinseal
- B. Transition Couplings for pressure piping: Style 501 straight and transition couplings as manufactured by Romac Industries Inc. Ductile iron with yellow shop coat: Ductile iron end rings: Virgin SBR gaskets: Stainless steel bolts and nuts.
 - 1. Provide ductile iron pipe-fittings as recommended by manufacturer.
- C. Gravity Piping: Polyvinyl chloride gravity sewer pipe with integral wall bell and spigot joints and flexible elastomeric seals. Pipe and fittings shall meet the requirements of ASTM D3034 for SDR 35.

1. Fittings and accessories shall be as manufactured and furnished by the pipe supplier, or equal.
2. Ring-Tight cast iron pipe-fittings may be used in lieu of standard fittings. Make connection to valves with cast iron adapters connected to the pipe with PVC couplings.
3. Joints shall be tested in accordance with ASTM D3212.
4. Available Manufacturers: Subject to compliance with requirements, manufacturers offering PVC gravity piping which may be incorporated in the Work include the following:

Schuller Corporation - Greenline
PW Pipe

2.05 CAST-IRON SOIL PIPE AND PIPE FITTINGS:

- A. Hubless Cast Iron Soil Pipe and Fittings: CISPI 301.
- B. Hubless Pipe Joining Materials:
 1. Neoprene gasket complying with ASTM C 564 or HSN-85 and stainless steel clamp holding band, Anaco "Husky", Clamp All, or equal, heavy duty type, for above grade installation only.
 2. Provide cast iron clamps with neoprene gasket for use below grade, and for exposed locations, or provide AB&I Best Couplings.
- C. Cast-Iron Hub and Spigot Soil Pipe and Fittings: ASTM A-74.
- D. Cast Iron Hub and Spigot Pipe Joining Materials: Use below grade only, and assemble with ASTM C-564 compression gaskets.

2.046 MISCELLANEOUS PIPING MATERIALS/PRODUCTS:

- A. Welding Materials: Except as otherwise indicated, provide welding materials as determined by contractor to comply with installation requirements.
 1. Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials.
- B. Soldering Materials: Joints in copper tubing for all installations shall be made with silver brazing alloy, Sil-Fos, or equal, with minimum 5 percent silver content. Surfaces to be jointed shall be free of oil, grease, rust, and oxides.
 1. Joints in copper tubing for laboratory compressed air and medical gas systems shall be brazed in accordance with NFPA-99, latest edition. Surfaces to be joined shall be free of oil, grease, rust and oxides. Solders and brazing materials containing lead will not be allowed.

- C. Ninety-five percent tin, five percent antimony solder may be permitted on plumbing lines above slab or ground only with prior review for piping sizes 2 inches and smaller only.
- D. Comply with SFA-5.8, Section II, ASME Boiler and Pressure Vessel Code for brazing filler metal materials.
- E. Gaskets for Flanged Joints: ANSI B16.21; full-faced for cast-iron flanges; raised-face for steel flanges, unless otherwise indicated.
- F. Piping Connectors for Dissimilar Non-Pressure Pipe: Elastomeric annular ring insert, or elastomeric flexible coupling secured at each end with stainless steel clamps, sized for exact fit to pipe ends and subject to approval by plumbing code.

PART 3 - EXECUTION

3.01 INSTALLATION OF PIPING:

- A. Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently leak resistant piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings but with adequate and accessible unions for disassembly and maintenance/replacement of valves and equipment. Reduce sizes where indicated by use of reducing fittings. Align piping accurately at connections, within 1/16-inch misalignment tolerance.
 - 1. Installation of piping shall be made with use of appropriate fittings. Bending of piping will not be allowed.
 - 2. Unions installed in water lines shall be accessible, in accordance with the requirements of the California Plumbing Code.
- B. Comply with ANSI B31 Code for Pressure Piping.
- C. Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain), and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations, or if not otherwise indicated, run piping in shortest route which does not obstruct usable space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, columns, and other structural and permanent-enclosure elements of building; limit clearance to 1/2-inch where furring is shown for enclosure or concealment of piping; locate insulated piping for one-inch clearance outside insulation. In finished and occupied spaces, conceal piping from view by locating in column enclosures, in hollow wall construction, or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.
- D. Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical or electronic equipment spaces and enclosures unless the piping serves equipment in the room.
 - 1. Install drip pan under piping that must be run through electrical spaces and in all other locations indicated on Drawings.

- E. Where piping crosses seismic expansion joints shown on Contract Drawings, provide expansion joints, sized according to manufacturers recommendations.
- F. Should structural difficulties or Work of other Contractors prevent the running of pipes or the setting of equipment at the points shown, necessary deviations as determined by the Contractor, with the Architect's review, will be allowed but must be made without additional cost to Owner.
- G. Inspect each piece of pipe and each fitting to see that there is no defective workmanship on pipe or obstructions in pipes and fittings.
- H. Install exposed polished or enameled connections from fixtures or equipment with special care, showing no tool marks or threads at fittings.
- I. Cap or plug openings in pipe and fittings immediately to exclude all dirt until fixtures are installed or final connections made.
- J. Use reducing fittings where any change in pipe size occurs. Bushings shall not be used.
- K. Couplings shall not be used except where required pipe runs between fittings are longer than a standard length of the type of pipe being used and except where their use is specifically reviewed by the Architect.
- L. Conceal piping in finished portions of building, above the floor line, except where otherwise shown or noted. Cutting of walls and floors shall be held to the minimum possible to secure the proper installation.
- M. Install piping subject to expansion or contraction in a manner permitting strains to be evenly distributed and alleviated.
- N. Sleeves for branches through walls from adjacent mains shall be of sufficient size to allow for free side motion of covered pipe in sleeve.
- O. Condensate Drain Piping: Run piping with pitch of 1 inch per 10 feet, without pockets.
- P. Pipe the discharge of each relief valve, air vent, backflow preventer, and similar device to floor sink or drain.

3.02 INSTALLATION OF PROTECTIVE PIPE WRAP:

- A. Protect all steel pipe buried in ground from corrosion by the application of protective pipe wrap and sacrificial anodes. Clean and prime pipe before application of the wrapping material.
- B. Damaged or defective wraps shall be repaired as directed. No wrapped pipe shall be covered until approved by the Architect.
- C. No rocks or sharp edges shall be backfilled against the wrap. When backfilling with other than sand, protect wrap with an outer wrapping of Kraft paper; leave in place during backfill.

- D. Test completed piping with Tinker and Razor Co. test machine (San Gabriel, CA (818)-287-7942).

3.03 PIPING SYSTEM JOINTS:

- A. General: Provide joints of type indicated in each piping system.
- B. Thread pipe in accordance with ANSI B1.20.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound on male threads at each joint and tighten joint to leave approximately 4 threads exposed, except as permitted by ANSI standards.
 - 1. Pipe joint compounds include Rectorseal #5 and Permatec #1. Teflon tape or caulking compounds shall not be used.
- C. Use joint compound, same as specified for threaded pipe joints, on all cleanout plugs.
- D. Copper and Brass Pipe and Tubing: Make all joints with silver brazing alloy, Sil-Fos, or equal, in accordance with ASME B31, 1100 degrees F melting point or greater, ASTM B-260, except that water piping 1-1/2 inches and smaller not buried in the ground or concrete and Type DWV plumbing piping may be made up with 95-5 tin-antimony, ASTM B-32, Grade 5A, solder. Use leadless solder for all applications. Boss or saddle type fittings will not be allowed.
- E. Solder copper tube and fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings. Insert tube, full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Solder shall be 95 percent tin, 5 percent antimony and shall be used above grade only. Wipe excess solder from joint before it hardens.
- F. Branch tees in copper tubing, provided that branch size is one-half the size of the main or smaller, may be made with Bonney "Brazoletts," with socket, or threaded outlets as required, and with factory-furnished curvature and socket dimensions for the specific type of copper tubing on which it is to be used. Make up joint between the "Brazolet" and the main with silver brazing alloy, as specified.
 - 1. Connections formed by extruding tube walls will not be acceptable.
- G. Welded Joints: Weld pipe joints in accordance with recognized industry practice and as follows:
 - 1. Welding shall be done by qualified welders in a first-class, workmanlike manner, conforming to the American Standard Code for Pressure Piping USA B-31-1 and B-31-1A.
 - 2. Bevel pipe ends at a 37.5 degree angle where possible, smooth rough cuts, and clean to remove slag, metal particles, and dirt.

3. Do not weld-out piping system imperfections by tack-welding procedures; re-fabricate to comply with requirements.
4. At contractor's option, install forged branch-connection fittings wherever branch pipe of two pipe sizes smaller than main pipe is indicated; or install regular "T" fitting.

H. Welded Joints:

1. Standards: Conform to Section UI, Chapter 4, "Welding of Pipe Joints", ANSI B31.1 and applicable portion of ASME Boiler and Pressure Vessel Code, Section IX, in accordance with latest accepted practice applicable to particular service.
2. Operator's Qualifications: All welders engaged in work under this section shall be qualified in accordance with State requirements. Each operator's certificate shall be on file at site and made available to Owner upon request.
3. Preparation for Welding: Bevel piping on both ends before welding; both ends shall have 1-1/6 inch land at bottom of bevel. Pipe with a 3/4-inch wall thickness or less shall be beveled to a standard 37-1/2 degrees.

Use following weld spacing on all butt welds:

Nominal Pipe Wall Thickness	Spacing
Bevel	1/4 inch or less
1/8 inch	37-1/2
Over 1/4 inch	less than 3/4 inch
3/16 inch	27-1/2

4. Use backing rings on all butt welding joints 6 inches and larger.
5. Before welding, remove all corrosion products and foreign material from surfaces.
6. Nozzle Welds: Nozzle weld fittings may be used for 90 degrees and angular attachment of branches one size smaller than main or smaller. Standard industry practice shall be followed per Crane Catalog No. 60, Page 371.
7. Electrodes: Conform to ASTM Designation A233, Classification E-6010 for black steel and E-8018-C2 for Yolo.

I. Welding Operation:

1. After deposition, clean each layer of weld metal to remove slag and scale by wire brushing or grinding. Chop where necessary to prepare for proper deposition of next layer.

2. Weld reinforcement with no less than 1/16 inches nor more than 1/8 inch above normal surface of jointed sections. Reinforcement crowned at center and taper on each side to surfaces being joined. Exposed surface of weld shall present workmanlike appearance and be free of depressions below surface of joined members.
 3. No welding shall be done when temperature of base metal is lower than 20 degrees F. Material to be welded during cold temperatures shall be made warm and dry before welding is started. Metal shall be "warm to the hand" or approximately 60 degrees F.
 4. Inspection: Representatives of the Owner will visually inspect welds. Any weld judged defective by visual inspection shall be cut out and tested in presence of Owner's representative. If percentage of defective coupons is deemed excessive, Contractor may be required to cut additional coupons as directed. Removal and replacement of test coupons and samplings shall be done at expense of Contractor. At the option of the Owner, certain welds may be required to be radiographed.
- J. Flanged Joints: Match flanges within piping system and at connections with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets.
- K. Cast-Iron Piping Joints: Comply with coupling manufacturer's installation instructions and in accordance with CISPI Pamphlet No. 100, latest edition.
1. No-Hub fittings shall be made with a torque wrench.
 2. Make joints between cast-iron and steel pipe same as above with special adapter as required.
 3. Hub type joints shall be Ty-Seal, "Best Couplings", or equal. Make No-Hub fittings with tools recommended by manufacturer of fittings, designed specifically for that application.
 4. Wrought iron, steel or copper pipe shall have a ring or part of a coupling screwed on to form a spigot end if caulked into a joint.
 5. Connect cast iron sewer piping to outside service pipe with cast iron reducers or increasers as required. Caulking of smaller pipe into the larger without a reducer or increaser will not be permitted.
- L. Make joints in PVC pipe with PVC-type couplings and rubber rings.
1. Check final location of rubber rings within the couplings with gage or as recommended by the manufacturer. Make joints between PVC pipe and cast iron pipe or fittings using cast iron adapter fittings, installed as recommended by the manufacturer.

2. Ring-Tite PVC or cast iron pipe-fittings may be used in lieu of standard fittings. Make connection to valves with cast iron adapters connected to the water pipe with PVC couplings.
3. Furnish and install thrust blocks or anchors as required by manufacturer.

3.04 TEST OF PIPING:

- A. Test piping at completion of roughing in, in accordance with the following schedule and show no loss in pressure or visible leaks after a minimum duration of four hours, or time as indicated, at the test pressures indicated.
- B. Existing piping systems that are to remain in service are to be tested at expected working pressure and show no loss in pressure or visible leaks after a minimum duration of four hours, or time as indicated.
- C. Make connections to existing systems with flanged connection. During testing of the new work, provide a slip-in plate to restrict test pressure to new systems only. Remove plate and complete connection to existing system at completion of testing.
- D. Final connection to system shall be witnessed by Inspector of record.
- E. Notify the Owner's Representative at least seven days in advance of any test.
- F. Test all piping at completion of roughing-in, or at other times as directed by the Owner's Representative.
- G. Isolate from the system all equipment which may be damaged by test pressure.
- H. Test Schedule:

SYSTEM TESTED

TEST PRESSURE PSIG

All Sewer, Soil, Waste Drain & Vent Piping.

Fill with water to top of highest vent, allow to stand 2 hrs. or longer as directed by Inspector. Minimum height of standpipe shall be 10 feet above piping being tested.

Domestic Hot and Cold Water Piping.
equipment connection.

150 lbs. Rough-in 100 lbs. after

- I. General: Provide temporary equipment for testing, including pump and gauges. Provide test gauges with 1-psi increments for pressure piping between 10 and 100 psig. Provide test gauges with 2 percent or less of the required test pressure for testing piping in excess of 100 psig. Total pressure range of gauges used shall not exceed twice the pressure of systems being tested.
- J. Test piping system, before insulation is installed if feasible, and remove control devices before testing. Test each natural section of each piping system independently but do not

use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water and pressurize for indicated pressure and time.

- K. Repair piping systems sections which fail required piping test, by disassembly and reinstallation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.
- L. Drain test water from piping systems after testing and repair work has been completed.

3.05 CLEANING, FLUSHING, INSPECTING:

- A. General: Clean exterior surfaces of installed piping systems of superfluous materials, and prepare for application of specified coatings, (if any). Inspect each run of each system for completion of joints, supports and accessory items.
- B. Inspect pressure piping in accordance with procedures of ANSI B31.

3.06 CLEANING UP:

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION

SECTION 220523

VALVES

PART 1 - GENERAL

1.01 CONDITIONS OF THE CONTRACT:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to Work of this section.
- B. This section is a Division-22 Basic Plumbing Materials and Methods section and is part of each Division-22 section making reference to pipes and pipefitting specified herein.

1.02 WORK INCLUDED:

- A. Types of valves specified in this section include the following:

Ball Valves

1.03 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of valves, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Valve Types: Provide valves of same type by same manufacturer.
- C. Identification: Provide valves with manufacturer's name (or trademark) and pressure rating clearly marked on valve body.
- D. Requirements of Regulatory Agencies:
 - 1. UL and FM Compliance: Provide valves used in fire protection piping which are UL listed and FM approved.

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical product data and installation instructions for each type of manufactured piping specialty and valve.
 - 1. Include pressure drop curve or chart for each control valve and balancing valve.
- B. Maintenance Data: Submit maintenance data and spare parts lists for each type of valve. Include this data and product data in maintenance manual in accordance with requirements of Division 1.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Provide valves recommended by manufacturer for use in service indicated. Provide sizes and connections that properly mate with pipe, tube, and equipment connections. Where more than one type is indicated, selection is Contractor's option.
- B. Unless otherwise indicated, provide valves of same size as upstream pipe size.

2.02 VALVES - GENERAL:

- A. Provide valves as shown and other valves necessary to segregate branches or units. Furnish discs suitable for service intended. Furnish a brass tag with identification of service controlled for each valve. Properly pack and lubricate valves. Place union adjacent to each threaded valve. Provide flanged valves in welded pipe. Provide ball valves in water lines unless otherwise shown.
- B. Furnish and deliver to Owner one wrench of each type and size required for operating underground valves.

2.03 BALL VALVES:

- A. General: Select with port area equal to or greater than connecting pipe area, include seat ring designed to hold sealing material.
- B. Comply with the following standards:
 - 1. Cast-Iron Valves: MSS SP-72
 - 2. Steel Valves: ANSI B16.34
 - 3. Bronze Valves: WW-V-35
- C. For Domestic Water Service:
 - 1. Threaded Ends 2 Inches and Smaller: Class 125, bronze two-piece body, bronze ball, bronze stem.
 - 2. Soldered Ends 2 Inches and Smaller: Class 125, bronze two-piece body, bronze ball, bronze stem.
- D. Manufacturer: Subject to compliance with requirements, provide ball valves of one of the following:
 - DeZurik Co.
 - Milwaukee Co.
 - Stockham Valves and Fittings, Inc.
 - Crane Co., Valve Div.
 - Hammond Valve Corp., Div. of Conval Corp.
 - NIBCO, Inc.

2.04 VALVE FEATURES:

- A. General: Provide valves with features indicated and, where not otherwise indicated, provide proper valve features as determined by Installer for installation requirements. Comply with ANSI B31.1.
- B. Connections:
 - 1. Flanges: Valve flanges complying with ANSI B16.1 (cast iron), ANSI B16.5 (steel), or ANSI B16.24 (bronze).
 - 2. Threaded: Valve ends complying with ANSI B2.1
 - 3. Buttwelding: Valve ends complying with ANSI B16.25
 - 4. Socket Welding: Valve ends complying with ANSI B16.11
 - 5. Solder Joint: Valve ends complying with ANSI B16.18
 - 6. Flangeless: Valve bodies manufactured to fit between flanges complying with ANSI B16.1 (cast iron), ANSI B16.5 (steel), or ANSI B16.24 (bronze).
- C. Valve terminology:
 - 1. Wafer: Flangeless valves
 - 2. Single Flange: Flangeless valves including bolt holes dimensioned for mating flanges.
 - 3. Trim: Fabricate pressure-containing components of valve, including stems (shafts) and seats from brass or bronze materials, of standard alloy recognized in valve manufacturing industry.
 - 4. Non-Metallic Disc: Non-metallic material selected for service indicated in accordance with manufacturer's published literature.
 - 5. Renewable Seat: Design seat of valve with removable disc and assemble valve so disc can be replaced when worn.
 - 6. Extended Stem: Increase stem length by 2 inch minimum to accommodate insulation applied over valve.
 - 7. Mechanical Actuator: Factory-fabricated gears, gear enclosure, external chain attachment and chain designed to provide mechanical advantage in operating valve.
 - 8. Bonnet: Part of gate or globe valve through which stem passes to valve body and attached to valve body by screws, bolts, union, or welding.
 - 9. Solid Wedge: One-piece tapered disc in gate valve, designed for contact on both sides.

10. Double Disc: Two-piece tapered disc in gate valve designed for contact on one side of each disc.
11. Parallel Double Disc: Two parallel discs in gate valve designed for contact by action of separate wedging block.
12. Inside Screw, Non-Rising Stem: Stem and hand wheel designed to rotate without rising when valve is operated from closed to open position.
13. Tight Shutoff: Butterfly valve designed for flow regulation, and manufactured to be tight in closed position.
14. Low Leakage: Butterfly valve designed for flow regulation and manufactured with minimum leakage tolerance in closed position.
15. Nominal Leakage: Butterfly valve designed for flow regulation.

PART 3 - EXECUTION

3.01 PRODUCT HANDLING AND PROTECTION:

- A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

3.02 INSTALLATION OF VALVES:

- A. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
- B. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward from horizontal plane.
- C. Provide union at each connection to equipment and downstream of each valve. Provide unions at both ends of valves when valves can not be turned due to an obstruction.
- D. Insulation: Where insulation is indicated, install extended-stem valves. Arrange in proper manner to receive insulation.
- E. Applications Subject to Shock: Install valves with bodies of metal other than cast iron where thermal or mechanical shock is indicated or can be expected to occur.
- F. Applications Subject to Corrosion: Do not install bronze valves and valve components in direct contact with steel unless bronze and steel are separated by dielectric insulator. Install bronze valves in steam and condensate service and in other services where corrosion is indicated or can be expected to occur.
- G. Selection of Valve Ends (Pipe Connections): Except as otherwise indicated, select and install valves with the following ends or types of pipe/tube connections:
 1. Pipe Size 2 Inches and Smaller: One of the following, at Installer's option:

2. Threaded valves
 3. Soldered Valves
 4. Grooved-end valves (where permitted by other sections of this specification).
 5. Butt-welding valves
 6. Socket-welding valves
 7. Flanged valves
 8. Flangeless valves
 9. Single flanged valves
 10. Pipe Size 2-1/2 Inches and Larger: One of the following, at Installer's option:
 11. Grooved-end valves
 12. Butt-welding valves
 13. Socket-welding valves
 14. Flanged valves
 15. Wafer valves
 16. Single flanged valves
 17. Hub-and-spigot valves
 18. Mechanical joint end valves
- H. Valve Stem: Select and install valves with outside screw and yoke stems, except provide inside screw non-rising stem valves where headroom prevent full opening of OS&Y valves.
- I. Non-Metallic Disc: Limit selection and installation of valves with non-metallic discs to locations indicated and where foreign material in piping system can be expected to prevent tight shutoff of metal seated valves.
- J. Renewable Seats: Select and install valves with removable seats, except where otherwise indicated.
- K. Fluid Control: Except as otherwise indicated, install gate, ball, globe, and butterfly valves to comply with ANSI B31.1.
- L. After piping systems have been tested and put into service, but before final testing, adjusting, and balancing, inspect each valve for possible leaks. Adjust or replace packing to stop leaks; replace valve if leak persists.
- M. Tag each valve and provide a complete listing of valve locations and functions.

END OF SECTION

SECTION 220529

SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.01 CONDITIONS OF THE CONTRACT:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to Work of this section.
- B. This section is a Division-22 Basic Plumbing Materials and Methods section and is part of each Division-22 section making reference to pipes and pipe fittings specified herein.

1.02 WORK INCLUDED:

- A. Types of supports and anchors specified in this section include the following:
 - 1. Horizontal-piping hangers and supports
 - 2. Vertical-piping clamps
 - 3. Hanger-rod attachments
 - 4. Building attachments
 - 5. Saddles and shields
 - 6. Miscellaneous materials
 - 7. Anchors

1.03 QUALITY ASSURANCE:

- A. Manufacturer's: Firms regularly engaged in manufacture of supports, anchors, and seals of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. UL and FM Compliance: Provide products which are Underwriters' Laboratories listed and Factory Mutual approved.
- C. Provide pipe hangers and supports of which materials, design, and manufacture comply with ANSI/MSS SP-58.
- D. Select and apply pipe hangers and supports, complying with MSS SP-69.
- E. Fabricate and install pipe hangers and supports, complying with MSS SP-89.
- F. Terminology used in this section is defined in MSS SP-90.
- G. Provide hangers and supports in conformance with SMACNA Standards, latest edition.

1.04 SUBMITTALS:

- A. Product Data: Submit catalog cuts, specifications, installation instructions, and dimensioned drawings for each type of support, anchor, and seal. Submit pipe hanger and support schedule showing manufacturer's figure number, size, location, and features for each required pipe hanger and support, all in accordance with Division 1.

PART 2 - MATERIALS

2.01 GENERAL:

- A. Support all piping so that it is firmly held in place by approved hangers and supports and special hangers as required. All Components shall support the weight of pipe, fluid, and pipe insulation based on spacing between supports with minimum factor of safety of five based on ultimate strength of material used. Do not exceed manufacturer's load rating. Do not support piping or ductwork with plumbers tape, wire, rope, wood, or other makeshift devices.
- B. Structural considerations:
 - 1. Steel or concrete or wood roof/floor system including slabs or roof deck shall be in place and complete before installation of any mechanical piping system.
 - 2. Space hangers so maximum individual hanger load will not exceed values listed in paragraph "Installation of Hangers and Supports".
 - 3. Do not attach hangers to steel roof deck.
 - 4. Do not attach hangers to bottom of concrete filled floor deck except by permission of Architect.
 - 5. Attach hangers to beams whenever possible.
- C. Provide electroplate or galvanized finish for all material used for support of piping.

2.02 HORIZONTAL PIPING HANGERS AND SUPPORT:

- A. General: Except as otherwise indicated, provide factory-fabricated horizontal-piping hangers and supports complying with ANSI/MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-piping systems, in accordance with MSS-SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Use felt lined J hangers for installation at copper piping.

Adjustable Steel Clevises:	B-Line B3100	MSS Type 1
Adjustable J Hanger	B-Line B3690	MSS Type 5
Vee Bottom Clevis Hanger	B-Line B3106	with B3106V
Split Pipe Rings:	B-Line B3173	MSS Type 11
Clips:	B-Line B3180	MSS Type 26
Single Pipe Rolls:	B-Line B3114	MSS Type 41
Adjustable Roller Hangers:	B-Line B3110	MSS Type 43

- B. Isolate copper tubing from ferrous materials and hangers with two thicknesses of 1-inch wide 10-mil polyvinyl tape, spiral-wrapped around pipe. Total width shall be a minimum of 3-inches.

2.03 HANGER RODS AND ATTACHMENTS:

- A. General: Except as otherwise indicated, provide factory-fabricated hanger-rods and attachments complying with ANSI/MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal- piping hangers and building attachments, in

accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hanger-rod attachments to suit hanger rods. Provide lock nuts at all threaded connections.

Steel Turnbuckles:	B-Line B3202	MSS Type 13
Swivel Turnbuckles:	B-Line B3224	MSS Type 15
Steel Weldless Eye Nuts:	B-Line B3200	MSS Type 17
Threaded Rod:	B-Line B3205	

B. Pipe hanger rod size:

<u>Pipe Size</u>	<u>Rod Size</u>
2 Inches and Smaller	3/8 Inches
2-1/2 Inches to 3-1/2 Inches	1/2 Inches
4 Inches to 5 Inches	5/8 Inches
6 Inches	3/4 Inches
8 Inches to 12 Inches	7/8 Inches

Provide 3/8 inch rod for support of PVC and CPVC and provide continuous support.

C. Trapeze suspension: B-Line B-22, or equal, 1-5/8 Inches width channel in accordance with manufacturers' published load ratings. No deflection to exceed 1/180 of a span.

1. Trapeze Supporting Rods shall have a safety factor of five; securely anchor to building structure.
2. Provide B-Line B2000 series pipe straps, or equal. Isolate copper pipe with two thicknesses of 2 Inches wide 10 mil polyvinyl tape, 3 inches wide.

2.04 BUILDING ATTACHMENTS:

A. General: Except as otherwise indicated, provide factory-fabricated building attachments complying with ANSI/MSS SP-58, of one of the following types listed, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.

1. Steel Structure

Top Beam C-Clamps:	B-Line B3031	MSS Type 19
Center Beam Clamps:	B-Line B3050	MSS Type 21
Welded Attachments:	B-Line B3083	MSS Type 22
Malleable C-Clamps:	B-Line B3036	MSS Type 23
Malleable Beam Clamps:	B-Line B3054	MSS Type 30

Provide retaining straps for all single sided beam clamps and C-clamps.

2. Wood Structure: Provide and install wood blocking as required to suit structure. Provide lag screws or thru bolts with length to suit requirements, and with size (diameter) to match the size of hanger rods required. Lag screws shall not be installed in tension, without written review and acceptance by Structural Engineer.

Side Beam Angle Clip	B-Line B3062	MSS Type 34
Side Beam Angle Clip	B-Line B3060	
Ceiling Flange	B-Line B3199	

Blocking for support of piping shall be not less than 2 inch thick for piping up to 2 inch size (water filled) or 3 inch size (vapor filled). Provide 3 inch blocking for piping up through 5 inch size, and 4 inch blocking for larger piping. Provide support for blocking in accordance with Structural Engineers requirements.

Where lag screws are used, length of screw shall be 1/2 inch less than the wood blocking. Pre-drill starter holes for each lag screw.

3. Concrete Structure: Do not use powder actuated fasteners for support of overhead piping unless approved by Architect.

Concrete Insert	B-Line B3014
Spot inserts	B-Line B2505
Equipment Anchor Bolt	B-Line B3022
Metal Deck Ceiling Bolt	B-Line B3019
Light Duty Spot Inserts	B-Line B2500

2.05 SADDLES AND SHIELDS:

- A. General: Except as otherwise indicated, provide saddles or shields under piping hangers and supports, factory-fabricated, for all insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.

1. Protection Saddles: Fill interior voids with segments of insulation matching adjoining insulation.

Welded Protection Saddle	B-Line B3160	MSS Type 39

2. Thermal Hanger Shields: Constructed of 360-degree insert of high density, 100 psi, water resistant calcium silicate, encased in 360-degree sheet metal shield. Provide assembly of same thickness as adjoining insulation.

- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering thermal hanger shields, which may be incorporated in the work include the following:

B-Line systems Inc.
 McDonald Supply
 Pipe Shields, Inc.

2.06 VERTICAL PIPING CLAMPS:

- A. General: Except as otherwise indicated, provide factory-fabricated vertical-piping clamps complying with ANSI/MSS SP-58, of one of the following types listed, selected by Installer to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.

Two-Bolt Riser Clamps: B-Line B3373 - MSS Type 8

- B. Support vertical piping risers securely to the pipe above each floor slab, with the arms of the clamp resting on the slab or the structural supports.
- C. Support pipe lines passing up through the building at each floor of the building. Bolt riser clamps securely to the floor slab.
- D. Support vertical piping risers securely to the structure at 10 foot centers maximum, for locations where vertical pipe length exceeds 12 feet.

2.07 MANUFACTURERS OF HANGERS AND SUPPORTS:

- A. Available Manufacturers: Products listed are B-Line. Subject to compliance with requirements, manufacturers offering hangers and supports, which may be incorporated in the work include the following:
 - 1. B-Line Systems Inc.
 - 2. Super Strut
 - 3. Power Strut
 - 4. Mason Mfg. Co., Div. of A-T-O, Inc.
 - 5. Grinnell Corp.
 - 6. Tolco Incorporated

2.08 MISCELLANEOUS MATERIALS:

- A. Metal Framing: Provide products complying with NEMA Standard ML1.
- B. Steel Plates: Shapes and Bars: Provide products complying with ANSI/ASTM A36.
- C. Cement Grout: Portland cement (ANSI/ASTM C150, Type I or Type III) and clean, uniformly graded, natural sand (ANSI/ASTM C404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum amount of water required for placement and hydration.
- D. Heavy Duty Steel Trapezes: Fabricate from steel shapes selected for loads required; weld steel in accordance with AWS standards.
- E. Pipe Guides: Provide factory-fabricated guides, of cast semi-steel or heavy fabricated steel, consisting of a bolted two-section outer cylinder and base with a two-section guiding spider bolted tight to pipe. Size guide and spiders to clear pipe and insulation, (if any), and cylinder. Provide guides of length recommended by manufacturer to allow indicated travel.

PART 3 - EXECUTION

3.01 PRODUCT HANDLING AND PROTECTION:

- A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

3.02 PREPARATORY PROVISIONS:

- A. The Contractor shall be responsible for the examination and acceptance of all conditions affecting the proper construction and/or installation of the Work of this Section and shall not proceed until all unsatisfactory conditions have been corrected. Commencing work shall be construed as acceptance of all conditions by the Contractor as satisfactory for the construction and/or installation of the Work.

3.03 PREPARATION:

- A. Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors and other building structural attachments.
- B. Prior to installation of hangers, supports, anchors and associated work, Installer shall meet at project site with Contractor, Installer of each component of associated work, inspection and testing agency representatives (if any), installers of other work requiring coordination with work of this section, for purpose of reviewing material selections and procedures to be followed in performing the work in compliance with requirements specified.

3.04 INSTALLATION OF BUILDING ATTACHMENTS:

- A. Install building attachments at required locations within concrete or on structural steel for proper piping support. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.
- B. Install building attachments for wood frame construction to structural framing or to blocking provided for this purpose. Install fasteners in wood structure or blocking in the top 1/3 of the wood structure. Provide and install blocking in accordance with the requirements of the structure it is being attached to.
 - 1. Install blocking for manufactured joists on both sides of joist, to provide equal loading. Install side beam angle clips with thru bolts and flat washers. Secure blocking to manufactured joists in accordance with manufacture's recommendations.
 - 2. Where blocking is provided, coordinate the location and installation with other trades.
 - 3. Install ceiling flanges on bottom of solid joists only, at ceiling construction.
 - 4. Where lag screws are used, pre-drill holes to suit the diameter of the lag screw.

3.05 INSTALLATION OF HANGERS AND SUPPORTS:

- A. General: Install hangers, supports, clamps and attachments to support piping properly from building structure; comply with MSS SP-69. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze-type hangers where possible. Where piping of various sizes is to be supported together by trapeze hangers, space

hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not support piping from other piping. Install seismic restraints in accordance with SMACNA A.76.

- B. Pipe hanger and support spacing: Locate hangers or supports at each change of direction, within one foot of elbow, and space at or within following maximum limits:

Pipe Dia.

	Steel Fluid	Steel Vapor	Copper Fluid	Copper Vapor	CPVC & PVC
1/2 – 1 inches	6	8	5	6	4
1-1/4 - 2 inches	7	10	6	6	4
2-1/2 - 3 inches	10	10	10	10	4
over 4 inches	10	10	10	10	4

1. Provide continuous support channel for all CPVC piping, with a minimum of one hanger per length of pipe.
 2. For fire protection piping, space hangers according to NFPA Section 13.
 3. For cast iron soil piping:
 - a) Support piping at every other joint for piping length of less than 4 feet.
 - b) For piping longer than 4 feet, provide support adjacent to each joint.
 - c) Hanger shall not be installed on the coupling.
 - d) Provide support at each horizontal branch connection.
 - e) Provide swaybrace at 40 feet-0 inch maximum spacing for all suspended pipe with No-Hub joints.
 4. Where grooved couplings are used, place hanger within 2 foot each side of fittings or refer to manufacturer's pipe support and anchorage guide.
 5. For piping of other materials, space hangers according to manufacturer's recommendations.
- C. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping. Where hangers and supports are used, the piping shall be hung independently of other piping.
- D. Support fire protection system piping independently of other piping.
- E. Prevent electrolysis in support of copper tubing by use of hanger, and supports which are copper plated, or by other recognized industry methods.
- F. Provisions for Movement: Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends and similar units.

- G. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
- H. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded.
- I. Insulated Piping: Comply with the following installation requirements.
 - 1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.
 - 2. Shields: Where low-compressive-strength insulation or vapor barriers are indicated on cold and chilled water piping, install thermal hanger shields. For pipe 8 inches and over, install wood insulation saddles.
 - 3. Saddles: Where insulation without vapor barrier is indicated, install protection saddles.

3.06 INSTALLATION OF ANCHORS:

- A. Install anchors at proper locations to prevent stresses from exceeding those permitted by ANSI B31, and to prevent transfer of loading and stresses to connected equipment, and as indicated on the drawings.
- B. Fabricate and install anchor by welding steel shapes, plates, and bars to piping and to structure. Comply with ANSI B31 and with AWS standards.
- C. Where expansion compensators are indicated, install anchors in accordance with expansion unit manufacturer's written instructions, to limit movement of piping and forces to maximums recommended by manufacturer for each unit.
- D. Anchor Spacing: Where not otherwise indicated, install anchors at ends of principal pipe-runs, at intermediate points in pipe-runs between expansion loops and bends. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping, and as indicated on the Drawings.
 - 1. Provide two guides at each side of expansion loop or compensator, and at all locations indicated on the Contract Drawings.

3.07 EXPANSION ANCHORS IN HARDENED CONCRETE:

- A. Qualification Tests: Base allowable shear and withdrawal load on qualification tests of at least three (3) test specimens, using a factor of safety of five (5) on the average of the test values, or a factor of safety of four (4) on the lowest test value, whichever is lower. Until the test data for the various anchors can be evaluated, use not more than 80% of the allowable load listed in the ICBO Research Committee Recommendation for the specific anchor, and shall comply with latest CBC.
- B. Installation: The anchors must be installed in accordance with the requirements given in ICBO Research Committee Recommendations for the specific anchor.
- C. Limitations on Anchors in Withdrawal: Anchors acting in withdrawal shall not be used for major connections such as anchoring tilt-up walls, tie-downs, heavy continuously applied loads, frequent vibratory loads, etc.

- D. Job Testing: Fifty percent of the anchors shall be load-tested on each job to twice the allowable capacity in tension, except that if the design load is less than 75 pounds; only one anchor in ten need be tested. If any anchor fails, all anchors must be tested. The load test shall be performed in the presence of the project inspector.
- E. The load may be applied by any method that will effectively measure the tension in the anchor, such as direct pull with a hydraulic jack, a torque wrench calibrated using the specific anchor, calibrated spring-loading devices, etc. Anchors in which the torque is used to expand the anchor without applying tension to the bolt may not be verified with a torque wrench.

3.08 ADJUSTMENT OF HANGERS AND SUPPORTS:

- A. Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

3.09 EQUIPMENT BASES:

- A. Concrete housekeeping bases will be provided as work of Division 3. Furnish to Contractor, scaled layouts of all required bases, with dimensions of bases, and location to column center lines. Furnish templates, anchor bolts, and accessories, necessary for base construction.
- B. Provide structural steel stands to support equipment not floor mounted or hung from structure. Construct of structural steel members or steel pipe and fittings. Provide factory-fabricated tank saddles for tanks mounted on steel stands.

END OF SECTION

SECTION 221000

PIPING SPECIALTIES

PART 1 - GENERAL

1.01 CONDITIONS OF THE CONTRACT

- A. The requirements of the GENERAL CONDITIONS, SUPPLEMENTAL CONDITIONS, and DIVISION 1, GENERAL REQUIREMENTS, apply to the work of this SECTION.

1.02 WORK INCLUDED

- A. Types of piping specialties specified in this section include the following:

- Pipe Escutcheons
 - Sleeves
 - Sleeve Seals
 - Unions and Flanges
 - Cathodic Protection
 - Pipe Identification

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of piping specialties, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Identification: Provide piping specialties with manufacturer's name (or trademark) and pressure rating clearly marked on valve body.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data and installation instructions for each type of manufactured piping specialty.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Provide factory fabricated piping specialties recommended by manufacturer for use in service indicated. Provide piping specialties of types and pressure ratings indicated for each service, or if not indicated, provide proper selection as determined by Contractor to comply with installation requirements. Provide sizes and connections which properly mate with pipe, tube, and equipment connections. Where more than one type is indicated, selection is Contractor's option.

2.02 PIPE ESCUTCHEONS

- A. Provide chrome plated brass pipe escutcheons with inside diameter closely fitting pipe outside diameter or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, ceilings, or pipe sleeve extension, if any. Furnish pipe escutcheons with nickel or chrome finish and screw or spring clamping device with concealed hinge.
 - 1. Pipe Escutcheons for Moist Areas: For water resistant floors, and areas where water and condensation can be expected to accumulate, provide cast brass or sheet brass escutcheons, solid or split hinged. Split hinged type shall not be used in areas with security requirements.
 - 2. Pipe Escutcheons for Dry Areas: Provide sheet steel escutcheons, solid or split hinged, split hinged type shall not be used in areas with security requirements.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering pipe escutcheons which may be incorporated in the work include the following:

Chicago Specialty Manufacturing Company
Producers Specialty and Manufacturing Corporation
Sanitary-Dash Manufacturing Company

2.03 PIPE SLEEVES

- A. Where pipes pass through concrete floors or walls, install galvanized metal or plastic sleeves having not less than ½-inch or more than 1-inch clearance around sides of the pipe or pipe covering for the full thickness of the concrete. Extend sleeves through floors one inch above floor and seal watertight.
- B. Manufactured pipe sleeves through firewalls and floors shall be equal to Pipe Shields Inc. Model F3000, F600, F9000 for bare piping; model F1000, F4000, F7000 for insulated piping.
 - 1. All insulated piping requiring a vapor barrier shall have an extension of insulation 1 inch beyond sheet metal.

- C. After piping has been installed, fill annular space with UL listed Fire Stopping System, 3M, Fire Barrier, Dow Firestop or Nelson Firestop. All through-wall firestop penetrations shall comply with the requirements of Specification Section 07275.
- D. The annular space between the pipe sleeves and the pipe and between duct openings and ducts through all floors and walls shall be fire resistant. Seal duct penetrations with an incombustible material, 3M "Fire Barrier", 3M "Fire Dam", Dow "Fire Stop", or equal.
- E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering pipe sleeves which may be incorporated in the work include the following:
- Pipe Shields Inc.
 Adjustocrete
 Sperzel "Crete-Sleeve"
- F. Sleeve Seals: Provide sleeve seals for sleeves located in foundation walls below grade or in exterior walls of one of the following:
1. Mastic and oakum, caulked between sleeve opening and pipe.
 2. Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.
 3. Available Manufacturers: Subject to compliance with requirement, manufacturers offering mechanical sleeve seals which may be incorporated in the work include the following:
- Link-Seal Corporation - Thunderline Corporation
 Calpico Inc.
 Metraflex - MetraSeal

2.04 UNIONS AND FLANGES

- A. Furnish and install unions at each threaded or soldered connection to all equipment, tanks and valves, of type specified in following schedule:

TYPE OF PIPE	UNION
Steel pipelines, 2 Inches and smaller	150 lb. screwed malleable ground joint, brass to iron seat, black for black pipelines, galvanized for galvanized lines.
Copper tubing, 2 Inches and smaller	150 lb. bronze ground joint, bronze to bronze sweat connections.
Copper tubing, 2-1/2 inches and larger	150 lb. cast bronze, flat faced flange with silver brazing threadless ends.

- B. Insulating couplings or flanges shall be furnished and installed at all connections of piping with dissimilar materials. Construct couplings so that the two pipes being connected are completely insulated from each other with no metal to metal contact. Heavily line the couplings with a hard, insulating, phenolic threaded coupling in standard pipe sizes.
- C. Furnish and install flanges at each flanged connection to equipment, tanks, and valves per following schedule:

<u>Type of Pipe</u>	<u>Flanges</u>
Screwed black or galvanized steel pipeline, 2-1/2 inches and larger.	125 lb. cast iron screwed steel flange flat faced, black or galvanized as required, unless noted otherwise.
Welded steel pipe, 2-1/2 inches and larger	150 lb. forged steel welding flanges, 1/16 inch raised faced, unless noted otherwise.

- D. Provide full faced or ring type gasket material to suit facing on flanges; Garlock Blue Guard Style 3000 or equal.

2.05 CATHODIC PROTECTION

- A. Furnish and install dielectric unions at all locations described herein, whether shown on Drawings or not, and except as noted herein. Construct couplings and flanges so that the two pipes being connected are completely insulated from each other with no metal to metal contact. Heavily line the couplings with a hard, insulating, phenolic plastic threaded in standard pipe sizes. Make up the flanges with insulating components consisting of a hard, phenolic gasket, bolt sleeves, and bolt washers. Supplement the insulating gasket with neoprene faces to form a seal.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers which may be incorporated in the work include the following:

F.H. Maloney
Walter C. Vallet

PART 3 - EXECUTION

3.01 PRODUCT HANDLING AND PROTECTION

- A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

3.02 INSTALLATION OF PIPING SPECIALTIES

- A. Pipe Escutcheons: Install pipe escutcheons on each pipe penetration through floors, walls, partitions, and ceilings where penetration is exposed to view and on exterior of building. Secure escutcheon to pipe or insulation so escutcheon covers penetration hole and is flush with adjoining surface.
- B. Sleeves: Secure sleeves to metal or wood forms in such a manner that they will not become displaced during pouring of concrete. Fill sleeves on deck with sand. After forms have been removed from concrete, the sleeves shall be removed from the openings.
- C. Core drill properly sized holes in the concrete to replace metal sleeves that are crushed or knocked out of position during pouring of concrete. Coordinate core drilling with structural engineer.
- D. Sleeve Seals: Install in accordance with the following:
 - 1. Mastic and Oakum: Fill and pack annular space between sleeve opening and pipe with oakum; caulk with mastic on both sides.
 - 2. Mechanical Sleeve Seals: Loosely assemble rubber links around pipe with bolts and pressure plates located under each bolt head and nut. Push into sleeve opening and center. Tighten bolts until links have expanded to form watertight seal.

3.03 INSTALLATION OF UNIONS AND FLANGES

- A. Install unions and flanges so that piping can be easily disconnected for removal of tanks, equipment, and valves. Provide three unions at each three-way valve.

END OF SECTION

SECTION 221000

PLUMBING PIPING SYSTEMS

PART 1 - GENERAL

1.01 CONDITIONS OF THE CONTRACT:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to Work of this section.
- B. This section is a Division-22 Basic Mechanical Materials and Methods section and is part of each Division-22 section making reference to pipes and pipe fittings specified herein.

1.02 WORK INCLUDED:

- A. Types of plumbing piping systems specified in this section include the following:
 - Domestic Cold Water Piping
 - Sanitary Waste and Vent Piping
 - Cleanouts
 - Floor Drains

1.03 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of plumbing piping systems products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with piping systems work similar to that required for project.
- C. Requirements of Regulatory Agencies: The publications listed below for a part of this specification; comply with provisions of these publications except as otherwise shown or specified.

1.04 JOB CONDITIONS:

- A. Cooperation with Other Trades: Coordinate Work of this SECTION with that of other SECTIONS to ensure that Work is carried out in an orderly fashion.
- B. Coordinate with other trades all equipment locations, pipe, duct and conduit runs, electrical outlets and fixtures, air inlets and outlets, and structural and architectural features. Provide information on location of piping and seismic bracing to all other trades as required for a completely coordinated project.

1.05 SUBMITTALS:

- A. Drawings shall be kept current and continually updated as the work progresses. IOR shall review and approve before payment.

- B. Product Data: Submit manufacturer's technical product data and installation instructions for plumbing piping systems materials and products.
- C. Provide certificate for all gas piping welders.
- D. Record Drawings: At project closeout, submit Record Drawings of installed piping systems, in accordance with requirements of Division 1.
- E. Maintenance Data: Submit maintenance data and parts lists for plumbing piping systems materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual; in accordance with requirements of Division 1.

PART 2 - PRODUCTS

2.01 MATERIALS AND PRODUCTS:

- A. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Provide materials and products complying with California Plumbing Code. Where more than one type of material or product is indicated, selection is Contractor's option.

2.02 BASIC IDENTIFICATION:

- A. General: Provide identification complying with Division 22 Basic Materials and Methods.
 - 1. Above ground Piping: Plastic pipe markers.
 - 2. Underground Piping: Underground type plastic line markers.
 - 3. Water Valves: Plastic valve tags.

2.03 BASIC PIPES AND PIPE FITTINGS:

- A. Provide pipes and pipe fittings complying with Division-22 Section "Pipes and Pipe Fittings," in accordance with the following listing:
 - 1. Interior Water Piping:
 - Tube Size 1-1/2 inches and Smaller: Copper tube; Type L, hard-drawn temper; wrought-copper fittings with full solder cups, solder joints.
 - Tube Size 2 inches and Larger: Copper tube; Type L, hard-drawn temper; wrought-copper fittings, brazed joints.
 - Capped or plugged outlets shall be Schedule 40 screwed brass.
 - 2. Exterior Water Piping:
 - a. Sizes 2 inches and larger (not under building): Gasket style PVC conforming to ASTM D2241-SDR21, Class 200 with gasket type fittings or ductile iron mechanical joint couplings. Gasket fittings shall be one piece injection molded PVC fittings, equal to Flo-Seal watermain fittings for PVC pressure pipe, 200 psi, ASTM D-3139.

- b. Manufacturer: Subject to compliance with requirements, provide gasket type PVC pipe of one of the following:

J.M. Ring-Tite
P.W. Pipe
Ipex Series pipe

- c. Sizes less than 2 inches: Type L copper tubing, hard temper, with wrought copper fittings.

Pipe size 4 inches and over (all locations): Ductile iron pipe with cement mortar lining; Schedule 150; ductile iron cement mortar lined fittings with rubber gasket joints.

3. Below Ground Sanitary Waste and Vent Systems Piping:

Service Weight (SV) cast iron soil pipe and fittings, asphaltic coated, conforming to ASTM-A-74 joined with neoprene gaskets conforming to ASTM C564, Ty-Seal, Dualtite, or equal.

Hubless cast-iron soil pipe conforming to CISPI-301 may be used if assembled M.G. couplings and no-hub fittings.

4. Above Ground Sanitary Waste and Vent Systems Piping:

Hubless cast iron soil pipe and fittings. Joints shall be made with FM No. 1680 approved, Class 1 rated couplings as manufactured by Anaco Husky, Clamp All, Mission Heavyweight, or equal.

- a. At Contractor's option, vertical piping above floor from lavatories and sinks may be standard weight galvanized steel pipe with class 125 black cast iron fittings, drainage pattern, screwed joints.
- b. At Contractor's option, vertical piping above floor from lavatories and sinks may be standard weight galvanized steel pipe with class 125 black cast iron fittings, drainage pattern, screwed joints.
- c. Vent Piping Above the Floor: Schedule 40 galvanized steel pipe with black cast iron drainage or vent fittings.

2.04 BASIC PIPING SPECIALTIES:

- A. General: Provide piping specialties complying with Division 22, Valves and Piping Accessories, with the following listing:

Pipe escutcheons.
Dielectric unions.
Pipe sleeves.
Sleeve seals.

2.05 BASIC SUPPORTS ANCHORS, AND SEALS:

- A. General: Provide supports, anchors, and seals complying with Division 15 Section - Supports and Anchors, in accordance with the following listing:
 - 1. Adjustable steel clevises, adjustable roller hangers, and adjustable pipe roll stands for horizontal piping hangers and supports.
 - 2. Two-bolt riser clamps for vertical piping supports.
 - 3. Protection shields for insulated piping support in hangers.

2.06 THRUST BLOCKS:

- A. All buried pressure piping with friction-type joints (bell and spigot, Tyton, etc.) shall have adequate concrete thrust blocks installed at each change of direction (horizontal, vertical), at each Tee, and at dead end. Anchor pipe at entrance to building.

2.07 BASIC VALVES:

- A. Provide valves complying with Division 22 Section Valves, in accordance with the following listing:
 - 1. Sectional Valves:
 - 2 inches and Smaller: Ball valves
 - 2. Shutoff Valves:
 - 2 inches and Smaller: Ball valves
 - 3. Drain Valves:
 - 2 inches and Smaller: Ball valves
 - 2-1/2 inches and Larger: Gate valves

2.08 HOSE BIBBS:

- A. Wall Hydrant: Recessed wall hose box with door and vacuum breaker and access door. Box shall be drawn formed 18 gage type 304 stainless steel. Flange shall be 16 gage stainless steel. Valve shall be cartridge type with vandal resistant lockshield loose key handle and screwdriver stop. Door shall be 16 gage with removable hinge and cylinder lock.
- B. Exterior Wall Mounted: Integral vacuum breaker protected, nickel bronze finish, and "T" handle key.
- C. Interior Wall Mounted: Integral vacuum breaker protected cartridge operated hose valve with lockshield bonnet and removable key handle.
- D. Exterior Wall Mount Non-freeze: Non-freeze wall box type with integral vacuum breaker.

2.09 TRAP PRIMER:

- A. Provide trap primers as indicated ½-inch size, with built-in air gap. Install trap primer piping with 1/4 inch per foot slope, to insure that the line will drain fully to the floor drain or floor sink. PVC trap primer bodies will not be acceptable.
 - 1. Provide ball valve at each trap primer location.
- B. Install trap primer and distribution unit exactly as called for in manufacturers printed installation instructions. Connect to domestic water piping from the top of the water line, in order to prevent foreign material from entering directly into primer assembly.
- C. Mount trap primer in wall, in sheet metal box, with Karp or equal access door. Size access door and box to suit the size required for hopper drain, and solder all seams of box. Provide locking door where installed in occupied spaces.
- D. Where one trap primer will be used for more than one trap, provide a distribution unit with feeder piping for a maximum of four traps.
- E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering trap primers which may be incorporated in the work include the following:

Precision Plumbing Products "Prime-Rite"
Sioux Chief Manufacturing Company "Prime Perfect"

2.10 CLEANOUTS:

- A. General: Install cleanouts of same diameter as pipe (4 inch maximum) in all horizontal soil and waste lines where indicated and at all points of change in direction. Cleanouts shall be located not less than 18 inches from building construction so as to provide sufficient space for rodding. No horizontal run over 50 feet inside buildings or 100 feet outside buildings shall be without cleanout, whether shown on Drawings or not. Provide 2 way cleanouts where indicated on drawings, and where required for satisfactory use.
 - 1. Provide cleanouts in waste drop from each sink and urinal.
 - 2. Provide one wrench for each size and type of cleanout used. Turn over to Owner at completion of the project, and obtain receipt. Place receipt in Operation and Maintenance Manuals.
 - 3. Exterior cleanouts 4" and larger shall be installed in manholes with the pipe extending up to within one foot of the grade.
- B. Cleanouts in floor and in concrete sidewalks (COTF): Ducco Cast Iron with Nickel Bronze top, clamping collar and ABS Plastic plug: Zurn ZN-1400-C with square or round top to suit floor construction.
- C. Cleanouts in concealed, above ground cast-iron soil or waste lines (CO): Zurn Z-1440A, with raised head ABS Plastic plug.

- D. Cleanouts in walls (WCO): Zurn Z-1441 or Z-1443, with Stainless Steel cover. Provide long sweep elbow or combination wye at connection to riser.
 - 1. Where space does not permit the above installation, provide Zurn Z-1446 with stainless steel access cover, and vandal resistant screw.
 - 2. Install face of cleanout plug within 1/2 inch of the finished wall.
- E. Cleanouts exterior to building in landscaped areas (GCO): Zurn Z-1449-BP cleanout ferrule with tapered bronze plug. Where located at grade, provide 18 by 18 by 6 inch concrete pad; Trowel concrete smooth and edge; set flush with finished grade.
- F. Cleanouts in drive areas (GCO)(COTG): Zurn A-1400-HD.
- G. Cleanouts in acid waste systems; Zurn-1404 cleanout access housing, with ductile cast iron body and nickel bronze top. Extend acid waste piping within the cleanout, and terminate with threaded cap. Secure acid waste pipe inside cleanout access housing with set screws provided.

2.11 FLOOR DRAINS:

- A. Provide flashing ring and clamp at floors with water resistant membrane. Set top of drain slightly below floor to insure drainage. Install vented P-trap below each drain. Install trap primer connection in the P-trap.
 - 1. General Service Floor Drains: Zurn Z-415-B.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Examine areas and conditions under which plumbing piping systems are to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected in manner acceptable to Contractor.
- B. Determine sanitary sewer and storm drain location and elevation at all points of connection before installing any piping. Notify Architect immediately if indicated grades cannot be maintained.
- C. At time of final connection, and prior to opening valve to allow pressurization of water and gas piping from existing systems, on site or off site, perform a pressure test to indicate static pressure of existing systems. If pressure on water piping is greater than 80 psi, or gas pressure is not as indicated on Contract Documents, inform Architect immediately. Do not allow piping systems to be pressurized without written consent of the Architect.

3.02 INSTALLATION OF WATER PIPING:

- A. Run all water piping generally level, free of traps or unnecessary bends, arranged to conform to the building requirements, and to suit clearance for other mechanical work such as ducts, flues, conduits, and other work. No piping shall be installed so as to

cause unusual noise from the flow of water therein under normal conditions. Changes of direction shall be made with approved fittings.

- B. Provide manufactured water hammer arrestors, sized and installed in accordance with Plumbing and Drainage Institute Standard PDI WH201.
 - 1. Locate water hammer arrestors to protect all fixture valves, including multiple and single fixtures, and as indicated on Drawings.
 - 2. Where two or more fixtures are located in a row or battery, continue water supply header either full size of branch line with air chamber one pipe size larger than header and a minimum 24 inches long installed on end of header.
 - 3. Arrange air chambers to drain through fixture faucet.
- C. Install piping on room side of building insulation.
- D. Check final location of rubber rings within couplings on PVC water piping with gauge or as recommended by manufacturer. Make connection to valves with cast iron adapters connected to water pipe with cast iron couplings. Furnish and install anchors or thrust blocks.
- E. For all faucets, hose bibbs, or other water outlets delivering industrial hot and/or cold water, provide a sign, permanently mounted, indicating "DANGER-UNSAFE WATER". Each sign shall be permanently engraved with white letters on a red background. Letters shall be minimum 1 inch high.

3.03 INSTALLATION OF SANITARY SYSTEMS:

- A. Check final location of rubber rings within the couplings with gauge or as recommended by the manufacturer.
- B. Ring-Tite cast iron pipe fittings may be used in lieu of standard fittings.
- C. Sewer Piping: Run all horizontal sanitary drain piping inside of building on a uniform grade of not less than 1/4-inch per foot. Piping shall slope uniformly between given elevations.
- D. Run all drainage piping as straight as possible and provide easy bends with long turns; make all offsets at an angle of 45 degrees or less.
- E. Grade all vent piping so as to free itself quickly of any water condensation.
- F. Where possible, join groups of vent risers together with one enlarged outlet through roof. Maintain minimum of 10 foot horizontal or 3 foot vertical clearance from air intakes.
- G. Hubless Cast Iron Joints: Comply with coupling manufacturer's installation instructions.

3.04 INSTALLATION OF DRAINAGE PIPING PRODUCTS:

- A. Cleanouts: Install in piping as indicated, as required by California Plumbing Code, at each change in direction of piping greater than 45 degrees, at minimum intervals of 50

feet for piping 4 inches and smaller and 100 feet for larger piping, and at base of each conductor.

- B. Flashing Flanges: Install flashing flange and clamping device with each cleanout passing through water resistant membrane.
- C. Install drains in accordance with manufacturer's written instructions and in locations indicated. Install floor drains and floor sinks with lip of drain slightly below finished floor to ensure drainage. Coordinate with other Contractors to ensure that floor slopes to drain. Provide flashing flange and clamping device with each drain passing through water resistant membrane.

3.05 INSTALLATION OF VALVES:

- A. Install valves as indicated on Drawings and in the following locations:
 - 1. Rigidly fasten hose bibbs, hydrants, fixture stops, compressed air outlets, and similar items to the building construction.
 - 2. Shutoff Valves: Install on inlet of each plumbing equipment item, and on inlet of each plumbing fixture, and elsewhere as indicated.
 - 3. Drain Valves: Install on each plumbing equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and elsewhere indicated or required to completely drain potable water system.

3.08 INSTALLATION OF TRAP PRIMERS:

- A. Install as indicated in manufacturers printed literature, with ½-inch, type-L, hard copper piping to trap primer connection on floor drains and floor sinks where indicated on Drawings. Provide valve ahead of each trap primer.

3.09 EQUIPMENT CONNECTIONS:

- A. Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated.

3.10 DOMESTIC WATER SYSTEM STERILIZATION:

- A. Clean and disinfect all hot and cold water systems connected to domestic water systems in accordance with AWWA Standard C651 and as required by the local Building and Health Department Codes, and EPA. The procedure shall be performed by an independent water treatment company that has a current Cal-EPA license to apply disinfectant chlorine in potable water.
- B. Chemical and bacteriological tests shall be conducted by a state- certified laboratory and approved by the local authorities having jurisdiction. Copies of the tests shall be submitted to the Architect and all governing authorities.

END OF SECTION

SECTION 224000

PLUMBING FIXTURES AND TRIM

PART 1 – GENERAL

1.01 CONDITIONS OF THE CONTRACT:

- A. The Conditions of the Contract (General, Supplementary, and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.
- B. Division-22 Basic Plumbing Materials and Methods sections apply to work of this section.

1.02 WORK INCLUDED:

- A. Types of plumbing fixtures required for the project include the following:
 - Lavatories
 - Sinks
 - Water Closets

1.03 QUALITY ASSURANCE:

- A. Plumbing Fixture Standards: Comply with applicable portions of the following codes and requirements for all work in this section:
 - California Plumbing Code - CPC
 - American National Standards Institute - ANSI
 - Federal Standards - FS

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical product data for plumbing fixtures and trim, including catalog cut of each fixture type and trim item furnished.
- B. Maintenance Data: Submit maintenance data and replacement material lists for each type of material listed in this section. Include this data and product data in maintenance manual.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING:

- A. Handle plumbing fixtures carefully to prevent breakage, chipping, and scoring the fixture finish. Do not install damaged plumbing fixtures; replace and return damaged units to equipment manufacturer.

PART 2 - PRODUCTS

2.01 PLUMBING FIXTURES:

- A. General: Provide factory-fabricated fixtures of type, style and material indicated. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats, and valves as indicated by their published product information; either as designed and constructed, or as recommended by the manufacturer, and as required for a complete, installation. Where more than one type is indicated, selection is Contractor's option; but, all fixtures of same type must be furnished by single manufacturer.

1. Take special care with the roughing-in and finished plumbing where batteries of fixtures occur.
2. Take location and mounting heights for roughing-in from Architectural Drawings.
3. Follow schedule on Plumbing Drawings for roughing-in connections. Set roughing-in for all fixtures exactly as per measurements furnished by the manufacturers of the fixtures used.
4. Roughing-in for lavatories and sinks shall be brought in through the wall under the centerline of the drain from the fixture wherever possible and as close to the fixture as possible.

2.02 MATERIALS:

- A. General: Unless otherwise specified, comply with applicable Fed. Spec. WW-P-541 Series sections pertaining to plumbing fixtures, fittings, trim, metals and finishes. Comply with requirements of WW-P-541 specification relative to quality of ware, glazing, enamel, composition and finish of metals, air gaps, and vacuum breakers, even though some plumbing fixtures specified in this section are not described in WW-P-541.
- B. Provide materials that have been selected for their surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, foundry sand holes, stains, discoloration, or other surface imperfections on finished units are not acceptable.
- C. Where fittings, trim and accessories are exposed or semi-exposed, provide, bright chrome-plated or polished stainless steel units. Provide copper or brass where not exposed.
- D. Handles on all faucets and stops shall be all-metal chromium plated.
- E. Stainless Steel Sheets: ANSI/ASTM A167, Type 302/304, hardest workable temper. Finish: No. 4, bright, directional polish on exposed surfaces.
- F. Steel Sheets for Baked-Enamel Finish: ANSI/ASTM A591, coating Class C, galvanized-bonderized.
- G. Aluminum: ANSI/ASTM B209/B221 sheet, plate and extrusions, as indicated; alloy, temper and finish as determined by manufacturer, except 0.40 mil natural anodized finish on exposed work, unless another finish is indicated.
- H. Plastic Laminate: NEMA LD3, general purpose high pressure type, 0.050 inch thick, smooth (non-textured) white unless another texture and color are indicated or selected by Architect.
- I. Vitreous China: High quality, free from fire cracks, spots, blisters, pinholes and specks; glaze on exposed surfaces, and test for crazing resistance in accordance with ANSI/ASTM C554.
- J. Fiberglass: ANSI Z124, smooth surfaced, with color selected by Architect.

- K. Synthetic Stone: High quality, free from defects, glaze on exposed surfaces, stain resistant.

2.03 PLUMBING FITTINGS, TRIM AND ACCESSORIES:

- A. Water Outlets: At locations where water is supplied (by manual, automatic or remote control) provide commercial quality faucets, valves, or dispensing devices, of type and size indicated, and as required to operate as indicated. Faucets and bubblers shall be lead free, in accordance with California code requirements, and NSF-61.
 - 1. Include manual shutoff valves and connecting stem pipes to permit outlet servicing without shut-down of water supply piping systems.
- B. P-Traps: Include IAPMO approved removable P-traps where drains are indicated for direct connection to drainage system. P-Traps shall be less trap screw cleanout.
- C. Escutcheons: Where fixture supplies and drains penetrate walls in exposed location, provide chrome-plated cast-brass escutcheons with setscrews.

2.04 MANUFACTURERS:

- A. Manufacturer: Subject to compliance with requirements, provide plumbing fixtures and trim of one of the following:
 - 1. See drawings (equipment schedule, sheet A103)

2.05 FIXTURE CONNECTIONS:

- A. Make connection between fixtures and flanges on soil pipe absolutely gastight and watertight with neoprene-type gaskets (wall-hung fixtures) or bowl wax (floor outlet fixtures). Rubber gaskets or putty will not be permitted.
- B. Provide fixtures not having integral traps with "P" traps of chromium-plated 17-gauge cast brass connected to concealed waste in wall and sanitary fittings. Provide IAPMO approval for trap, and provide less trap screw cleanout.
- C. Connections from stacks or horizontal wastes to wall or floor finish for wastes from lavatories, urinals, sinks, and drinking fountains and connection between floor drains and traps shall be IPS 85% red brass pipe.
- D. Plumbing fixture traps connected to special waste systems shall be constructed of materials to suit the waste system.
- E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering traps which may be incorporated in the work include the following:

Jameco Industries, Inc.
Cambridge Brass "Teck" Series
McGuire
- F. Unions on waste pipes on fixture side of traps may be slip or flange joints with soft rubber or lead gaskets.

2.06 WATER SUPPLIES AND STOPS:

- A. Provide 85% IPS red brass pipe, securely anchored to building construction, for each connection to faucets, stops, hose bibbs, etc. Each fixture, except hose bibbs, shall have a stop valve installed on water supply lines to permit repairs without shutting off water mains.
- B. Provide all water supplies to fixtures with compression shut-off stops with IPS inlets with threaded brass nipples at pipe connection and lock shield-loose key. Provide combination fixtures with compression stop and IPS inlet on each water supply fitting. Provide loose key handle for each stop.
- C. Provide 3/8-inch braided flexes or 3/8-inch rigid supplies for all fixtures, unless otherwise noted.
- D. Provide cast brass escutcheon.
- E. Furnish shut-off valves on hose bibbs directly connected to mains with no intervening valves.
- F. Manufacturer: Subject to compliance with requirements, provide water supplies of one of the following:

Speedway #SR3712A, lock shield, with loose key stops.
Cambridge Brass
McGuire

2.07 PLUMBING FIXTURE HANGERS AND SUPPORTS:

- A. Residential-type fixture supports are not acceptable.
- B. Install the following fixtures on concealed support with feet of support securely anchored to floor. Anchor top of support to wall construction in an approved manner.

Lavatories

2.08 PLUMBING FIXTURES:

- A. Install all plumbing fixtures at height indicated on Architectural Drawings. Where mounting height is not indicated, install at height required by Code.
- B. Special Requirements For ADA Requirements:
 - 1. Operating handle or valve for ADA water closets, urinals, lavatories, drinking fountains, and sinks shall operate with less than 5 pounds force.
 - 2. Insulate domestic water piping and waste piping below ADA plumbing fixtures with molded fire resistant foam single piece removable insulation covers for domestic hot water and waste piping. Install insulation to conform to ADA requirements.

Acceptable Manufacturers:

Handi Lav-Guard
Skal+Gard
Truebro, Inc - Handi Lav Guard
Plumberex Handy-Shield

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION:

- A. Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors, substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION:

- A. Install plumbing fixtures of types indicated where shown and at mounting height indicated on Architectural Drawings in accordance with fixture manufacturer's written instructions, roughing-in Drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of the California Plumbing Code pertaining to installation of plumbing fixtures.
- B. In all cases where plumbing fixtures are mounted on or against building walls of concrete or other materials having relatively rough or non-planar surfaces, it shall be the responsibility of this Contractor to provide any necessary grout or backing materials required to facilitate fixture mounting and eliminate void spaces between fixtures and wall to ensure adequate bearing contact.
 - 1. On completion of installation, provide silicone sealer at all points of fixture contact with walls or floors.
- C. Any fixture broken, cracked, or otherwise damaged during installation must be replaced by Contractor at his own expense.

3.03 TRAPPING AND VENTING OF FIXTURES:

- A. Trap and vent all plumbing fixtures in accordance with California Plumbing Code adopted by the Western Plumbing Officials Association and local plumbing codes, whether or not shown on Drawings. Strictly adhere to any local codes. Only exceptions to above will be those fixtures which are specially noted herein or on Drawings to be provided with special wastes.
- B. No vent shall intersect another vent at a point less than 6 inches above extreme overflow level of highest fixture served.
- C. Take vents off top half of horizontal runs and grade so as to free vents quickly of any water or condensation.

3.04 ADJUSTMENT OF PLUMBING PIPING SYSTEM:

- A. Test and adjust all flush valves so that each fixture receives the proper amount of water. Regulate all faucets, bibbs, drinking fountains, etc. to the approval of the Architect so that the entire system is left in first-class condition.
- B. Clean fixtures, equipment, and materials installed under this contract. Remove cement, plaster, paint and/or rust, etc. Dirt, rubbish, paint spots, or grease on walls or fixtures for which this Contractor is responsible must be removed by him.

3.05 CLEAN AND PROTECT:

- A. Clean plumbing fixtures of dirt and debris upon completion of installation.
- B. Protect installed fixtures from damage during the remainder of the construction period.

3.06 FIELD QUALITY CONTROL:

- A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.
- B. Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and match to be judged by Architect. Remove cracked or dented units and replace with new units.

3.07 EXTRA STOCK:

- A. Furnish special wrenches and other devices necessary for servicing plumbing fixtures and trim to Owner with receipt. Furnish one device for every 10 units.

3.08 OPERATION TEST:

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.09 CLEANING UP:

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION

SECTION 230000

BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 CONDITIONS OF THE CONTRACT:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to Work of this section.
- B. This section is a Division-23 Basic Mechanical Materials and Methods section and is part of each Division-23 section making reference to pipes and pipe-fittings specified herein.
- C. Related work included in other sections and divisions.
 - 1. Rough Carpentry – Section 061000.
 - 2. Exterior Painting – Section 099113.
 - 3. Interior Painting – Section 099123.
 - 4. Electrical – Division 26.

1.02 INCORPORATED DOCUMENTS:

- A. This section consists of General Requirements and Standard Specifications covering certain parts of work under Division 23 and is supplemented by other Division 23 sections covering additional work, requirements, and materials specifically applicable to the work of each section. Requirements of subsequent sections of the specifications, if in conflict with these General Requirements, shall govern.
- B. These General Provisions apply to the entire Division 23.
- C. Published specifications, standards, tests or recommended methods of trade, industry or governmental organizations apply to work of this Section, including those noted below.
 - 1. American National Standards Institute (ANSI).
 - 2. American Society of Mechanical Engineers (ASME).
 - 3. American Society for Testing and Materials (ASTM).
 - 4. Air Conditioning and Refrigeration Institute (ARI).
 - 5. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).
 - 6. National Electrical Manufacturers Association (NEMA).
 - 7. National Fire Protection Association (NFPA).
 - 8. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
 - 9. Underwriters' Laboratories, Inc. (UL).
 - 10. Air Moving and Conditioning Association (AMCA).
 - 11. Air Diffusion Council (ADC).

1.03 REQUIREMENTS OF REGULATORY AGENCIES:

- A. Permit Fees: Refer to General Conditions, Section 007000.

- B. Provide work and materials in full accordance with the latest rules and regulations of the following:
1. California Code of Regulations - Title 24 - Parts 2, 3, 4, 5, and 6
 2. California Code of Regulations - Title 22 - Chapter 7
 3. California Electric Code
 4. National Fire Protection Association
 5. CAL-OSHA
 6. Occupational Safety and Health Administration
 7. State Fire Marshal, Title 19 CCR
 8. California Building Code
 9. California Fire Code
 10. California Mechanical Code
 11. California Plumbing Code
 12. Other applicable state laws
- C. Nothing in Drawings or specifications shall be construed to permit work not conforming to these codes.
- D. Conform to State of California Energy Conservation Standards for all systems, equipment, and construction.
- E. When Contract Documents differ from governing codes, furnish and install larger size or higher standards called for without extra charge.
- F. No material installed as part of this WORK shall contain asbestos in any form.

1.04 WORK INCLUDED:

- A. This Section consists of General Requirements and Standard Specifications covering certain parts of work under Division 23 and is supplemented by other Division 23 sections covering additional work, requirements, and materials specifically applicable to the work of each section. Requirements of subsequent sections of the specifications, if in conflict with these General Requirements, shall govern.

1.05 OWNER-FURNISHED EQUIPMENT:

- A. Refer to Division 1 for specification requirements on mechanical equipment furnished to project by Owner, and to be received, installed and placed in operation as mechanical work.

1.06 PHASE CONSTRUCTION:

- A. Refer to Division 1 provisions for determination of how construction phasing requirements may affect performance of mechanical work.

1.07 SUBMITTALS:

- A. Material List and Substitutions.

- B. Operation and Maintenance instructions.
- C. Shop Drawings.
- D. Record Drawings.
- E. Project Completion Tests and Start-up: The following work shall be completed and submitted for review before project closeout field observations.
 - 1. Startup and operation reports as required throughout Division 23.
 - 2. Test and balance reports.
 - 3. Final observation will not be made until all of the above have been completed and balance report has been submitted and reviewed.

1.08 UTILITY CONNECTIONS:

- A. Contractor shall bear the cost of all construction related to utility services, from the point of connection shown on the Contract Documents. This shall include any piping, excavation, backfill, meters, boxes, check valves, backflow prevention devices, general service valves and the like, whether or not the work is performed by this contractor, the water/sanitation district or any other governmental agencies or assigns.

1.09 FEES, PERMITS, AND UTILITY SERVICES:

- A. Obtain and pay for all permits and service required in installation of this work; arrange for required inspections and secure approvals from authorities having jurisdiction.
- B. Arrange for utility connections and pay charges incurred, including excess service charges, if any.
- C. Prior to the start of construction, contact local gas company representative and coordinate location of gas meter and piping. In addition, coordinate time required for installation, in order to avoid delay to the project.
- D. Charges for permits required will be reimbursed to the contractor.
- E. The Owner will pay all fees required by the Division of the State Architect, Department of General Services, State of California. The Owner will reimburse the Contractor for fees, permits, and utility service charges, other than temporary utility charges unless otherwise indicated, necessary to the completion of the work. Proper documentation of fee, permit, and utility service charges shall be submitted to the Owner through the Architect. No mark-up shall be allowed the Contractor on these reimbursable charges.
- F. Obtain the first permits to operate any compressed air tanks that are required to be furnished under this work, pay all costs, and perform all tests required to obtain permits. Post permits under glass in a conspicuous place on or near the tanks, as required by these authorities.

1.10 SITE EXAMINATION:

- A. Examine site, verify dimensions and locations against Drawings, and inform self of conditions under which work is to be done before submitting proposal. No allowance will be made for extra expense on account of error.
- B. Information shown relative to existing services is based upon available records and data but is approximate only. Make minor deviations found necessary to conform with actual locations and conditions without extra cost. Verify location and elevation of utilities prior to commencement of excavation for new piping or its installation.
- C. Exercise extreme care in excavating near existing utilities to avoid any damage thereto. This Contractor is responsible for any damage caused by his operations.
 - 1. Refer to section 312000 prior to performing any excavating for requirements.

1.11 PLACEMENT OF EQUIPMENT AND WORK:

- A. The placement of equipment and mechanical work in the locations and spaces shown on the Drawings is the Contractor's responsibility.
- B. Move equipment and/or work into spaces through openings provided or located in the spaces during construction, as required.
- C. Do disassembling and reassembling of equipment or other work necessary to accomplish this requirement without extra cost to the Owner.

1.12 MATERIAL LIST AND SUBSTITUTIONS:

- A. Prior to commencement of work, and within time specified in Section 013300, after award of Contract, submit to Architect for review as required by Specification section 013300 a complete list of equipment and materials to be furnished, including all substitutions.
 - 1. Substitutions will be interpreted to be all manufacturers other than those specifically listed by model or catalog number.
 - 2. Identify submittal with Architect's project name, number and with item designation as indicated on drawings and referenced to applicable paragraphs of the specification.
 - 3. Partial or incomplete lists of material will not be considered.
 - 4. Only one request for substitution will be considered on each item of material or equipment. No substitutions will be considered thereafter.
 - 5. Quantities are the Contractor's responsibility and will not be reviewed.
 - 6. Provide materials of the same brand or manufacturer throughout for each class of material or equipment whenever possible.
- B. If Contractor desires to make a substitution, he shall submit complete information or catalog data to show equality of equipment or material offered to that specified. No substitutions will be allowed unless requested and reviewed in writing per specification Section 016000. The Architect shall review and take appropriate action on shop Drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be only for general conformance with the design concept and general compliance with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination

with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Architect shall not be required to review and shall not be responsible for any deviations from the Contract Documents not clearly noted by the Contractor, nor shall the Architect be required to review partial submissions or those for which submissions for correlated items have not been received. Architect reserves right to require originally specified item.

- C. Installation of reviewed substitution is Contractor's responsibility. Any changes required for installation of reviewed substituted equipment must be made without additional cost. Review by the Architect of the substituted equipment and/or dimensional Drawings do not waive these requirements.

1.13 MAINTENANCE AND OPERATING INSTRUCTIONS:

- A. General: Submit to the Architect the lesser of a) a minimum of 30 days prior to start-up or b) within 60 days after submittals are approved. The manual shall be complete and submitted all at one time. Partial or separate data will not be accepted. Data shall consist of the following minimum submissions:
1. Piping Identification Schedule: Copy of charts as specified under valve tags and charts.
 2. Equipment: List of nameplates, including nameplate data and system served.
 3. Manufacturers Literature: 3 copies of manufacturer's instructions for operation and maintenance of all mechanical equipment, including replacement parts list.
 4. Written Instructions: Typewritten instructions for operation and maintenance of these systems composed of Operating Instructions and Maintenance Schedule. 4 copies submittal to the Engineer for review.
 5. Operating instructions: A brief description of the system indicating proper setting of switches and other equipment furnished for providing control of the system and its components by the operator. Do not include adjustments requiring the technical knowledge of the service agency personnel.
 6. Maintenance Instructions: A list of each item of equipment requiring inspection or lubrication, describing the performance of such maintenance, and the month of the year when each item of equipment should be inspected, serviced, or lubricated. Maintenance Schedule: A list of each item of equipment requiring maintenance, showing the exact type of bearing on every component of each item of equipment, and the frequency when each item of equipment should be inspected or serviced.
- B. Verbal Instructions: Upon completion of the work, and at a time designated by the Architect, instruct the Owner's representative in the operation and maintenance of the equipment supplied by his company. This shall include two 4 hour sessions at site.
- C. Binders: Four complete sets of the above data in loose ring binders with permanent covers, with permanent identification on the back and index.
- D. Provide copies of check test and start reports for each piece of mechanical equipment provided as part of the Work.

1.13 JOB CONDITIONS:

- A. Cooperation with Other Trades: Coordinate Work of this SECTION with that of other SECTIONS to ensure that Work is carried out in an orderly fashion.
- B. Coordinate with other trades all equipment locations, pipe, duct and conduit runs, electrical outlets and fixtures, air inlets and outlets, and structural and architectural features. Provide information on location of piping and seismic bracing to all other trades as required for a completely coordinated project.

1.14 ELECTRICAL COORDINATION:

- A. Refer to the Electrical Drawings and Specifications, Division 26, for the service voltage and power feed wiring for equipment specified under this section. The Contractor has full responsibility for the following items of work:
 - 1. Review the Electrical Drawings and Division 26 to verify that the electrical services provided are adequate and compatible with the equipment requirements.
 - 2. If additional electrical services are required over and above what is indicated on the Electrical Drawings and in Division 26, such as more control interlock conductors, larger feeder, or separate 120 volt control power source, the Contractor shall include in his bid the cost to furnish and install the additional electrical services.
 - 3. Prior to proceeding with the installation of any additional electrical work, the Contractor shall submit detailed drawings indicating the exact scope of additional electrical work for review.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT:

- A. Mention herein or on Drawings requires that this Contractor provide each item listed of quality noted or equal.
 - 1. All material shall be new, full weight, standard in all respects, and in first-class condition.
 - 2. Provide materials of the same brand or manufacture throughout for each class of material or equipment wherever possible.
 - 3. Materials shall be tested within the Continental United States by independent, nationally recognized testing agency and shall be listed in accordance with testing agency requirements.
 - 4. All sizes, capacities and efficiency ratings shown are minimum, except gas capacity which is maximum available.
- B. The grade or quality of materials desired is indicated by the trade names or catalog numbers stated herein.
- C. Dimensions, sizes, and capacities shown are a minimum and shall not be changed without permission of the Architect.

- D. Conform to the State Energy Conservation Standards for all material and equipment.

2.02 PRODUCT HANDLING AND PROTECTION:

- A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

2.03 PREPARATORY PROVISIONS:

- A. The Contractor is responsible for the examination and acceptance of all conditions affecting the proper construction and/or installation of the Work of this Section, and shall not proceed until all unsatisfactory conditions have been corrected. Commencing work shall be construed as acceptance of all conditions by the Contractor as satisfactory for the construction and/or installation of the Work.

2.04 MATERIALS FURNISHED:

- A. Identify all materials and equipment by manufacturer's name and model number. Remove unidentified materials and equipment from site.
- B. Equipment specified by manufacturer's number shall include all accessories, controls, etc. listed in catalog as standard with equipment. Furnish optional or additional accessories as specified.
- C. Equipment or material damaged during transportation, installation, or operation is considered as totally damaged. Replace with new equipment. Variance from this permitted only with written consent of the Architect.

PART 3 - EXECUTION

3.02 DRAWINGS AND COORDINATION:

- A. Examine all Drawings prior to bidding of work and report any discrepancies in writing to the Architect.
- B. Drawings showing location of equipment, piping, ductwork, etc., are diagrammatic and job conditions will not always permit their installation in the location shown. The Mechanical Drawings show the general arrangement of all piping, ductwork, equipment, etc., and shall be followed as closely as existing conditions, actual building construction, and the work of other trades will permit. The Architectural and Structural Drawings shall be considered a part of the work insofar as these Drawings furnish the Contractor with information relating to design and construction of the building. Architectural Drawings shall take precedence over Mechanical Drawings.
- C. Because of the small scale of the Mechanical Drawing, it is not possible to indicate all offsets, fittings, and accessories which may be required. The Contractor shall investigate the structural and finish conditions affecting the work and shall arrange his work accordingly providing such fittings, valves, and accessories as may be required to meet conditions.

- D. General arrangement and location of piping, ductwork, equipment, etc. are shown on Drawings or herein specified. Carefully examine other work that may conflict with this work. Install this work in harmony with other crafts and at proper time to avoid delay of work.
- E. In advance of construction, work out minor changes and relocation to suit actual conditions and work of other trades to avoid conflict therewith. This shall not be cause for additional cost.
 - 1. Obtain all necessary information from the other trades regarding centers of partitions, walls, location of plumbing mains, fire sprinkler mains, and electrical conduits, ducts, pipes, etc. in order that pipes, equipment, and ductwork may be placed in their correct positions.
- F. Execute any work or apparatus shown on the Drawings and not mentioned in the specifications, or vice versa, the same as if specifically mentioned by both. Omission from Drawings or specifications of any minor details of construction, installation, materials, or essential specialties does not relieve this Contractor from furnishing same in place complete.
- G. Furnish and install any incidental work not shown or specified which can reasonably be inferred as part of the work and necessary to provide a complete and workable system.
- H. Furnish materials and work at proper time to avoid delay of the work.

3.03 INSTALLATION INSTRUCTIONS:

- A. Where requested by the Architect or Inspector of Record, provide manufacturer's printed installation instructions. This information shall include as a minimum, all information required by the contractor for complete installation of the product.

3.04 ACCESS:

- A. Continuously check Architectural Drawings for clearance and accessibility of equipment specified herein to be placed. No allowance of any kind will be made for negligence on part of Contractor to foresee means of installing his equipment into proper position.

3.05 CLOSING IN OF UNINSPECTED WORK:

- A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected and tested. Should work be enclosed or covered up before it has been inspected and tested, uncover work at own expense. After it has been inspected and tested, make repairs necessary to restore work of other contractors to condition in which it was found at time of cutting.

3.06 PROJECT MODIFICATIONS:

- A. During the progress of construction, if such conditions arise that require revisions, modifications, or relocations to any mechanical equipment or materials incorporated in this project, such alterations shall be immediately called to the attention of the Architect.

Contractor shall then prepare necessary Drawings showing proposed changes. Submit proposed changes for review by the Architect prior to actual revision work in the field.

- B. Two sets of Drawings showing all revisions shall be immediately presented to Architect for his records. Maintain additional copies on the project as necessary to comply with "RECORD DRAWINGS" requirement of the General Requirements.
- C. Incorporate all revisions into record Drawings.

3.07 FRAMING, CUTTING AND PATCHING:

- A. Coordinate with other contractors as necessary to provide any special framing, recesses, chases, etc., and provide wood blocking, backing, and grounds as necessary for proper installation of mechanical work.
- B. If this Contractor fails to coordinate with other contractors at proper time or fails to locate items properly, resulting in extra work, then this Contractor is responsible.
- C. This Contractor is responsible for proper placement of pipe sleeves, hangers, inserts, and supports for work.
- D. Cutting, patching, and repairing of existing (old) construction to permit installation of piping, etc. is responsibility of this Contractor. Repair or replace damage to existing work with skilled mechanics for each trade involved in first-class manner in accordance with renewed codes and standards.
- E. Cut existing construction in a neat and workmanlike manner by the use of a concrete saw. Use of pneumatic devices will not be allowed.
 - 1. Do not cut, core or drill structural members without consent of Architect and unless a DSA approved drawing is provided.
- F. Core openings through existing construction as required for the passage of new piping and conduits. Cut holes of the minimum diameter to suit size of pipe installed and associated insulation.

3.08 CARE AND CLEANING:

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.
- B. Drain and flush piping to remove grease and foreign matter.
- C. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.

3.09 SPECIAL JOB CONDITIONS:

- A. The Contractor's attention is directed to the fact that this building area is occupied and operational. Make every effort to minimize noise, dust, and inconveniences to the on-going operations of the building, and avoid any service interruptions.
- B. Perform Work in an orderly and careful manner with due consideration for the safety and protection of all existing surfaces, materials, and equipment that are to remain. Install and maintain protective and dust-protective devices as necessary and as required by State codes.
- C. It is intended that the Contractor provide and maintain dust-protective devices and partitions to contain or enclose all work operations conducted within any occupied room or space or adjacent to any occupied room or space when doors or other openings will permit dust infiltration into such occupied areas. Dust protective partitions shall be airtight. The location of such partitions and construction materials used is subject to the review of the Architect.
- D. Arrange for any interruptions of HVAC, plumbing, electrical, or fire protection work a minimum of 48 hours in advance. Arrange sequence of mechanical work with the Architect before construction is started, and confirm arrangements with all other trades.
- E. All temporary connections required to maintain services, including adequate heating and cooling, during the course of this Contract shall be made without additional cost to the Owner. The normal function of the building must not be interrupted; notify the Owner's Representative seven (7) days in advance before disturbing any service.

3.10 DEMOLITION AND SALVAGE:

- A. Provide demolition of mechanical work under this SECTION as indicated on Drawings. All mechanical fixtures, materials, and equipment will become the property of the mechanical contractor, unless otherwise directed by the owner, and shall be removed from the job site.

3.11 EXISTING SERVICES:

- A. Provide and install all required connections to existing systems as required by the Drawings and specifications.
- B. Integrate existing systems with all new work to provide a complete working system.
- C. Provide minimum 48-hour notice to Owner of service interruptions. All service interruptions shall be kept to the minimum possible time. When requested by Owner service interruptions shall occur outside of normal working hours.

3.12 STRUCTURAL DESIGN OF EQUIPMENT AND SEISMIC RESTRAINTS:

- A. All mechanical equipment supports shall be designed by a licensed Structural Engineer and shall comply with the California Building Code seismic requirements as well as requirements for direct bearing loads.
- B. Provide all piping and ductwork with seismic restraints using seismic hazard level (SHL) "A" as called for in SMACNA's "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems," prepared by the Sheet Metal Industry Fund of Los Angeles.

- C. In addition, conform to all State of California requirements.

3.13 ASBESTOS ABATEMENT:

- A. Existing systems within the area of this scope of work may have asbestos-bearing materials. Testing, encapsulation, removal, treatment, or correction of existing asbestos-bearing materials is not a part of this scope of work and is not the responsibility of the Mechanical Contractors.

3.14 GUARANTEE:

- A. Be responsible for work done and material installed under these plans and specifications. Repair or replace, as may be necessary, any defective work, material, or part which may show itself within two years of filing of Notice of Completion and be responsible for damage to other materials, furnishing, equipment, or premises caused by such defects during this period, if in the opinion of the Architect said defect is due to imperfection of material or workmanship. Provide all such work and materials at no cost to Owner.
- B. Be responsible for damage to any part of premises during guarantee period caused by leaks or breaks in work furnished and/or installed under this section.
- C. Replace refrigerant, lubricants, or gasses lost as result of defects, breaks, or leaks in work.
- D. The start date of warranty of all items is the recordation date of the project Notice of Completion regardless of phasing schedule and date equipment is first brought into service. The contractor is to perform all manufacturer's and bid document required maintenance after the equipment while it is in use during phased construction.
- E. Material, equipment and workmanship warranty shall be for 2 years.

3.15 RECORD DRAWINGS:

- A. Upon completion of work covered by this Contract, furnish Architect with reproducible sepias, showing all changes of piping, ductwork, etc. within building and installed under this Contract which are not in accord with these Drawings for the work.
- B. In addition, furnish one tracing showing all outside utility connections, piping, etc. installed under this Contract. Locate and dimension all work with reference to permanent landmarks.
- C. Match all symbols and designations used in Contract Drawings when preparing "Record" Drawings.
- D. Properly identify all stubs for future connections as to locations and use by setting of concrete marker at finished grade in manner suitable to Architect.

3.16 PROJECT COMPLETION TESTS AND START-UP:

- A. Upon completion of the mechanical work, or at such time agreed to by the Contractor and Architect, the Contractor shall assemble a mechanical systems start-up team to perform

systems start-up. This team shall consist of, as a minimum, the mechanical contractor (air and hydronic), electrical contractor, controls contractor, equipment manufacturer's start-up technician, District Rep, and any others that are deemed necessary to perform satisfactory system start-up. These start-up team members shall all be present throughout the entire system start-up process. In addition to all other Division 23 requirements, it shall be demonstrated that each mechanical system satisfactorily operates throughout its complete and full sequence of operation. Any failures shall be corrected before continuing. This shall be documented in the start-up report including all failures found and the corrective measures taken to correct the failure. Notify the Architect and District at least seven calendar days in advance of starting the above tests. The notification shall include a list of all startup personnel.

- B. Upon completion of the mechanical work, or at such time prior to completion as may be determined by the Architect, operate and test all mechanical equipment and systems for a period of at least five consecutive 8-hour days to demonstrate the satisfactory overall operation of the building or project as a complete unit. Include operation of heating and air conditioning equipment and systems for a period of not less than two 8-hour days at not less than 90 percent of full, specified heating and cooling capacities in tests. Commence tests after preliminary balancing and adjustment to equipment has been checked. Immediately before starting tests, install air filters and lubricate all running equipment. Notify the Architect at least seven calendar days in advance of starting the above tests.
- C. Provide training and orientation of Owners operating staff in proper care and operation of equipment, systems and controls.
- D. Neatly tabulate and deliver to the Architect complete operational data, including air flows, room temperatures, fan speeds, motor currents, plenum and duct static pressures, and other data as required. The Architect reserves the right to spot check results, and if discrepancies or errors are noted, Contractor will be required to redo balancing tests and tabulations entirely.
- E. During test period, make final adjustments and balancing of equipment, systems, controls, and circuits so that all are placed in first-class operating condition.
- F. Final observation will not be made until all of the above have been completed and balance report has been submitted and reviewed.

3.17 CLEANING UP:

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION

SECTION 230500

BASIC MECHANICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.01 CONDITIONS OF THE CONTRACT:

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to Work of this section.
- B. This section is a Division-23 Basic Mechanical Materials and Methods section and is part of each Division-23 section making reference to pipes and pipe-fittings specified herein.

1.02 WORK INCLUDED:

- A. Types of mechanical related work specified in this section include the following:

Mechanical Identification
Painting

1.03 PROJECT CONDITIONS:

- A. Existing Utilities: Locate and protect existing utilities and other underground work in manner which will ensure that no damage or service interruption will result from excavating and backfilling.

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical product data and installation instructions for each type of material listed in this SECTION.
- B. Maintenance Data: Submit maintenance data and replacement material lists for each type of material listed in this section. Include this data and product data in maintenance manual.

PART 2 - MATERIALS

2.01 MECHANICAL IDENTIFICATION:

- A. Colored stenciling, prefabricated labels on paper or on pressure sensitive self-adhesive cloth tapes may be used, as manufactured by General Painting Company, Westline Products, W.H. Brandy Company, or equal. The labels shall have black lettering and flow arrows on colored backgrounds, and the background colors shall conform to the color schedule shown in this Article. Yellow letters may be used on brown background only for better visibility. If the paper labels are used, they shall be attached to the piping with Adhesive. After the adhesive has dried, the paper label shall be given a protective coating. Comply with ANSI A13.1.
 - 1. The size of the lettering and label shall be such that the lettering can be easily read from the floor and the colors are easily discernible.
 - 2. The installation must be weather proof in exposed areas outdoors.

- B. Provide white lamacoid plate for each and every piece of equipment installed in this work. Lettering on plate shall be black, with size of lettering to suit equipment. Lettering shall be minimum of 3/8-inch in height. Plates shall be riveted or bolted to equipment.
- C. Provide 1 1/2" diameter round or 1 1/8" square plastic, plastic laminate or brass valve tags with sturdy fasteners for all valves installed above ground. Schedule on mountable frame to be located per Owner direction.

PART 3 - EXECUTION

3.01 PRODUCT HANDLING AND PROTECTION:

- A. Deliver packaged materials in their original, unopened wrapping with labels intact. Protect materials from water, the elements and other damage during delivery, storage and handling.

3.02 PREPARATORY PROVISIONS:

- A. The Contractor shall be responsible for the examination and acceptance of all conditions affecting the proper construction and/or installation of the Work of this Section and shall not proceed until all unsatisfactory conditions have been corrected. Commencing work shall be construed as acceptance of all conditions by the Contractor as satisfactory for the construction and/or installation of the Work.

3.03 PAINTING:

- A. Refer to Summary of Work, section 001010, for responsibility to perform painting.
- B. Refer to Exterior Painting Section, section 099113 and Interior Painting Section, section 099123, for items requiring painting and painting procedures.
- C. All new materials installed by Mechanical Prime Contractor, shall be cleaned of grease, oil, rust or dirt in preparation for painting. Spot prim all abraded areas in factory-primed surfaces and / or repair damage finish to match original factory condition.

3.04 MECHANICAL IDENTIFICATION:

- A. Provide stenciled or plastic-laminate type signs on each access door in ductwork and housings indicating purpose of access and to what equipment.
- B. Practical variations or changes in locations and spacing may be made with the specific approval of the Architect to meet specific conditions.
- C. The marking shall be located so as to be readily conspicuous at all times from any reasonable point of vantage.
- D. The paint shall be prepared enamel brushed on or sprayed from pressurized cans.
- E. Mechanical Equipment Identification: Install engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:
 - 1. Packaged HVAC central-station and zone-type units

3.05 ELECTRICAL WORK:

- A. Adequate working space shall be provided around electrical equipment in compliance with the National Electric Code and other applicable codes or ordinances. The mechanical work shall be coordinated with the Electrical Work in order to comply with these requirements. Any work which does not conform to these regulations shall be properly corrected without additional cost to the Owner.
- B. Furnish and install all line voltage and low-voltage temperature control wiring in the Mechanical Work by the Temperature Control sub-contractor, including all interlock wiring between motor starter coils, interlock relays, and temperature control equipment. Unless noted otherwise, this does not include primary control wiring between starters and push button or other manual starter switch or branch power circuits required for temperature control systems.
 - 1. Starters located in motor control centers will be provided under the Electrical Work. Contractor is referred to electrical drawings for motors served by motor control centers.
 - 2. Motors furnished in the Mechanical Work shall be furnished by the Mechanical Contractor, but such equipment shall be delivered to the Electrical Contractor for mounting and connecting to power wiring. Coordinate all motor starter requirements with Electrical Contractor.
 - 3. Temperature control equipment, including relays shown on control diagram, shall be furnished and installed by the Temperature Control Subcontractor.
 - 4. Electrical devices with piping connections, such as solenoid valves, insertion thermostats, strap-on aquastats, and similar items which are to be wired under the Electrical Work or by the Temperature Control Subcontractor, shall be installed by the Mechanical Contractor.
- C. Equipment furnished in this work that is factory wired but requires modification to internal wiring to meet specifications or drawing requirements shall have such internal modifications made at factory before shipment.
- D. All electrical work and equipment, including internal wiring, must comply with applicable codes and applicable portions of electrical specifications. Run line and low-voltage control wiring in conduit. Conduit for temperature control wiring shall be responsibility of Mechanical Contractor and shall be of type specified in electrical specifications.

3.13 FLASHINGS:

- A. Flue and duct flashings and storm collars shall be securely clamped around flue or duct storm collar or counterflashing, above flashing.

3.14 CARE AND CLEANING:

- A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.

- B. Keep the interior of all ductwork dry and free of dirt, dust, loose insulation, and other foreign materials at all times. If ductwork is found wet on jobsite it shall be removed and replaced.
- C. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.

3.15 OPERATION TEST:

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.16 CLEANING UP:

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Balancing Air Systems:
 - a. Constant-volume air systems.

1.2 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An entity engaged to perform TAB Work.

1.3 INFORMATIONAL SUBMITTALS

- A. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- B. Certified TAB reports.

1.4 QUALITY ASSURANCE

- A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC, NEBB or TABB.
 - 1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC, NEBB, or TABB.
 - 2. TAB Technician: Employee of the TAB contractor and who is certified by AABC, NEBB or TABB as a TAB technician.
- B. Certify TAB field data reports and perform the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
 - 2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

- C. TAB Report Forms: Use standard TAB contractor's forms approved by Architect.
- D. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."
- E. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- F. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine systems for installed balancing devices, manual volume dampers. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine equipment performance data including fan curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- G. Examine test reports specified in individual system and equipment Sections.

- H. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- I. Examine operating safety interlocks and controls on HVAC equipment.
- J. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system-readiness checks and prepare reports. Verify the following:
 - 1. Permanent electrical-power wiring is complete.
 - 2. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 - 3. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
 - 1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- B. Cut ducts and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
- C. Mark equipment and balancing devices, including damper-control positions, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.

- C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- D. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- E. Verify that motor starters are equipped with properly sized thermal protection.
- F. Check dampers for proper position to achieve desired airflow path.
- G. Check for airflow blockages.
- H. Check for proper sealing of air-handling-unit components.
- I. Verify that air duct system is sealed as specified in Division 23 Section "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
 - 2. Measure fan static pressures as follows to determine actual static pressure:
 - a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
 - b. Measure static pressure directly at the fan outlet or through the flexible connection.
 - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
 - 3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 - 4. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 23 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 - 5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, sub-main ducts, and major branch ducts to indicated airflows within specified tolerances.
 - 1. Measure airflow of sub-main and branch ducts.

- a. Where sufficient space in sub-main and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
 2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
 3. Re-measure each sub-main and branch duct after all have been adjusted. Continue to adjust sub-main and branch ducts to indicated airflows within specified tolerances.
- C. Measure air outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 TOLERANCES

- A. Set HVAC system's air flow rates within the following tolerances:
1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
 2. Air Outlets and Inlets: Plus or minus 10 percent.

3.7 REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.
- B. Status Reports: Prepare weekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced.

3.8 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 2. Include a list of instruments used for procedures, along with proof of calibration.

- B. Final Report Contents: In addition to certified field-report data, include the following:
 - 1. Fan curves.
 - 2. Manufacturers' test data.
 - 3. Field test reports prepared by system and equipment installers.
 - 4. Other information relative to equipment performance; do not include Shop Drawings and product data.
- C. General Report Data: In addition to form titles and entries, include the following data:
 - 1. Title page.
 - 2. Name and address of the TAB contractor.
 - 3. Project name.
 - 4. Project location.
 - 5. Architect's name and address.
 - 6. Engineer's name and address.
 - 7. Contractor's name and address.
 - 8. Report date.
 - 9. Signature of TAB supervisor who certifies the report.
 - 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 - 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 - 12. Nomenclature sheets for each item of equipment.
 - 13. Notes to explain why certain final data in the body of reports vary from indicated values.
 - 14. Test conditions for fans performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Fan drive settings including settings and percentage of maximum pitch diameter.
 - c. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:
 - 1. Quantities of outdoor, supply, return, and exhaust airflows.
 - 2. Duct, outlet, and inlet sizes.
 - 3. Position of balancing devices.

3.9 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

END OF SECTION

SECTION 23 31 13

METAL DUCTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rectangular ducts and fittings.
 - 2. Round ducts and fittings.
 - 3. Sheet metal materials.
 - 4. Sealants and gaskets.
 - 5. Hangers and supports.
 - 6. Seismic-restraint devices.
- B. Related Sections:
 - 1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting,
 - 2. Division 23 Section "Air Duct Accessories" for dampers and flexible ducts.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."
 - 1. Seismic Hazard Level A: Seismic force to weight ratio, 0.48.
 - 2. Seismic Hazard Level B: Seismic force to weight ratio, 0.30.
 - 3. Seismic Hazard Level C: Seismic force to weight ratio, 0.15.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
 3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.
- B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."
- C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 PRODUCTS

2.1 RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lindab Inc.
 - b. McGill AirFlow LLC.

- c. SEMCO Incorporated.
 - d. Sheet Metal Connectors, Inc.
 - e. Spiral Manufacturing Co., Inc.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- 1. Transverse Joints in Ducts Larger than 60 inches in Diameter: Flanged.
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- 1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
- 1. Galvanized Coating Designation: G60.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.
- D. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- E. Tie Rods: Galvanized steel, 6-mm minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
 - 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 - 2. Tape Width: 4 inches.
 - 3. Sealant: Modified styrene acrylic.
 - 4. Water resistant.
 - 5. Mold and mildew resistant.
 - 6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
 - 7. Service: Indoor and outdoor.
 - 8. Service Temperature: Minus 40 to plus 200 deg F.
 - 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
 - 10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Water-Based Joint and Seam Sealant:
 - 1. Application Method: Brush on.
 - 2. Solids Content: Minimum 65 percent.
 - 3. Shore A Hardness: Minimum 20.
 - 4. Water resistant.
 - 5. Mold and mildew resistant.
 - 6. VOC: Maximum 75 g/L (less water).
 - 7. Maximum Static-Pressure Class: 10-inch wg positive and negative.
 - 8. Service: Indoor or outdoor.
 - 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Flanged Joint Sealant: Comply with ASTM C 920.
 - 1. General: Single-component, acid-curing, silicone, elastomeric.
 - 2. Type: S.
 - 3. Grade: NS.
 - 4. Class: 25.
 - 5. Use: O.
 - 6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile

Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with poly-isobutylene plasticizer.
- F. Round Duct Joint O-Ring Seals:
 - 1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg at 10-inch wg and shall be rated for 2500 Pa static-pressure class, positive or negative.
 - 2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
 - 3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.5 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Hanger Rods for Corrosive Environments: Electro-galvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
- F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- H. Trapeze and Riser Supports:
 - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 - 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
 - 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

2.6 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2. Ductmate Industries, Inc.

3. Hilti Corp.
 4. Mason Industries.
 5. TOLCO; a brand of NIBCO INC.
 6. Unistrut Corporation; Tyco International, Ltd.
- B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.
1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- C. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.
- D. Restraint Cables: ASTM A 603, galvanized-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.
- E. Hanger Rod Stiffener: Reinforcing steel angle clamped to hanger rod.
- F. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 EXECUTION

3.1 DUCT INSTALLATION

- A. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- B. Install round ducts in maximum practical lengths.
- C. Install ducts with fewest possible joints.
- D. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- E. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

- G. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- H. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- I. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
 - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 2. Outdoor, Supply-Air Ducts: Seal Class A.
 - 3. Outdoor, Exhaust Ducts: Seal Class C.
 - 4. Outdoor, Return-Air Ducts: Seal Class C.
 - 5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
 - 6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
 - 7. Unconditioned Space, Exhaust Ducts: Seal Class C.
 - 8. Unconditioned Space, Return-Air Ducts: Seal Class B.
 - 9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.

10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg Seal Class B.
11. Conditioned Space, Exhaust Ducts: Seal Class B.
12. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 1. Where practical, install concrete inserts before placing concrete.
 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 SEISMIC-RESTRAINT-DEVICE INSTALLATION

- A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."
 1. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet.
 2. Brace a change of direction longer than 12 feet.

- B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install cable restraints on ducts that are suspended with vibration isolators.
- E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction.
- F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.
- G. Drilling for and Setting Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify the Architect if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid pre-stressed tendons, electrical and telecommunications conduit, and gas lines.
 - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 - 4. Set anchors to manufacturer's recommended torque, using a torque wrench.
 - 5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

3.6 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.7 DUCT CLEANING

- A. Clean new and existing duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
 - 1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer
 - 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.

3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Particulate Collection and Odor Control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.8 START UP

- A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.9 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel as follows:

B. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
 - a. Pressure Class: Negative 1-inch wg.
 - b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.

- c. SMACNA Leakage Class for Rectangular: 12.
- d. SMACNA Leakage Class for Round and Flat Oval: 6.

C. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
 - a. Velocity 1000 fpm or Lower:
 - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
 - 2) Mitered Type RE 4 without vanes.
 - b. Velocity 1000 to 1500 fpm:
 - 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
 - c. Velocity 1500 fpm or Higher:
 - 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
 - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
 - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
 - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
 - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
 - 4) Radius-to Diameter Ratio: 1.5.
 - b. Round Elbows, 12 inches and Smaller in Diameter: Stamped or pleated.
 - c. Round Elbows, 14 inches and Larger in Diameter: Standing seam.

D. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
 - a. Rectangular Main to Rectangular Branch: 45-degree entry.
 - b. Rectangular Main to Round Branch: Spin in.
2. Round: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
 - a. Velocity 1000 fpm or Lower: 90-degree tap.
 - b. Velocity 1000 to 1500 fpm: Conical tap.
 - c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION

SECTION 23 33 00

AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Manual volume dampers.
 - 2. Flange connectors.
 - 3. Turning vanes.
 - 4. Flexible connectors.
 - 5. Duct accessory hardware.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G60.
 - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inches minimum diameter for lengths longer than 36 inches.

2.3 MANUAL VOLUME DAMPERS

A. Standard, Steel, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Air Balance Inc.; a division of Mestek, Inc.
 - b. American Warming and Ventilating; a division of Mestek, Inc.
 - c. Flexmaster U.S.A., Inc.
 - d. McGill AirFlow LLC.
 - e. Nailor Industries Inc.
 - f. Pottorff.
 - g. Ruskin Company.
 - h. Trox USA Inc.
 - i. Vent Products Company, Inc.
2. Standard leakage rating.
3. Suitable for horizontal or vertical applications.
4. Frames:
 - a. Frame: Hat-shaped, 0.094-inch-thick, galvanized sheet steel.
 - b. Mitered and welded corners.
 - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
5. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized-steel, 0.064 inch thick.
6. Blade Axles: Stainless steel.
7. Bearings:
 - a. Stainless-steel sleeve.
 - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
8. Tie Bars and Brackets: Galvanized steel.

B. Standard, Aluminum, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Air Balance Inc.; a division of Mestek, Inc.
 - b. American Warming and Ventilating; a division of Mestek, Inc.
 - c. McGill AirFlow LLC.
 - d. Nailor Industries Inc.
 - e. Pottorff.
 - f. Ruskin Company.
 - g. Trox USA Inc.
 - h. Vent Products Company, Inc.
2. Standard leakage rating.
3. Suitable for horizontal or vertical applications.
4. Frames: Hat-shaped, 0.10-inch-thick, aluminum sheet channels; frames with flanges for attaching to walls and flangeless frames for installing in ducts.
5. Blades:

- a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Roll-Formed Aluminum Blades: 0.10-inch-thick aluminum sheet.
 - e. Extruded-Aluminum Blades: 0.050-inch-thick extruded aluminum.
 - 6. Blade Axles: Stainless steel.
 - 7. Bearings:
 - a. Stainless-steel sleeve.
 - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
 - 8. Tie Bars and Brackets: Aluminum.
- C. Jackshaft:
- 1. Size: 0.5-inch diameter.
 - 2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
 - 3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.
- D. Damper Hardware:
- 1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
 - 2. Include center hole to suit damper operating-rod size.
 - 3. Include elevated platform for insulated duct mounting.

2.4 FLANGE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 1. Ductmate Industries, Inc.
 - 2. Nexus PDQ; Division of Shilco Holdings Inc.
 - 3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel.
- D. Gage and Shape: Match connecting ductwork.

2.5 TURNING VANES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 1. Ductmate Industries, Inc.
 - 2. Duro Dyne Inc.
 - 3. Elgen Manufacturing.

4. METALAIR, Inc.
 5. SEMCO Incorporated.
 6. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."
1. Vane Construction: Double wall.

2.6 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Ductmate Industries, Inc.
 2. Duro Dyne Inc.
 3. Ventfabrics, Inc.
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
1. Minimum Weight: 26 oz./sq. yd..
 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 3. Service Temperature: Minus 40 to plus 200 deg F.

2.7 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
 - 1. Install steel volume dampers in steel ducts.
 - 2. Install aluminum volume dampers in aluminum ducts.
- D. Set dampers to fully open position before testing, adjusting, and balancing.
- E. Install flexible connectors to connect ducts to equipment.
- F. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.
- G. Install duct test holes where required for testing and balancing purposes.

3.2 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Operate dampers to verify full range of movement.
 - 2. Inspect locations of access doors and verify that purpose of access door can be performed.
 - 3. Inspect turning vanes for proper and secure installation.

END OF SECTION

SECTION 233400

FANS AND VENTILATORS

PART 1 - GENERAL

1.01 CONDITIONS OF THE CONTRACT:

- A. The Conditions of the Contract General, Supplementary and other Conditions and the General Requirements Sections of Division 1 are hereby made a part of this Section.
- B. Division-23 Basic Mechanical Materials and Methods apply to work of this section.

1.02 WORK INCLUDED:

- A. Types of fans and ventilators required for project include the following:
Centrifugal Ceiling Exhausters

1.03 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical product data and installation instructions for each type of material listed in this SECTION.
- B. Maintenance Data: Submit maintenance data and replacement material lists for each type of material listed in this SECTION. Include this data and product data in maintenance manual.

PART 2 - MATERIALS

2.02 CEILING VENTILATORS:

- A. Centrifugal Ceiling Exhausters: Provide centrifugal ceiling exhausters, designed for ceiling or inline mounting, of type, size and capacity as scheduled.
- B. Provide AMCA Certified Ratings Seal for air flow and sound.
- C. Type: Provide galvanized steel housing lined with acoustical insulation, adaptable for ceiling or inline installation. Provide centrifugal fan wheels mounted on motor shaft with fan shrouds, all removable for service. Provide integral backdraft damper at fan discharge.
- D. Motor: Provide permanent split-capacitor motor, permanently lubricated, with grounded cord and plug.
- E. Electrical: Provide junction box for electrical connection on housing, and receptacle for motor plug-in.
- F. Speed Control: Furnish remote fan speed control, solid state, capable of controlling fan speed from full speed to approximately half speed. Unless noted otherwise, locate speed controller adjacent to fan.

- G. Accessories: Provide manufacturer's standard roof jack or wall cap, and transition fittings as indicated on drawings or schedules.
- H. Available Manufacturers: Subject to compliance with requirements, manufacturers offering centrifugal ceiling exhausters which may be incorporated in the work include the following:
 - Acme Engineering & Mfg. Co.
 - Penn Ventilator Co., Inc.
 - Greenheck
 - Cook Fan

PART 3 - EXECUTION

3.01 GENERAL:

- A. Install ventilators where indicated, in accordance with equipment manufacturer's installation instructions, and with recognized industry practices, to ensure that equipment complies with requirements and serves intended purposes.
- B. Provide motors so that they cannot be overloaded above nameplate rating throughout the full speed range of the adjustable pitch driving sheave.
- C. Fan wheels shall be balanced statically and dynamically near operating speed.
- D. Provide drives and guards conforming to the requirements hereinbefore specified.
- E. Fan construction, speed, noise level, tip speeds, outlet velocities and efficiencies will be taken into consideration in approval of fans offered. Fans shall be as scheduled on drawings, or approved equal.

3.02 ELECTRICAL CONNECTIONS:

- A. Ensure air distribution equipment is wired properly, with rotation in direction indicated and intended for proper performance.

3.03 CARE AND CLEANING:

- A. Repair or replace broken, damaged or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment and trim installed as part of this work. Leave systems and equipment in satisfactory operating condition.

3.04 OPERATION TEST:

- A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.05 CLEANING UP:

- A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like and leave premises clean, neat and orderly.

END OF SECTION

SECTION 260500

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Provide labor, materials, equipment, transportation and perform operations necessary or incidental to the proper execution and completion of the electrical work, whether specifically mentioned or not, and as directly indicated or reasonably implied by the Drawings and Specifications.
- B. Work specified in Division 16:
 - 1. Section 260519: 600-Volt Power Conductors and Cables
 - 2. Section 260526: Grounding and Bonding for Electrical Systems
 - 3. Section 260533: Raceway and Boxes for Electrical Systems
 - 4. Section 260553: Identification for Electrical Systems
 - 5. Section 262413: Switchboards
 - 6. Section 262416: 600-Volt Rated Panelboards & CB
 - 7. Section 262726: Wiring Devices
 - 8. Section 263100: Solar PV System
 - 9. Section 265000: Lighting
 - 10. Section 271343: Telecommunication Infrastructure
 - 11. Section 275116: Public Address & Intercom System
 - 12. Section 283100: Fire Detection and Alarm System
- C. Work specified in other divisions:
 - 1. Section 337173: Electric Utility Services

1.2 WORK NOT INCLUDED

- A. Refer to the specific Division 16 Sections for a detailed listing of work that is not included in this Contract.
- B. In any case, cooperate with the other trades who may or may not be party to this Contract for the purpose of coordinating the electrical requirements and installation of equipment, materials, and furnishings provided by those other trades, including the Owner.

1.3 CODES AND STANDARDS

- A. Provide equipment and materials which conform to, and perform the installation thereof in accordance with the following codes and industry standards. The applicable version of each shall be that in effect as of the date of the Contract:
 - 1. California Electrical Code (CEC).

2. Titles 8, 19 and 24 of the California Code of Regulations (CCR).
3. American National Standards Institute (ANSI).
4. California State Fire Marshal (CSFM).
5. Underwriters' Laboratories (UL).
6. National Electrical Manufacturers' Association (NEMA).

- a. Institute of Electrical and Electronics Engineers (IEEE).
 - 1) National Electrical Safety Code (NESC).
 - a) Electrical Safety Orders.
 - b) Other applicable local codes and ordinances.

- B. Where the authority-having-jurisdiction makes an interpretation or decision, as is their prerogative in accordance with the Code, such direction shall be considered a part of these Contract Documents as if contained herein. With respect to completing the intent of the Contract Documents, comply with any and all requirements of the authority-having-jurisdiction and utility company field inspectors, at no additional cost.
- C. The above referenced codes and standards are considered to be absolute minimum requirements. The Drawings and Specifications shall take precedence over the above referenced codes and standards where materials or workmanship of higher quality or larger size is indicated. Nothing in these Drawings or Specifications shall be construed to allow work not conforming to the applicable codes and standards.

1.4 REVIEW OF CONTRACT DOCUMENTS

- A. Examine all relevant Contract Documents including Drawings, Specifications, and Shop Drawings in order to become acquainted with the Work of other installers whose activities will adjoin or be affected by the Electrical Work.

1.5 PERMITS, LICENSES, AND FEES

- A. Procure and pay for all permits, licenses and fees that are required to carry out and complete the Electrical Work.
- B. Pay for building department or utility company imposed inspection fees.
- C. Pay utility company charges for normal or after hours shutdowns, service calls, repairs, and cable locating that are directly related to the installation of the Electrical Work.

1.6 SITE VERIFICATION OF INFORMATION

- A. Visit the project site prior to submitting a bid and verify the condition, location and dimensions of buildings, equipment, and facilities. Become acquainted with conditions under which the Work is to be performed and which may affect the cost thereof.
- B. Verify at the project site, the accuracy of information shown on the Drawings regarding existing equipment, materials, and facilities. This includes but is not limited to: size, type, rating, quality, age, and serviceability. No allowance will be made on behalf of the Contractor for extra expenses resulting from the failure to discover conditions affecting the Work.

1.7 WORKING SPACE

- A. Maintain adequate work space around, and access to, electrical and mechanical equipment in strict accordance with the applicable Codes. Verify during the course of construction that sufficient space will be available for the installation equipment, fixtures, etc.

1.8 MATERIALS AND SUBSTITUTIONS

- A. Materials shall be new, high quality, free from defects, of standard make, and of the brand or grade as shown on the Drawings or specified herein. Specific trade names are used in the Drawings and Specifications in order to establish the standard grade and characteristics of said items. This does not imply the right upon the part of the Contractor to use other materials or methods without the approval of the Architect.
- B. Electrical materials and equipment shall bear the label of, or be listed by, the Underwriters' Laboratories (UL) wherever standards have been established and label service is regularly furnished by that agency. Comply with the installation and application requirements of UL as documented in their published directories.
- C. Unless specifically noted, equipment and systems shall be the product of a manufacturer who has been in the manufacture of, and has nationally distributed catalogs covering the ratings and specifications of, said equipment or systems, for a period of not less than five (5) years.
- D. Maintain uniformity throughout the Project by making use of only one make or brand of material for each material used.
- E. Substitutions of materials or methods will only be allowed if such items are approved in writing by the Architect as equal in quality and utility to the specified items. Submit a list of proposed substitutions within thirty (30) days of the award of the Contract. Include on the list the original manufacturer's name and model number, the proposed manufacturer's name and model number, catalog cut sheets, ratings, sizes, performance curves, shop drawings, and other data as may be required to demonstrate equality to the specified item.
- F. The approval of a substitution does not authorize any deviation from the utility, size, function, or durability of the specified item unless specifically pointed out and requested in the proposed substitution list, and said deviation is approved in writing by the Architect. Responsibility of the Contractor for dimensional considerations or space conflicts is not relieved by the approval of a substitution.
- G. If requested by the Architect, submit samples of materials and equipment for approval prior to installation.

1.9 ELECTRICAL SUBMITTALS

- A. See the General Conditions for conditions of submittal approval and general requirements for submission of shop drawings.
- B. Submit a minimum of five copies (or more as required by the General Conditions) of electrical shop drawings and manufacturer's cut sheets for equipment and materials as noted in each Division 16 specification section. Bind the submittals as complete volumes according to

classification of equipment such as power, lighting, fire alarm, etc. When possible, make all electrical submittals at the same time.

- C. Submit shop drawings and supporting data as instruments of the Contractor. Stamp each item in the submittal documents with the Contractor's stamp, thereby stating that the equipment meets all requirements and conditions of the Drawings and Specifications. In particular, certify that the items shown on the shop drawings conform to the dimensional, environmental, and space restrictions as pertains to all work under this Contract and the work of other parties in conjunction with this Project.
- D. Provide a blank space on the title page of each submittal classification for the Architect's or Engineers approval stamp and comment field. The minimum size of such space shall be eight inches wide by five inches high.
- E. Arrange panelboard submittals to show bussing, circuit numbering, and branch circuit protective devices similar the schedules on the Drawings. Show elevations of switchboards, motor control centers, and distribution centers indicating the layout of devices, meters, handles, etc. Provide device ratings, circuit numbers, and nameplate descriptions in table form. Include terminal strip mounting arrangements on elevations for terminal cabinets.

1.10 DRAWINGS AND SPECIFICATIONS

- A. The data and information contained on the Drawings is as accurate as was reasonably possible at the time they were produced, but absolute accuracy is not guaranteed. Exact locations, distances, elevations, etc., will be dictated by the actual building and the conditions at the site.
- B. The layout of electrical equipment, wiring, and accessories is shown in a diagrammatic fashion (not pictorially) in order to achieve clarity and legibility. Although the size and location of electrical equipment is drawn to scale wherever possible, refer to all data in the Contract Documents and field verify this information as the project progresses. Examine architectural, structural, mechanical, and other drawings to determine the exact location of conduits, outlets, fixtures, and equipment and to note any conditions which may affect the electrical work.
- C. The Drawings and Specifications may be superseded by later detail drawings and specifications prepared by the Architect. Conform to such detail drawings, specifications, addenda, change orders, other reasonable changes as if they are contained herein. See the General Conditions for change order cost considerations.
- D. Because the Electrical Drawings may be distorted for clarity of representation, it may be necessary to field verify the exact location of electrical outlets, lights, switches, etc. in order to conform to the architectural elements. The Architect reserves the right to make minor changes to the locations of equipment, devices, and wiring shown on the Drawings, at no additional cost, providing the changes are ordered before the rough-in of conduit, boxes, or related items is completed, and no extra material are required.
- E. For dimensional and locational purposes, the Architectural Drawings take precedence over the Electrical Drawings. Determine the appropriate location of lighting fixtures, outlets, wall-mounted devices, etc. by studying the reflected ceiling plans, building sections, and interior elevations. Report conflicting conditions to the Architect before rough-in for adjustments to the locations.

- F. Conduit quantities, sizes, termination points, and wiring are depicted on the Electrical Drawings. However, not all conduit bends or routing details are necessarily shown. Route conduit so as to conform to the structural conditions, avoid obstructing other trades, maintain space restrictions and keep circulation areas and access openings clear.
- G. Thoroughly examine the Contract Documents prior to submitting a bid in order to determine electrical requirements which are not necessarily indicated on the Electrical Drawings. Include sufficient allowance in the bid sum to cover the costs of these other requirements.
- H. Should the Contractor perceive that the Drawings and Specifications do not sufficiently define the intent of electrical work, contact the Architect for clarification or additional information. The absence of such contact will be considered as evidence of understanding, on the part of the Contractor, of the intended Electrical Work and the required installation thereof.

1.11 WORKMANSHIP

- A. Constantly supervise the work personally or through an authorized and competent representative. Keep the same foreman or supervisor on the project from commencement through completion.
- B. Perform the Electrical work using the highest caliber craftsman available. Workmanship shall be first class and of the best quality available to insure a long and trouble free service life. Allow only experienced and competent workmen on the job.

1.12 COOPERATION AND COORDINATION

- A. Consult with the other installers and trades in coordinating the Work so as to avoid conflicts, omissions and delays. Cooperate with other contractors, third parties, and the Owner in order to expedite the project and provide for the proper execution of the building as a whole. Work performed without regard to other trades or the overall project scheme, may necessarily be required to be moved at the Contractor's expense.

1.13 MANUFACTURER'S DIRECTIONS

- A. Adhere to the manufacturer's directions regarding the proper installation and configuration of electrical equipment where those directions cover points not included in these Drawings and Specifications.

1.14 PROTECTION AND STORAGE

- A. Deliver electrical materials to the site new, and in unbroken packages. Provide for the temporary storage of such materials, equipment, and construction tools in accordance with the General Conditions. Protect electrical equipment and materials during transit, storage and handling to prevent damage, soiling and deterioration.
- B. During shipping storage and handling protect electrical materials from damage of any type including dust, water, over-spray, and temperature. Avoid damage during construction to the work and materials of other trades as well as the electrical work and material. Repair or replace,

at the Contractor's expense, defective or damaged items such that the entire Work is completed in a condition satisfactory to the Architect.

1.15 EXCAVATION, CUTTING, PATCHING, AND REPAIR

- A. Perform excavation and backfill required for the installation of electrical sub-structures. Restore grounds, walkways, roadways, curbs, walls, and other existing underground facilities to their original condition.
- B. Conform to the applicable requirements of Division 2, Earthwork for Utilities, in the selection, placement, and compaction of backfill material and finished surfaces.
- C. Cut, core-drill, and demolish existing walls, floors, ceilings and other building surfaces as required for the installation of Electrical Work. Obtain the approval of the Architect prior to performing any operation which may affect any structural elements of the building.
- D. Patch and repair wood, plaster, tile, or concrete surfaces which have been damaged by the installation of the Electrical Work so that the finished surface matches the surrounding conditions.

1.16 FLASHING, WATERPROOFING AND SEALING

- A. In general, install in an approved watertight manner, Electrical Work which pierces exterior walls or waterproofing membranes. Flash and counter-flash roof and wall penetrations in a manner described in other applicable sections of this Specification and as approved by the Architect.
- B. Fit conduits passing through finished walls with steel escutcheon plates of brass, chrome, or painted finish as directed by the Architect. Grout penetrations of floor slabs, concrete or masonry walls with an approved grout or silicone elastomeric caulk.

1.17 CLEANING, ADJUSTING, AND TOUCH-UP

- A. Remove on a daily basis electrical debris, scraps, packaging material and other rubbish. Dispose of such items off-site in an approved manner and debris. Maintain the site free from physical hazards at all times in accordance with OSHA regulations. See the General Conditions for additional requirements.
- B. After installation, completely clean electrical equipment, fixtures, and materials of excess paint, over-spray, plaster, cement, insulating products, and other foreign matter. Leave the Electrical Work in a clean, finished, dry, level, like new condition.
- C. Touch-up paint scratches and scuffs on electrical equipment and lighting fixtures with paint recommended by the manufacturer and matching the original item finish.
- D. Make setting, adjustments, and programming in accordance with the manufactures' operating and installation instructions. Settings and program variables will be issued by the Architect prior to commissioning of the electrical system.

1.18 AS-BUILT DRAWINGS

- A. Throughout the project, maintain accurate and current record documents. Show on the record drawings deviations from the Electrical Drawings, locations of underground conduits and pull-boxes, and concealed equipment which is not readily apparent. Dimension the record drawings using permanent, readily identified benchmarks such as column or wall lines.
- B. At the completion of the project, present one clearly legible set of the record drawings to the Architect.

1.19 INSPECTIONS AND TESTING

- A. Arrange for the inspection of the Work at various stages of completion by the Authority Having Jurisdiction, utility company representatives, and the Architect. Comply with all directions and remedial measures issued thereby. Any objections to these orders on the part of the Contractor must be presented to the Architect in writing within forty eight (48) hours of the inspection report.
- B. Coordinate the installation of the Work so that observation of all rough-in, concealed, or underground Work can take place by the Architect. Provide a minimum of seventy two (72) hours notice to the Architect prior to covering up the work. Uncover Work that has not been properly observed and make repairs to restore the Work and adjoining surfaces to their proper condition at no additional cost.
- C. Perform tests of the electrical system during the course of the project and at project completion to ensure safe and proper function in accordance with the Contract Documents, manufacturers' recommendations, and applicable codes. Provide complete documentation of all test results to the Architect prior to project completion. Testing shall include, but not necessarily be limited to, the following:
 - 1. Test for short circuits, open circuits, neutral leakage, and improper grounds on feeders and branch circuits. Perform this test with mains in disconnect from feeders, branch circuits closed, fixtures and devices permanently connected, lamps removed from sockets and wall switches closed.
 - 2. Provide insulation resistance tests of all phase and neutral circuit conductors using a 500 Volt Megger for circuits of 240 Volt rating and below, and a 1000 Volt Megger for circuits of 277 volts and above. Minimum acceptable insulation resistance is one (1) megohm.
 - 3. Perform a ground resistance test of each main grounding electrode system, ground rod, and supplemental grounding electrode. Utilize a calibrated, direct reading, earth ground test set and make the tests using the "Three-terminal, Fall-of-Potential" method. The maximum allowable earth ground resistance is 25 ohms.
 - 4. Test for proper phase-to-phase and phase-to-neutral operating voltage on the main service and on each separately derived system. Perform this test at full load and at no load. With all circuits at full operating conditions, test the phase and neutral load currents using a clamp-on ammeter.
 - 5. Tests as required by other sections of these Specifications.
 - 6. Tests as prescribed by individual equipment manufacturers whether or not described in these Specifications.
- D. At project completion, demonstrate to the Architect that the entire installation is complete, in proper operation condition and that the Contract has been properly and fully executed. Activate

all circuits, lights, devices, and controls under full load and normal operating conditions. Identify faulty items and immediately replace or repair defective equipment, workmanship, and materials to like new condition and retest in the presence of the Architect.

- E. At the completion of the Project, demonstrate to the Architect that the entire electrical system is free from short circuits and improper grounds, or upon request of the Architect anytime, make necessary tests under the observation of the Architect which will ensure that electrical equipment, materials and installation methods are as specified.

1.20 GUARANTEE

- A. In accordance with Division 1 requirements.

1.21 WARRANTIES, CERTIFICATES, AND OPERATING MANUALS

- A. Properly fill out and deliver to the Architect, all warranties, guarantees, certificates, etc. for equipment and materials that are furnished and installed under this Section of the Work. The effective date on each item shall be the date of acceptance of the work by the Owner.
- B. Deliver to the Architect, a minimum of two (2) copies of the manufacturers' operating and maintenance manuals for major items of equipment.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 260519

600-VOLT POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section covers all labor, material, tools, equipment and services required to install building wire and cable, service entrance cable, control cables, wiring connectors and connections.

1.2 RELATED SECTIONS

- A. Section 260500: Common Work Results for Electrical
- B. Section 260526: Grounding and Bonding for Electrical Systems
- C. Section 260533: Raceway and Boxes for Electrical Systems
- D. Section 260553: Identification for Electrical Systems

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. ASTM B 3 Soft or Annealed Copper Wire
- B. ASTM B 496 Compact Round Concentric-Lay-Stranded Copper Conductors
- C. ASTM B 8 Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
- D. ANSI C 2 National Electrical Safety Code – latest edition
- E. IEEE 242 Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.
- F. IEEE 399 Recommend Practice for Industrial and Commercial Power System Analysis.
- G. NECA(National Electrical Contractors Association) - Standard of Installation.
- H. NEMA WC-26 Wire and Cable Packaging
- I. NETA ATS National Electrical Testing Association Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- J. NFPA 70 National Electrical Code – latest edition.
- K. UL 83 Thermoplastic-Insulated Wires and Cables.

- L. UL 486A Wire Connectors and Soldering Lugs for Use with Copper Conductors.
- M. UL 510 Polyvinyl Chloride, Polyethylene and Rubber Insulating Tapes.

1.4 SYSTEM DESCRIPTION

- A. The applications for cable, wire and connectors required, but not limited to, are as follows:
 - 1. Power distribution circuitry.
 - 2. Lighting circuitry.
 - 3. Appliance and equipment circuitry.
 - 4. Wiring for motors of mechanical equipment
 - 5. Wiring from the motor(s) of mechanical equipment to the disconnect switches or junction boxes, including wiring for pushbuttons, pilot lights, interlocks and similar devices as directed, shown, or specified.
 - 6. Wiring from the motors of mechanical equipment to motor starters, including other auxiliary wiring as may be required, directed, or shown.
 - 7. Line voltage wiring as required by other Divisions 2 thru 15, and interlocking to motor starters.
 - 8. Control wiring for motors, mechanical equipment, relays and switches, and similar mechanical-electrical devices.
 - 9. Line voltage wiring to thermostats, alarm systems and other miscellaneous equipment.

1.5 PROJECT CONDITIONS

- A. All wire and cables shall be minimum No. 12 AWG copper conductor unless otherwise shown on drawings.
- B. All conductor sizes are based on copper.
- C. Wire and cable routing shown on Drawings is diagrammatic unless dimensioned.
- D. Route wire and cable as required to complement project conditions.
- E. The contractor shall be responsible for any and all raceways and raceway/cable supports in accordance with all other sections of these specifications.

1.6 REGULATORY REQUIREMENTS

- A. Furnish products listed and classified by Underwriters Laboratories, Inc. (UL), Electrical Testing Laboratories, Inc. (ETL), or other recognized, acceptable testing and listing agencies as suitable for the purpose specified and shown.

1.7 CONTRACTOR SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's catalog cuts and technical data for building wire and cables.

B. Field Test Report:

1. Measure overall insulation resistance to ground. Provide certified test report for Engineer's Review.

1.8 CLOSEOUT SUBMITTALS

- A. Provide project record documents showing actual locations of components and circuits.
- B. Submit final certified test reports of all insulation resistance tests.

1.9 QUALIFICATIONS

- A. Manufacturer shall be a Company specializing in manufacturing products specified in this section with a minimum of five (5) years experience.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products on site in accordance with Division 1 requirements.
- B. Accept cable and accessories on site in manufacturer's packaging. Inspect for damage.
- C. Store and protect cable and accessories from the environment in accordance with manufacturer's published instructions. Provide adequate heating and ventilation to prevent condensation.
- D. Damaged items shall be replaced at no additional cost to Owner.

1.11 COORDINATION

- A. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.
- B. Wire and cable routing indicated is approximate unless dimensioned. Include wire and cable lengths within 10 feet of length shown.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Domestic manufacturer regularly engaged in the manufacture of Building Wire and Cable products for at least five (5) years as follows:
 1. American Wire and Cable.
 2. Cerro Wire and Cable Co.
 3. General Cable Corp.

4. Okonite Co.
5. Or Approved Equal.

2.2 BUILDING WIRE AND CABLE

- A. Building wire and cable shall be UL83 compliant, insulated, single conductor, copper, solid or stranded, rated for 600-volts AC. The insulation shall be thermoplastic material rated for 90 degrees Celsius dry locations, 75 or 90 degrees Celsius wet locations, THW, THHN/THWN, RHW or XHHW, per ANSI/NFPA 70.
- B. For Interior Dry Location: Use only building wire, THHN/THWN insulation rated 90 degree Celsius, in raceway.
- C. For Exterior Wet or Dry Locations: Use only XHHW insulation rated for 90 degree Celsius, in raceway.
- D. For Underground Dry or Wet Locations: Use only XHHW insulation rated 90 degree Celsius, in raceway.
- E. For connections to electrical equipment, coordinate wire type with equipment manufacturer.

2.3 SERVICE ENTRANCE CABLES

- A. Service entrance cables shall be insulated, single conductor, copper, stranded, rated for 600-volts AC, type XHHW insulation.
- B. Overhead Service entrance cables shall be insulated, single conductor, copper, stranded, rated for 600-volts AC, type SE insulation.

2.4 WIRING CONNECTORS

- A. Split Bolt Connectors:
 1. FCI Burndy Corp.
 2. Cooper Crouse Hinds.
 3. O.Z./Gedney Co.
 4. Thomas & Betts Co.
 5. 3-M Co.
- B. Solderless Pressure Connectors:
 1. FCI Burndy Corp.
 2. Ideal Industries Co.
 3. Thomas & Betts Co.
 4. 3-M Co.
- C. Spring Wire Connectors:
 1. Ideal Industries Co.

2. 3-M Co.

D. Compression Connectors:

1. FCI Burndy Corp.
2. Thomas & Betts Co.
3. 3-M Co.

2.5 WIRE COLOR CODE

A. Color-code all conductors:

1. Wire sizes No. 10 AWG and smaller shall have integral color-coded insulation.
2. Wire sizes No. 8 AWG and larger may have black insulation but shall be identified by color-coded electrical tape at all junction, splice, pull, or termination points.
3. Color tape shall be applied to at least 3 inches of the conductor at the termination ends and in junction or pull boxes or where readily accessible.
4. Conductors for all systems shall not change color at splice points.
5. Where there are two or more neutrals in one conduit, each shall be individually identified with the proper circuit.
6. For No. 4 AWG and larger ground conductors, identify with green tape at both ends and all visible points, included in all junction boxes.

B. Each phase wire shall be uniquely color-coded as indicated below:

1. 120/240-Volts
 - a. Phase A – Black
 - b. Phase B – Red
 - c. Neutral - White
 - d. Ground - Green
2. 120/208-Volts
 - a. Phase A – Black
 - b. Phase B – Red
 - c. Phase C – Blue
 - d. Neutral – White
 - e. Ground – Green
3. 277/480-Volts
 - a. Phase A - Brown
 - b. Phase B - Orange
 - c. Phase C – Yellow
 - d. Neutral - White or Natural Gray
 - e. Ground – Green
4. Isolated Grounds: Green with Yellow Stripes

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.
- C. Verify that raceway installation is complete and supported as required by the specifications.

3.2 PREPARATION

- A. Test raceway with a mandrel and thoroughly swab out to remove foreign material before pulling cables.
- B. For conduits sizes less than 3 inches, draw a stiff bristle brush through until conduit is clear of particles of earth, sand and gravel.
- C. For conduits sizes 3 inches and larger, draw a flexible testing mandrel approximately 12 inches long with a diameter less than the inside diameter of the conduit through the conduit. Then draw a stiff bristle brush through until conduit is clear of particles of earth, sand and gravel.

3.3 EXISTING WORK

- A. Disconnect and remove exposed and/or abandoned wire and cable. Patch surfaces where removed cable pass through building finishes.
- B. Disconnect abandoned circuits and remove wire and cable. Remove abandoned boxes if wire and cable servicing them is abandoned and/or removed. Provide blank cover for abandoned boxes that are not removed.
- C. Ensure access to existing wiring connections which remain active and which require access. Modify installation or provide access panel as appropriate.
- D. Extend existing circuits using materials and methods and compatible with existing electrical installations, or as otherwise specified.
- E. Tag and repair existing wire and cable that remain or are being reused.

3.4 INSTALLATION

- A. General:
 - 1. Install wire and cable in accordance with manufacturer's instructions and NECA "Standard of Installation".
 - 2. Route wire and cable as required to meet project conditions.
 - 3. Identify and color code wire and cable. Identify each conductor with its circuit number or other designation indicated.

4. Protect exposed cable from damage.
5. Pull all conductors into raceway at same time.
6. Use suitable wire pulling lubricant for building wire No. 4 AWG and larger. Lubricant shall not be deleterious to the cable sheath, jacket or outer covering.
7. Do not exceed cable manufacturer's recommended pulling tension limits when installing wire or cable.
8. Support cables above accessible ceiling using standard support methods to support cables from structure. Do not rest cable on ceiling panels.
9. Neatly train and lace wiring inside boxes, equipment, and panelboards

B. Cable and Wire Size:

1. Conductor sizes are based on copper unless specifically indicated as aluminum or "AL".
2. Use conductor no smaller than No. 12 AWG for power and lighting circuits.
3. Use conductor no smaller than No. 14 AWG for control circuits.
4. Use No. 10 AWG conductors for 20 ampere, 120-volt branch circuits longer than 75 feet.
5. Use No. 10 AWG conductors for 20 ampere, 277-volt branch circuits longer than 200 feet.
6. Use stranded conductor for all feeders, branch and control circuits.

C. Cable Identification

1. Identify all wires and cables as specified in other Sections of these Specifications.

D. Special Techniques - Wiring Connections:

1. Clean conductor surfaces before installing lugs and connectors. Where an anti-oxidation lubricant is used, apply liberally, coating all exposed conductor surfaces.
2. Use suitable cable fittings and connectors.
3. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
4. Use split bolt connectors for copper conductor splices and taps, No. 8 AWG and larger.
5. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, No. 8 AWG and smaller.
6. Tape un-insulated conductors and connector with two layers of half-lapped rubber insulating compound tape and two layers of half-lapped, 7-mil electrical tape, Scotch 33+, or equal.
7. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, No. 10 AWG and smaller.
8. Stranded conductors for control circuits shall have fork or ring terminals crimped on for all device terminations. Bare stranded conductors shall not be placed directly under the screws.

3.5 FIELD QUALITY CONTROL

A. Field inspection and test shall be performed under provisions of NETA ATS section 7.3 (2) - Low Voltage Cables, 600-Volt Maximum as follows.

1. Visual and Mechanical Inspection:
 - a. Compare cable data with drawings and specifications.

- b. Inspect exposed sections of cable for physical damage and correct connection in accordance with single-line diagram.
 - c. Inspect all bolted electrical connections for high resistance using one of the following methods:
 - 1) Use of low-resistance ohm-meter in accordance with NETA section 7.3.2.2 (Electrical Tests).
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data from NETA ATS Table 10.12.
 - d. Inspect compression-applied connectors for correct cable match and indentation.
 - e. Verify cable color coding with applicable specifications and National Electrical Code.
2. Electrical Tests
- a. Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute.
 - b. Perform resistance measurements through all bolted connections with low-resistance ohmmeter, if applicable, in accordance with Section 7.3.2.1 (Visual and Mechanical Inspection).
 - c. Perform continuity test to insure correct cable connection.
 - d. Correct malfunctions and/or deficiencies immediately as detected at no additional cost to the District, including additional verification testing.
 - e. Subsequent to final wire and cable terminations, energize all circuitry and demonstrate functional adequacy in accordance with system requirements.
3. Test Values
- a. Compare bolted connection resistance to values of similar connections.
 - b. Bolt-torque levels should be in accordance with NETA ATS Table 10.12 unless otherwise specified by the manufacturer.
 - c. Micro-ohm or milli-volt drop values shall not exceed the high levels of the normal range as indicated in the manufacturer's published data. If manufacturer's data is not available, investigate any values which deviate from similar connections by more than 50 percent of the lowest value.
 - d. Minimum insulation-resistance values should not be less than 50 meg-ohms.
 - e. Investigate deviations between adjacent phases.

END OF SECTION

SECTION 260526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes:
 - 1. Furnishing of grounding electrodes and conductors; equipment grounding conductors; bonding methods and materials; conduit and equipment supports; anchors and fasteners; sealing and fireproofing of sleeves and openings between conduits and wall.
 - 2. Inspection and testing of the Grounding and Bonding System; and Ground-Fault Protection Systems.

1.2 RELATED SECTIONS

- A. Section 260500: Common Work Results for Electrical
- B. Section 260519: 600-Volt Power Conductors and Cables
- C. Section 260533: Raceway and Boxes for Electrical Systems
- D. Section 260553: Identification for Electrical Systems
- E. Section 262413: Switchboards
- F. Section 262416: 600-Volt Rated Panelboards & CB

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. The standards referenced herein, except as modified in the Contract Documents, shall have full force and effect as though included in these Specifications. These standards are not furnished to the Contactor since manufacturers and trades involved are assumed to be familiar with these requirements. The Contractor shall obtain copies of reference standards direct from publication sources as needed for proper performance and completion of the work.
 - 1. ASTM B 187 Specifications for Copper Bus, Rod, and Shapes.
 - 2. ASTM A 653 Standard Specifications for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by Hot Dip Process
 - 3. IEEE 142 Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 - 4. IEEE 1100 Recommended Practice for Powering and Grounding Electronic Equipment.
 - 5. NECA (National Electrical Contractors Association) – Standard of Installation.
 - 6. NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

7. NFPA 70 National Electrical Code (NEC). Latest edition adopted by the State of California (CEC).
8. UL 467 Electrical Grounding and Bonding Equipment.

1.4 SYSTEM DESCRIPTION

- A. Grounding electrode system consist of the following elements:
 1. Metal underground water pipe
 2. Metal frame of the building
 3. Concrete encased electrode
 4. Rod electrodes
 5. Service equipment
 6. Enclosures
 7. Separately derived systems.
- B. Anchor and fasten electrical products to building elements and finishes as follows:
 1. Concrete Structural Elements: Provide preset inserts.
 2. Concrete Surfaces: Provide epoxy or expansion anchors.
 3. Interior Structural Steel: Provide appropriate size beam clamps.
 4. Solid Masonry Walls: Use expansion anchors and preset inserts.
 5. Sheet Metal: Provide sheet metal screws.

1.5 DESIGN REQUIREMENTS

- A. Furnish products listed and classified by Underwriters Laboratories, Inc. (UL), Electrical Testing Laboratories, Inc. (ETL), or other recognized, acceptable testing and listing agencies as suitable for purpose specified and shown.
- B. Grounding shall be in accordance with the National Electrical Code (NEC). Where size, type, rating and quantities indicated or specified are in excess of NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.
- C. Select materials, sizes, and types of anchors, fasteners, and supports to carry at least twice the loads of equipment and raceway, including weight of wire and cable in raceway.

1.6 CONTRACTOR SUBMITTALS

- A. Product Data:
 1. Submit product data for grounding electrodes and connections for fastening components; fire stopping material; and fireproofing sealants.
- B. Test Report:
 1. Grounding & Bonding: Provide certified test report for Engineer's Review.
 2. Ground-Fault Protection System: Provide certified test report for Engineers Review.

1.7 CLOSEOUT SUBMITTALS

- A. Record actual locations of components and grounding electrodes.
- B. Submit final one (1) electronic copy on CD-ROM and certified, five (5) bound copies of the Power System Study report.
- C. Submit final certified five (5) copies of the test reports of all grounding tests and ground-fault protection systems.

1.8 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years' experience.
- B. Installer: A firm with at least five (5) years of installation experience on projects with electrical grounding work similar to that required for this project.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.
- B. Field testing shall be performed by a third party testing firm with certification from a recognized testing agency, with a minimum of five (5) years of testing experience.

PART 2 - PRODUCTS

2.1 GROUNDING SYSTEM

- A. Except as indicated elsewhere, provide materials for electrical grounding system, including, but not limited to, cables, wires, connectors, terminals (solderless lugs) and exothermic welds, grounding rods and electrodes, bonding jumper and braided straps, and other items and accessories required for a complete installation. Where more than one type of material or equipment meets indicated requirements, selection shall be at Installer's option. Where materials or components are not otherwise indicated, provide products as recommended by the accessories manufacturers and in compliance with the NEC and established industry standards.
- B. All grounding materials required shall be furnished new and undamaged in accordance with the requirements of these specifications:

2.2 WIRE

- A. Service Equipment Grounding Electrode Conductor: Bare, soft-drawn copper, Class AA stranding, ASTM B 8. Size per NEC Table 250-66, unless otherwise noted.

- B. Electrical Equipment Grounding Conductor: Insulated, soft-drawn copper, Class B stranding or solid, with green colored polyvinyl chloride insulation per Section 16123. Size per NEC Article 250-122, unless otherwise noted.

2.3 BUS AND BARS

- A. Silver plated, soft copper with cross section not less than 1 square inch per 1,000 ampere rating, but in no case less than 1/4-inch thick by 1-inch wide, ASTM B 187. Rating shall be per the NEC, unless otherwise noted.

2.4 EXOTHERMIC WELD CONNECTIONS

- A. Exothermic materials, accessories and tools for preparing and making permanent field connections between grounding system components. Molds, cartridges, materials, and accessories as recommended by the manufacturer of the molds for the items to be welded.
- B. Manufacturer:
 - 1. Cadweld (Erico Products) "Exolon" Low Emission. Molds and powder shall be furnished by the same manufacturer.
 - 2. Acceptable equal.

2.5 MECHANICAL CONNECTORS

- A. Mechanical connectors shall be permitted only when exothermic weld connections are not suitable or recommended by the manufacturer.
- B. Bolt-on bronze connectors, suitable for grounding and bonding applications in configurations required for the particular installation.
- C. Manufacturer
 - 1. Burndy Corp.
 - 2. Anderson
 - 3. Thomas & Betts
 - 4. 3-M Co.

2.6 FLUSH GROUND PLATES

- A. Cadweld B-162 series, B-164 series, or acceptable equal.

2.7 FLEXIBLE JUMPER STRAP

- A. Flexible flat conductor, 480 strands of 30-gauge, bare copper wire; 3/4-inch width, 9-1/2-inch-long; 48.25 kCMil, minimum. Protect braid with copper bolt-hole ends with holes sized for 3/8-inch diameter bolts.

2.8 BONDING PLATES, CONNECTIONS, TERMINALS AND CLAMPS

- A. Provide electrical bonding plates, connectors, terminals and clamps, and accessories as recommended by the manufacturer for the specific applications. Components shall be high-strength, high-conductivity copper alloy.

2.9 UFER GROUND

- A. In accordance with the latest edition of the National Electrical Code.

2.10 ROD ELECTRODES

- A. Copper-clad steel, 5/8-inch (16 mm) minimum diameter, 10 feet (3,000 mm) long, coupling type unless otherwise noted.

2.11 GROUNDING WELL COMPONENTS

- A. Well Pipe: 8 inches NPS (DN200) by maximum 12 inches (300-mm) long, precast concrete or fiberglass pipe with belled end.
- B. Well Cover: Cast iron, high impact traffic rated cover with legend "GROUND" embossed on outer face.

2.12 ANCHORS AND FASTENERS

- A. Indoor Locations: Epoxy type anchors and heavy-duty, galvanized steel screws and bolts.
- B. Outdoor Locations: Epoxy type or Red Head anchor bolts and stainless steel screws and bolts.

2.13 SUPPORT CHANNEL

- A. All conduit and electrical equipment support channels for interior, exterior, wet and corrosive areas shall be galvanized steel.
- B. Support channels for free standing electrical equipment such as switchgear, switchboard and motor control centers, shall be:
 - 1. Indoors: galvanized steel channel and hardware, minimum 12 gauge, ASTM A653 Grade 33 sheet steel, zinc coated by hot dip process.
 - 2. Outdoors: 316 Stainless steel

2.14 SEALING AND FIREPROOFING

- A. Furnish UL listed products or products tested by a nationally recognized independent testing laboratory. Select products with rating not less than the rating of the wall, ceiling or floor being penetrated.

- B. Manufacturers:
 - 1. 3M CP 25WB + Caulk
 - 2. 3M FS 195 wrap or strip with restricting collar
 - 3. 3M CS 195 composite sheets
 - 4. Proset Systems fire rated floor and wall penetrations
 - 5. Dow Corning Fire Stop System
 - 6. Substitutions not permitted.
- C. Use stamped steel, chrome plated, hinged, split ring escutcheons or floor/ceiling plates for covering openings in occupied areas where conduit is exposed.
- D. In exterior wall openings below grade, use a modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the conduit and the cored opening or a water-stop type wall sleeve.
- E. At non-rated interior wall or floor openings use Tremco Fyre-Sil, Sika Corp. Sikaflex Ia, Sonneborn Sonolastic NPT, or Mameco Vulkem 116 urethane caulk or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that abandoned wiring and equipment serve only abandoned facilities.

3.2 EXISTING WORK

- A. Modify existing grounding system to maintain continuity to accommodate renovations.
- B. Extend existing grounding system using materials and methods as specified.
- C. Install temporary wiring and connections to maintain existing grounding systems in service during construction.
- D. Perform work on energized equipment or circuits with experienced and trained personnel following all safety rules and procedures.
- E. Remove, relocate, and extend existing installations to accommodate new construction.
- F. Repair adjacent construction and finishes that are damaged during demolition and extension work.
- G. Remove exposed and/or abandoned grounding and bonding components, fasteners, supports and electrical identification labels. Cut embedded support elements below surface of walls and floors. Patch surfaces damaged by removal of existing components to match surrounding finishes.

3.3 GROUNDING AND BONDING INSTALLATION:

- A. Verify that final backfill and compaction has been completed before driving rod electrodes.
- B. Install grounding well with cover at rod locations as indicated on Drawings. Install well top flush with finished grade.
- C. Installation:
 - 1. Remove paint, rust, mill-oils, and surface contaminants at connection points.
 - 2. Install grounding electrode conductor and connect to reinforcing steel in slab or foundation.
 - 3. Bond together metal siding not attached to grounded structure; bond to ground.
 - 4. Bond together reinforcing steel and metal accessories.
 - 5. Connect to site grounding system.
 - 6. Install continuous grounding using underground cold water system and building steel as grounding electrode. Where water piping is not available, provide an artificial station ground by means of driven rods or buried electrodes.
 - 7. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panel boards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.
 - 8. Install branch circuits feeding isolated ground receptacles with separate insulated grounding conductor, connected only at isolated ground receptacle, ground terminals, and at ground bus of serving panel in accordance with IEEE 1100.
 - 9. Accomplish grounding of electrical system by installing insulated grounding conductor with each feeder and branch circuit conductor in conduit. Install separate insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing. Size grounding conductor in accordance with the NEC.
 - 10. Install grounding conductor from ground bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes, and metal enclosures of service equipment.
 - 11. Bond all metallic conduits to grounding bus at service panel by means of grounding bushings using minimum No. 12 AWG conductor.
 - 12. Ground electrical system using continuous metal raceway system enclosing circuit conductors in accordance with NEC. Bond together each metallic raceway, pipe, duct and other metal object entering enclosures and exiting slabs.
 - 13. Permanently bond all equipment, grounding conductors, lightning protection system and grounding system prior to energizing equipment.

3.4 GROUND CONDUCTORS

- A. Grounding conductors shall be located and connected as indicated on drawings or as required by Code.
- B. Ground conductors under buildings or structures shall be buried with at least 6 inches of earth cover. Buried grounding conductors extending beyond the foundations of buildings or structures shall have at least 18 inches of earth cover.

- C. Exposed conductors shall be installed inconspicuously in vertical or horizontal positions on supporting structures. When located on irregular supporting surfaces or equipment, the conductors shall run parallel to or normal to dominant surfaces.
- D. Conductors routed over concrete, steel, or equipment surfaces shall be kept in close contact with those surfaces by using fasteners located at intervals not to exceed 3 feet.
- E. Conductors passing through floor slabs shall be installed in conduit sleeves that extend above the floor slab, a minimum of 1-1/2 inches to provide protection. Sleeves shall be sealed to maintain fireproof integrity.
- F. Provide isolated grounding conductor for circuits supplying equipment and systems as shown on the drawings.
- G. Provide a separate equipment-grounding conductor for low voltage distribution systems, single or three phase feeder circuit and each branch circuit with single or three phase protective devices. Install a grounding conductor in conduit with phase and neutral conductors. Single-phase branch circuits for 120 and 277 volt lighting, receptacles, and motors shall have a phase, neutral, and ground conductors installed in the common conduit. Provide suitable bonding jumpers and approved grounding type bushings for flexible conduits used for equipment connection utilized in conjunction with the above branch circuits. Single-phase circuits for equipment and all branch circuits installed in non-metallic or flexible conduits shall be provided with a separate grounding conductor.
- H. Ground the neutral of separately derived systems with a bare copper conductor, installed in conduit, from the neutral directly to the building interior cold water pipe or nearest solidly grounded structural reinforcing steel, in accordance with the provisions of NEC Article 250-24. Use bolted accessible connections to the ground system so that the neutral ground can be disconnected for test. Ground the system ground conduit as detailed on drawing. Size the grounding electrode conductors in accordance with the NEC, Table 250-66, or as indicated.

3.5 CONNECTIONS

- A. All connections shall be made by the exothermic welding process, except where otherwise indicated. The manufacturer's instructions on the use of exothermic welding materials shall be followed in all details. Powder and molds shall be kept dry and warm until use. Worn or damaged molds shall not be used.
- B. All surfaces to be joined by the welds shall be thoroughly cleaned. Paint, scale, and other deleterious substances shall be removed from surfaces of ungalvanized structural steel members by grinding. Galvanized steel surfaces shall be cleaned with emery paper.
- C. All exothermic welded connections shall successfully resist moderate hammer blows. Any connection which fails such test or which, upon inspection, indicates a porous or deformed weld, shall be remade.
- D. All exothermic welds shall encompass 100 percent of the ends of the materials being welded. Welds, which do not meet this requirement, shall be remade.

- E. Worn, damaged, incorrectly sized, or improperly shaped molds which, in the opinion of the Engineer, do not make satisfactory welds, shall be removed from the jobsite after being physically rendered inoperable.
- F. All contact surfaces of bolted and screwed connections shall be thoroughly cleaned and coated with oxide inhibitor before being securely tightened.

3.6 CONDUIT GROUNDING

- A. All grounding bushings within all enclosures, including equipment enclosures, shall be wired together and connected internally to the enclosure grounding lug or grounding bus with a bare copper conductor. Grounding bushings shall be grounded with conductors sized in accordance with NEC, but not smaller than No. 8 AWG.

3.7 EQUIPMENT GROUNDING

- A. Comply with NEC 250, except where larger sizes or more conductors are indicated.
 - 1. All electrical equipment shall be connected to the grounding system with an insulated, green, stranded or solid copper equipment-grounding conductor.
 - 2. Terminate each end on suitable lug, bus, or bushing. The term "electrical equipment", as used in this article, shall include, but not be limited to, all enclosures containing electrical connections or bare conductors, except that individual devices, such as solenoids, pressure switches, and limit switches, shall be exempt from this requirement, unless the device requires grounding for proper operation.
 - 3. Large equipment, such as metal-clad or metal-enclosed switchgear, will be furnished with a grounding bus that shall be connected to the grounding system.
 - 4. Most other equipment will be furnished with grounding pads and/or grounding lugs which shall be connected to the grounding system. All ground connection surfaces shall be cleaned immediately prior to connection.
 - 5. Contractor shall furnish all grounding material required, if not furnished with the equipment.
- B. Install equipment grounding system such that all metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, portable equipment and other conductive items in close proximity with electrical circuits will operate continuously at ground potential and provide a low impedance path for possible ground fault currents.
- C. Where grounding system extension stingers are indicated on the drawings to be provided for connection to electrical equipment, the Contractor shall connect the bare grounding conductor to the equipment ground bus, pad, or lug. Except where otherwise indicated on the drawings, all equipment ground conductors that are not an integral part of a cable assembly, shall be sized in accordance with the requirements of NEC. All ground conductors installed in conduit shall be insulated.
- D. Suitable grounding facilities, acceptable to the Engineer, shall be furnished on electrical equipment not so equipped. The grounding facilities shall consist of compression type terminal connectors bolted to the equipment frame or enclosure and providing a minimum of joint resistance.

- E. The conduit system is not considered to be a grounding conductor, except for lighting fixtures. No grounding conductor shall be smaller in size than No. 12 AWG, unless it is a part of an acceptable cable assembly.

3.8 GROUND SYSTEM RESISTANCE

- A. Ground resistance of the system shall be no greater than five (5) ohms.

3.9 ANCHORS, FASTENERS AND SUPPORT

A. Installation:

1. Locate and install anchors, fasteners, and supports in accordance with NECA "Standard of Installation".
2. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
3. Do not use spring steel clips and clamps.
4. Do not use powder-actuated anchors.
5. Do not drill or cut structural members.

B. Supports:

1. Fabricate supports from structural steel or formed steel members. Rigidly weld members or install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
2. Install surface-mounted cabinets and panel board with minimum of four (4) anchors.
3. Use steel channel supports to stand cabinets and panel boards one (1) inch off wall.
4. Use sheet metal channel to bridge studs above and below cabinets and panel boards recessed in hollow partitions.

3.10 SEALING AND FIREPROOFING

A. Fire-Rated Surface:

1. Where conduit penetrates fire rated surface, install fire-stopping product in accordance with manufacturer's published instructions.
2. All openings through fire rated wall, floor, ceiling or roof must be sealed.
3. Install galvanized sheet metal sleeves (minimum 12-gage) through opening and extending beyond minimum of one (1) inch on each side of building element.
4. Pack void between sleeve and building element with backing material.
5. Seal ends of sleeve with UL listed fire-resistive silicone compound to meet fire rating of structure penetrated.

B. Non-Rated Surfaces:

1. Opening through a non-fire rated wall, floor, ceiling or roof must be sealed using an approved type of material.
2. Use galvanized sheet metal sleeves in hollow wall penetrations to provide a backing for the sealant. Grout area around sleeve in masonry construction.

3. Install escutcheons or floor/ceiling plates where raceway, penetrates non-fire rated surfaces in occupied spaces.
4. Install rubber links of mechanical seal tightened in place and sized for the pipe, in exterior wall openings below grade, in accordance with the manufacturer's instructions.
5. All pipe penetrations at interior partitions and/or walls, laboratory spaces, telephone, data and communication rooms and similar spaces where the room pressure or odor transmission must be controlled, shall be sealed. Sealant shall be applied to both sides of the penetration in such a manner that the annular space between the pipe sleeve and the pipe is completely filled.

3.11 ACCEPTANCE TESTING

A. Grounding and Bonding: Perform inspections and tests as outlined below (NETA ATS, Section 7.13 – Grounding Systems).

1. Visual and Mechanical Inspection

- a. Verify ground system is in compliance with drawings and specifications.
- b. Electrical Tests
- c. Perform fall-of-potential test or alternative in accordance with IEEE Standard 81 "IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potential of a Ground System." on the main grounding electrode or system. Instrumentation utilized shall be as defined in section 12 of the above guide and shall be specifically designed for ground impedance testing. Provide sufficient spacing so that the plotted curves flatten in the 62% area of the distance between the item under test and the current electrode.
- d. Perform point-to-point tests to determine the resistance between the main grounding system and all major electrical equipment frames, system neutral, and/or derived neutral points.
- e. When sufficient spacing of electrodes per Electrical Tests is impractical, perform ground impedance measurements utilizing either the intersecting curves method or the slope method. (Ref. Nos. 40 and 41 in IEEE Std. 81).
- f. Utilize two-point method of IEEE Std. 81. Measure between equipment ground being tested and known low-impedance grounding electrode or system.
- g. Test shall be performed after a minimum of ten (10) calendar days of dry weather so that the ground is not wet.

2. Test Values

- a. The resistance between the main grounding electrode and ground shall be greater than five (5) ohms for commercial or industrial systems and one (1) ohm or less for generating or transmission station grounds unless otherwise specified by the owner. (Reference: ANSI/IEEE Standard 142.) Equipment grounds, depending on size and length of grounding conductor, should be only fractionally higher than system ground.
- b. Investigate point-to-point resistance values which exceed 0.5 ohm.

END OF SECTION

SECTION 260533

RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes conduit and tubing, surface and buried raceways, wireways, outlet boxes, pull boxes, junction boxes, hand holes and concrete manholes.

1.2 RELATED SECTIONS

- A. Section 260500: Common Work Results for Electrical
- B. Section 260519: 600-Volt Power Conductors and Cables
- C. Section 260526: Grounding and Bonding for Electrical Systems
- D. Section 260553: Identification for Electrical Systems

1.3 REFERENCES - CODES AND STANDARDS

- A. ANSI C80.1 Rigid Steel Conduit, Zinc Coated.
- B. ANSI C80.3 Electrical Metallic Tubing, Zinc Coated.
- C. ANSI C80.6 American National Standard for Electrical Intermediate Metal Conduit.
- D. ASTM A 48 Standard Specification for Grey Iron Castings.
- E. NECA (National Electrical Contractor's Association) – "Standard of Installation."
- F. NEMA FB 1 (National Electrical Manufacturers Association) – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- G. NEMA OS 1 (National Electrical Manufacturers Association) – Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
- H. NEMA OS 2 (National Electrical Manufacturers Association) – Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
- I. NEMA RN 1 (National Electrical Manufacturers Association) – Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
- J. NEMA TC 2 – Electrical Polyvinyl Chloride (PVC) Conduit.

- K. NEMA TC 3 (National Electrical Manufacturers Association) – PVC Fittings for Use with Rigid PVC Conduit and Tubing.
- L. NEMA TC 6 - Non-Metallic Conduit.
- M. NEMA 250 (National Electrical Manufacturers Association) – Enclosures for Electrical Equipment (1,000 Volts Maximum).
- N. NFPA 70 National Electrical Code (NEC). Latest approved edition
- O. UL 1 Flexible Metal Conduit
- P. UL 6 Rigid Metal Conduit
- Q. UL 514B Conduit, Tubing and Cable Fittings.
- R. UL 651 Rigid Non-Metallic Conduit
- S. UL 797 Electrical Metallic Tubing
- T. UL 1242 Intermediate Metal Conduit

1.4 SYSTEM DESCRIPTION

- A. Raceway, boxes and manholes located as indicated on drawings and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway, boxes and manholes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.
- B. Underground more than 5 feet (1,500 mm) outside foundation wall: Provide Schedule 40 non-metallic conduit encased in concrete.
- C. Underground within 5 feet from foundation wall: Provide rigid steel or Schedule 40 non-metallic conduit encased in concrete.
- D. In or Under Slab on Grade: Provide Schedule 40 non-metallic conduit encased in concrete. Provide Galvanized with tape wrap rigid steel factory bends greater than 22.5 degrees and for stub-ups through concrete slabs.
- E. Outdoor Locations, Above Grade: Provide rigid steel conduit. Provide cast metal outlet, pull, and junction boxes.
- F. In Slab above Grade: Provide galvanized rigid steel conduit. Provide cast or concrete-tight sheet metal boxes.
- G. Exposed Dry Locations: Provide galvanized rigid steel conduit. Provide cast boxes.
- H. Concealed Dry Locations: Provide electrical metallic tubing for sizes less than 2-inches. Provide galvanized rigid steel or intermediate steel conduit in sizes 2-inches or larger. Provide cast or sheet metal boxes.

- I. Locations subject to Corrosive Atmosphere: Provide PVC coated, galvanized rigid steel or intermediate steel conduit. Provide PVC coated cast or sheet metal boxes.
- J. Hazardous Locations (Per NEC Article 500): Galvanized rigid steel conduit. Cast iron boxes with threaded hubs for conduit entry. Conduit seals.H

1.5 DESIGN REQUIREMENTS

- A. Minimum Raceway Size: 3/4 inch (19 mm) unless otherwise specified.

1.6 SUBMITTALS

- A. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by product testing agency having jurisdiction. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- B. Submit detailed conduit routing plan, for review and approval, prior to installation as follows:
 - 1. Exposed and/or concealed in building walls for conduits larger than 2-inch outside diameter.
 - 2. All underground conduits (3/4-inch and larger) in duct bank; concealed in floor slabs, equipment pads and concrete slabs.
- C. Product Data: Submit for the following:
 - 1. Rigid Steel Conduit.
 - 2. PVC Coated galvanized rigid steel conduit.
 - 3. Intermediate steel conduit.
 - 4. Electrical Metallic Tubing (EMT).
 - 5. Flexible metal conduit.
 - 6. Liquid tight flexible metal conduit.
 - 7. Nonmetallic conduit.
 - 8. Raceway fittings.
 - 9. Conduit bodies.
 - 10. Surface raceway.
 - 11. Pull boxes, junction boxes and manholes.
- D. Manufacturer's Installation Instructions:
 - 1. Submit application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.
 - 2. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.7 CLOSEOUT SUBMITTALS

- A. Project Record Documents:

1. Record actual routing of conduits. Provide record (as-built) drawings marked in red to show actual routing of the underground raceway and cable when different from the original contract drawings. Prepare on new, clean set of contract drawings.
2. Record actual locations and mounting heights of outlet, pull boxes, junction boxes and manholes.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- B. Protect PVC and PVC-coated metallic conduit from sunlight.

PART 2 - PRODUCTS

2.1 CONDUIT

- A. Galvanized Rigid Steel Conduit (GRSC or RGS), couplings and elbows shall be hot-dip galvanized, rigid mild steel in accordance with ANSI C80.1 and UL 6. The conduit interior and exterior surfaces shall have a continuous zinc coating with a transparent overcoat of enamel, lacquer, or zinc chromate. Conduit shall be formed with continuous welded seams with a uniform wall thickness, in minimum 10-foot lengths, with threaded ends.
- B. Intermediate Metal Conduit (IMC). Raceway shall be hot-dipped galvanized mild steel in accordance with ANSI C80.6 and UL 1242 and shall bear the UL label. Conduit shall have same characteristics of rigid steel except for thinner wall.
- C. Polyvinyl Chloride (PVC) coated galvanized rigid steel conduit and intermediate metal conduit shall be in accordance with NEMA RN 1. Coating shall be applied under controlled factory conditions. Prior to coating, conduit shall meet requirements of ANSI C80.1 and UL 6 or ANSI C80.6 and UL 1242 as appropriate. PVC coated conduits shall have ultra-violet (UV) inhibitor in the coating material.
- D. Electrical Metallic Tubing (EMT). Electrical metallic tubing, including elbows and bends, shall be zinc coated, mild steel in accordance with the requirements of ANSI C80.3 and UL 797. The interior and exterior surfaces of the tubing shall have a continuous zinc coating. Conduit shall be formed with a continuous welded seam, with a uniform wall thickness, in minimum 10-foot lengths.
- E. Flexible Metal Conduit shall be galvanized steel meeting the requirements of UL 1. Flexible aluminum conduit is not permitted.
- F. Liquid-Tight Flexible Metal Conduit shall be plastic-jacketed, galvanized steel, "Sealtite" Type EF for general service areas or Type HC for high-temperature when used under raised floor or in air plenums. Conduit shall be UL listed.
- G. Non-Metallic Conduit shall be as follows:

1. Schedule 40: Conduit shall be 90 degree Celsius, polyvinyl chloride in conformance with NEMA TC-2 and UL 651 requirements.
 2. Spacers used in duct bank installations shall be high impact plastic, interlocking bases, and intermediate type spacers. Place spacers between 6 and 10 feet apart.
- H. Rigid aluminum conduits and flexible aluminum or non-metallic conduits are not permitted on this project.

2.2 RACEWAY FITTINGS

- A. Couplings and Thread Protectors. Each length of threaded conduit shall be provided complete from the manufacturer with a coupling on one end and a thread protector on the other. The thread protector shall have sufficient mechanical strength to protect the threads during normal handling and storage.
- B. Metal Conduit Fittings shall conform to the requirements of UL 514B where this standard applies. Galvanized iron or galvanized steel fittings shall be used with steel conduit. Threaded fittings shall engage a minimum of five threads made up wrench-tight and be compatible with conduit. EMT fittings shall be compression type, UL approved for rain tight applications and setscrew type with insulated throat for indoor applications.
- C. Liquid-Tight Flexible Conduit Fittings shall be galvanized steel, T&B 53XX series insulated throat, and shall bear the UL label. Die-cast malleable fittings are not acceptable.
- D. Liquid-Tight Flexible Metal Conduit Fittings shall be galvanized steel similar to T&B "Tite-Bite".
- E. Non-Metallic Conduit Fittings shall be of same material and strength characteristics as the conduit and shall be solvent welded as recommended by manufacturer. End bells shall be plastic, high impact, tapered to fit. Where conduit transition from non-metallic to metallic is required, provide non-metallic female "terminal" adapter. Non-metallic "male" adapters are not acceptable.
- F. Special Fittings. Conduit sealing, explosion proof, dust proof, and other types of special fittings shall be provided as required and shall be consistent with the area and equipment with which they are associated. Fittings installed outdoors or in damp locations shall be sealed and gasketed. Outdoor fittings shall be of heavy cast construction. Hazardous area fittings and conduit sealing shall conform to NEC requirements for the area classification.
- G. Bushings shall be provided for the termination of all conduits not terminated in hubs, couplings or insulated throat connectors. Grounding type insulated bushings with insulating inserts in metal housings shall be provided for conduit 1-1/4 inches and larger. Standard bushings shall be galvanized steel or malleable iron in all sizes.
- H. Locknuts. One interior and one exterior locknut shall be provided for all conduit terminations not provided with threaded hubs and couplings. Locknuts shall be designed to securely bond with the conduit to the box when tightened. Locknuts shall be so constructed that they will not be loosened by vibration.
- I. Unions. Watertight conduit unions shall be Appleton or Crouse-Hinds Type UNF or UNY, or approved equal.

- J. Raintight Conduit terminating hubs, where indicated on the drawings or required by these specifications, shall be Meyer's rigid conduit hubs, or approved equal.

2.3 CONDUIT BODIES

- A. Aluminum conduit bodies shall be die-cast copper-free aluminum alloy A360. Aluminum conduit bodies shall be finished with powder-coated paint. Cover shall be die-cast or stamped aluminum or steel.}
- B. Malleable iron conduit bodies shall be cast malleable iron with tensile strength meeting ASTM A 48, Class 30A requirements. Malleable conduit bodies shall be finished with an epoxy powder coating. Cover shall be malleable iron with captive screws.
- C. All conduit bodies' entrances shall be machined NPT threads with a smooth, rounded, internal conduit stop bushing.
- D. All conduit bodies shall be equipped with a sealed and gasketed cover. Cover shall be secured using stainless steel machine screws.

2.4 CONDUIT SUPPORTS

- A. Conduit supports shall be furnished and installed in accordance with other section of these specifications. Conduits shall be supported so that fittings are accessible. Support systems shall be limited to electrical conduits only.
- B. Hanger rods shall be 3/8-inch diameter galvanized threaded steel rods, minimum. Conduit racks over 18-inch wide, over one level, or supporting 2-inch RSC or larger, shall be 1/2-inch diameter rod minimum.
- C. Conduit Clamps. Conduits in single runs or groups of two shall be supported by steel clamps and clamp backs. They shall be galvanized malleable iron or approved equal cast ferrous metal for steel conduit or tubing.
- D. Support Channels. Supports for banks of three or more conduits shall be constructed of formed steel support channels (Unistrut, Kindorf, Superstrut, B-Line or approved equal) with associated conduit or tubing clips. Support channels shall be steel, hot-dip galvanized after fabrication with galvanized steel clips for steel conduit or tubing.
- E. Wall Penetrations. All conduits, raceways, cables and sleeve penetrations through fire rated and hazardous location walls, shafts, floor, ceilings, etc., shall be sealed with a UL-approved fire stopping system, in accordance with specification Section 16060 – Basic Electrical Materials and Methods.

2.5 OUTLET BOXES AND SWITCH BOXES

- A. Manufacturers: Firms regularly engaged in the manufacturing of electrical raceways of the types and capacities required, whose products have been in satisfactory use in similar service for not less than 3 years.

- B. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized flat rolled sheet steel outlet wiring boxes of types, shapes and sizes, including box depths, to suit each respective location and installation; construct with stamped knockouts in back and sides, and with threaded screw holes with corrosion-resistant screws for securing box covers and wiring devices.
- C. Outlet boxes used in wet outdoor locations, surface mounted shall be cast metal (FS or FD type) with mounting lugs and gasketed covers.
- D. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported, per NEC requirements.
- E. Outlet Box Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used and meeting requirements of individual wiring situations.

2.6 PULL BOXES, JUNCTION BOXES, HANDHOLES AND MANHOLES

- A. Sheet Metal Boxes shall be NEMA OS 1, NEMA rating as indicated on drawings. Minimum 16 gauge galvanized steel construction with stainless steel hinged cover and neoprene gasket. Cover shall be secured to the body with a continuous, full length, piano type hinge and stainless steel pin on one side and captive screw on the other side. Door shall be equipped with padlock hasp with sealing hole provisions.
 - 1. Provide #10-32 tapped hole provisions for optional ground lug kit.
 - 2. Provide 0.375-16 collar studs for mounting optional panel.
 - 3. Provide external mounting feet for secure wall mounting.
 - 4. Finish: Wash and phosphate undercoat with ANSI 61 gray polyester power finish.
- B. Surface-Mounted Cast Metal Box: NEMA 250, NEMA Type 3R or 4 as indicated, flat-flanged, surface-mounted junction box:
 - 1. Material: Cast Iron.
 - 2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.
- C. Concrete pull boxes, vaults and hand holes for power, lighting, controls and telecommunications shall be pre-cast concrete boxes, sized as indicated on the drawing. Pull boxes shall be equipped with a concrete cover for non traffic rated locations OR cast-in frame, galvanized steel, adjustable, high impact traffic cover (H-20 load rated), sump, lifting lugs, and conduit knock-outs as indicated on the drawings. Knockout location and sizes shall be coordinated with the duct bank for each location. Cover shall be engraved with the words - - "POWER", "LIGHTING", "CONTROLS", "COMM/DATA", "TELEPHONE" or similar as applicable.
- D. Concrete manholes and/or pull boxes for buried power (MH-P-xx) and control (MH-C-xx) conduits shall be either cast-in-place or pre-cast concrete vault.
 - 1. Size shall be indicated on the drawings.
 - 2. Pull boxes, Vaults and Manholes shall be equipped with:

- a. Galvanized steel covers for non-traffic rated locations and cast-in frame, galvanized steel, adjustable, high impact traffic cover (H-20 load rated) for traffic rated locations.
- b. Sump, lifting lugs, conduit knock-outs, pick holes, bolt down holes in cover plate, and pull irons. Knockout location and sizes shall be coordinated with the duct bank for each location. HDG cable racks shall be provided as required to support the cables in the pull box. Cover shall be engraved with the words "POWER", "LIGHTING", or "CONTROLS" as applicable.

2.7 CLOSURE FOAM

- A. All conduit, raceways, cables and sleeves penetrations through fire rated and hazardous location walls, shafts, floor, ceilings, etc., shall be sealed by closure foam as in Dow Corning #3-6548 silicone RTV, GE RTV 850 silicone foam, or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify outlet locations and routing and termination locations of raceway prior to rough in.

3.2 EXISTING WORK

- A. Extend existing raceway and box installations using materials and methods compatible with existing electrical installations, or as specified.
- B. Clean and repair existing raceway and boxes to remain or to be reinstalled.

3.3 INSTALLATION OF RACEWAYS

- A. Routing
 - 1. Install raceway and boxes in accordance with NECA "Standard of Installation."
 - 2. Conduit routing shown on drawings is diagrammatic only. Contractor shall field route conduit and raceways between equipment and devices as required to obtain a complete wiring system.
 - 3. All exposed conduits shall be installed parallel or perpendicular to dominant surfaces with right-angle turns made of symmetrical bends or fittings.
 - 4. Conduit shall not be installed on the outside face of exposed columns, but shall be routed on the web or on the inside of a flange of the column.
 - 5. Except where prevented by the location of other work, a single conduit or a conduit group shall be centered on structural members.
 - 6. Conduit shall be located at least 6 inches from hot water or steam pipes and from other hot surfaces
- B. Moisture Pockets

1. Moisture pockets shall be eliminated from conduits. If water cannot drain to the natural opening in the conduit system, a hole shall be drilled in the bottom of a pull box or a "C-type" conduit fitting provided in the low point of the conduit run.

C. Couplings and Unions

1. Metal conduit shall be joined by threaded conduit couplings, with the conduit ends butted.
2. The use of running threads, Erickson type couplings, split couplings or similar unions are not permitted.

D. Conduit Bodies

1. Conduit bends shall meet the requirements of NEC, minimum bend radius of the cable installed or as indicated on the drawings, whichever is greater.
2. Conduits or tubing deformed or crushed in any way shall be removed from the job site.

E. Bends and Offsets

1. Changes in direction of conduits shall be made with fittings or bends.
2. Conduit bends shall meet the requirements of NEC, minimum bend radius of the cable installed or as indicated on the drawings, whichever is greater.
3. Bends shall be made using appropriate tools or mechanical equipment. The use of a pipe tee or vise for bending conduit or tubing will not be permitted.
4. For non-metallic conduit or plastic coated steel, approved factory bends and offsets shall be used.
5. Conduits or tubing deformed or crushed in any way shall be removed from the job site.
6. Install no more than the equivalent of three 90 degree bends between boxes or outlets

F. Cutting and Threading

1. The plane of all conduit ends shall be square with the centerline.
2. Where threads are required, they shall be cut and cleaned prior to conduit reaming.
3. The ends of all conduit and tubing shall be reamed to remove all rough edges and burrs.
4. Cutting oil shall be used in threading operations; the dies shall be kept sharp, and provisions shall be made for chip clearance.
5. Threads on conduits and fittings shall be lubricated with conducting and sealing compound.
6. All steel conduits shall be coated after threading with cold-galvanized zinc coating. The Contractor shall supply this protective material and shall apply it in the field prior to installing conduit or fittings.

- G. All steel conduit, exposed to weather or in contact with earth, shall be re-galvanized after threading with "Galvanizing Powder M-321" as manufactured by the American Solder and Flux Company of Philadelphia, Pennsylvania; "Zincilate 810" as manufactured by Industrial Metal Protectives, Inc., of Dayton, Ohio; "Zinc Rich" coating as manufactured by ZRC Chemical Products Company, Quincy, Massachusetts; or approved equal. The Contractor shall supply this protective material and shall apply it in the field.

H. Connections to Boxes and Cabinets

1. Conduit shall be securely fastened to all boxes and cabinets.

2. Threads on metallic conduit shall project through the wall of the box to allow the bushing to butt against the end of the conduit.
 3. The locknuts, both inside and outside, shall then be tightened sufficiently to bond the conduit securely to the box.
 4. Locknuts on connectors shall be tightened securely to bond the connectors.
- I. All conduits entering enclosures outdoors or in wet areas shall enter through Meyer's hubs, or approved equal, or threaded openings.
- J. Cleaning
1. Precautions shall be taken to prevent the accumulation of water, dirt, or concrete in the conduit.
 2. Conduit in which water or other foreign materials have been permitted to accumulate shall be thoroughly cleaned or, where such accumulation cannot be removed by methods acceptable to the Owner /Engineer, the conduit shall be replaced.
 3. For conduits sizes 3 inches and larger, draw a flexible testing mandrel approximately 12 inches long with a diameter less than the inside diameter of the conduit through the conduit. After which, draw a stiff bristle brush through until conduit is clear of particles of foreign materials. For conduits less than 3 inches, draw a stiff bristle brush through until conduit is clear of particles and foreign material.
- K. Empty Conduit
1. All conduits installed for future use shall have a polypropylene pull line with a minimum tensile strength of 200 lbs., Jet Line, Cat. No. 232, polyolefin, or approved equal. Pull line shall be secured at both ends to ensure future accessibility.
- L. Rooftop Conduits
1. Provide redwood sleepers on waterproof mastic base for all conduit runs exposed on roofs.
- M. Identification
1. All conduits shall be identified in accordance with other section of these specifications.
- N. Grounding
1. All conduits shall be grounded in accordance with specification Section 16050 – Basic Electrical Materials and Methods.
 2. A solid or stranded bare copper or green insulated copper solid or stranded ground wire shall be provided in all conduits and raceways.
- O. Galvanized Rigid Steel Conduit
1. Galvanized rigid steel conduit shall be installed in areas exposed to weather, vehicle traffic, in hazardous classified areas, for penetrations through foundations, and 10 feet before transition from below grade to 8 feet above grade, unless otherwise noted on the drawings.

2. Steel conduit in contact with earth shall be protected by "Scotchwrap" 10 mil tape applied in double thickness using 50 percent lap turns to 6 inches above grade and 6 inches beyond transition.
3. Expansion joints shall be used where required.

P. Intermediate Steel Conduit

1. Intermediate steel conduit may be installed in lieu of galvanized rigid steel conduit in all above ground areas where rigid steel conduit is permitted, except for wires over 600-volts, unless otherwise specified.

Q. Polyvinyl Chloride (PVC) Coated Galvanized Rigid Steel Conduits and Intermediate Steel Conduit

1. PVC -coated, steel conduit and fittings shall be installed where highly corrosive conditions exist, indoors or outdoors.
2. The Contractor shall patch any damaged coating according to the manufacturer's instructions.

R. Electrical Metallic Tubing

1. Electrical metallic tubing shall be installed for all circuits, indoors above concrete slab, where not subject to conditions outlined for rigid galvanized steel conduits.

S. Rigid Aluminum Conduit

1. Not acceptable on this project.

T. Flexible Metal Conduit, Steel or Aluminum

1. Flexible conduit inserts not greater than 30 inches in length, shall be installed in all conduit runs, which are supported by both building steel and by structures subject to vibration or thermal expansion. This shall include locations where conduit supported by building steel enters or becomes supported by isolated structures on separate foundations.
2. Flexible conduit shall be installed in conduit runs, which cross expansion joints.
3. Special areas, such as plant office control rooms in which external noise is to be minimized, shall have flexible conduit in conduit runs where the runs cross from the main building framing to the control room or office framing.
4. Flexible conduit shall be installed adjacent to all equipment and devices, which move in relation to the supply conduit due to vibration, normal operation of the mechanism, or thermal expansion.
5. Conduit shall be connected to pressure switches, thermocouples, solenoids, and similar devices with flexible conduit. Flexible conduit shall be installed adjacent to the motor terminal housing for motors requiring 4-inch and smaller conduit.
6. Flexible metal conduit inserts not greater than 6 feet in length shall be installed for light fixture tap conductors.

U. Liquid-Tight Flexible Metal Conduit

1. Liquid-tight flexible metal conduit shall be used in place of regular flexible conduit for connections to motors and transformers, in areas exposed to weather, moisture or oil, and under raised floors.
2. Liquid-tight flexible metal conduit may be used in place of flexible metal conduit where not otherwise required.

V. Non-Metallic Conduit

1. Schedule 40 shall be used for all power, signal feeders and branch circuits, in earth or enclosed in concrete, unless otherwise noted on the drawings. Conduits must be buried in earth in accordance with the NEC.

W. Conduit Support

1. Fasten conduit supports to building structures and surfaces in accordance with Section 16050 – Basic Electrical Materials and Methods.
2. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
3. Do not use wire, ceiling support wires or perforated pipe straps to support conduit. Remove any temporary installation support wire.

X. Spacing of Supports

1. All conduit runs shall be rigidly supported, except where buried in concrete.
2. Each conduit shall be supported within one (1) foot of junction boxes and fittings.
3. Spacers used in duct bank installations shall be placed no more than 6 to 10 feet apart.
4. Support spacing along conduit runs shall be as follows.

Conduit Size	Maximum Distance Between Supports
½ inch through 1-1/4 inch	5 feet
1-1/2 inch and larger	8 feet

- Y. Ground and bond raceway and boxes in accordance with Section 16050 – Basic Electrical Materials and Methods.

3.4 CABINET AND BOX INSTALLATION

- A. Install electrical boxes as shown on drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
- B. Locate boxes and conduit bodies so as to ensure ready accessibility of electrical wiring, maintain headroom and to present neat mechanical appearance.
- C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. In inaccessible ceiling areas, install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
- D. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices with each other.

- E. Use flush mounting outlet boxes in finished areas.
 - 1. Do not install flush mounting boxes back-to-back in walls.
 - 2. Provide minimum 6-inch separation between adjacent boxes.
 - 3. Provide minimum 24-inch separation in acoustic rated walls.
 - 4. Use stamped steel bridges to fasten flush mounting outlet box between studs.
 - 5. Secure flush mounting box to interior wall and partition studs.
 - 6. Accurately position to allow for surface finish thickness.
 - 7. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
 - 8. Use adjustable steel channel fasteners for hung ceiling outlet box.
- F. Support boxes independently of conduits.
- G. Use code sized gang box where more than one device is mounted together. Do not use sectional box. Use code sized gang box with plaster ring for single device outlets.
- H. Use cast outlet box in exterior locations where exposed to the weather and wet locations (interior or exterior).
- I. Coordinate installation of electrical boxes and fittings with cable and raceway installation work. Provide knockout closures to cap unused knockout holes where blanks have been removed.
- J. Avoid using round boxes where conduit must enter box through side of box, which would result in difficult and insecure connections where fastened with a locknut or bushing on rounded surface.
- K. Fasten boxes rigidly to substrate or structural surfaces to which they are being mounted, or solidly embed electrical boxes in concrete or masonry as appropriate.
- L. Except as prevented by the location of other work, all junction boxes and outlet boxes shall be centered on structures.
- M. Conduit openings in boxes shall be made with a hole saw or shall be punched.
- N. Cabinets and boxes shall be rigidly mounted.
 - 1. Mounting on concrete shall be secured by self-drilling anchors.
 - 2. Mounting on steel shall be by drilled and tapped screw holes, or by special support channels welded to the steel, or by both.
 - 3. Cabinets shall be leveled and fastened to the mounting surface with not less than ¼-inch air space between the enclosure and mounting surface.
 - 4. All mounting holes in the enclosure shall be used.
- O. Large Pull Boxes - Boxes larger than 100 cubic inches in volume or 12 inches in any dimension.
 - 1. Interior Dry Locations - Use hinged enclosure.
 - 2. Other Locations - Use surface mounted box of appropriate location classification.

3.5 ANCHORS

- A. Where supports for raceways, boxes, and cabinets are mounted on concrete surfaces, they shall be fastened with self-drilling tubular expansion shell anchors with externally split expansion shells, single-cone expanders, and annular break-off grooved chucking cones. Anchors shall be Phillips "Red Head" or approved equal.

3.6 PULL BOX AND VAULT INSTALLATION

- A. Openings or "knockouts" in precast concrete vaults shall be located as shown on the drawings and shall be sized sufficiently to permit passage of the largest dimension of pipe and/or flange.
- B. Upon completion of installation, all voids or openings in the vault walls around pipes shall be filled with 3,000 psi non-shrink grout.
- C. After the structure and all appurtenances are in place and approved, backfill shall be placed to the original ground line or to the limits designated on the plans.
- D. All joints between precast concrete vault sections shall be made watertight. The plastic joint sealing compound shall be installed according to the manufacturer's recommendations to provide a watertight joint which remains impermeable throughout the design life of the structure. The outside of the entire structure shall be coated with an approved water proofing material.
- E. Access doors shall be built up such that the hatch is flush with the surrounding surface unless otherwise specified on the drawings or by the District. The Contractor is responsible for placing the cover at the proper elevation where paving is to be installed and shall make all necessary adjustments so that the cover meets these requirements.
- F. Ladders shall be installed using Type 316 stainless steel capsule anchors.
- G. Ladders shall be attached a minimum of 3 places to the vault wall.
- H. Ladder shall be centered under access door opening.

3.7 ADJUSTING

- A. Install knockout closures in unused openings in boxes.

3.8 CLEANING

- A. Clean interior of boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore manufacturer's finish.

END OF SECTION

SECTION 260553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. The extent of the electrical systems and equipment requiring identification is shown on the drawings, and the extent of identification required is specified herein and in individual sections of work requiring identification. The types of electrical identification specified in this section include the following:
 - 1. Exposed conduit color banding.
 - 2. Buried cable warnings.
 - 3. Cable/conductor identification.
 - 4. Operational instructions and warnings.
 - 5. Danger signs.
 - 6. Equipment/system identification signs.

1.2 REFERENCES - CODES AND STANDARDS

- A. ANSI Z535.1 - Safety Color Code
- B. APWA ULCC - Uniform Color Code for Buried Utilities.
- C. NFPA 70 National Electrical Code (NEC). Latest approved edition.

1.3 SYSTEM DESCRIPTION

- A. Label the following electrical equipment with nameplates which clearly identify each item, the function or use of the item, and the circuit identification of the feed to the item:
 - 1. All transformers shall be identified by 1-inch high block letters cut in stencil and applied with yellow paint on a flat-black background. The transformer number, primary and secondary voltages, and the kVA shall be shown.
 - 2. All Metal-Clad Switchgear, Metal-Enclosed Switchgear, Switchboards, Distribution Panelboards, Power and Lighting Panels, Motor Control Centers, Local Control Panels, Terminal Cabinets and all electrical equipment enclosure shall be identified using laminated plastic nameplates. The equipment number, voltage rating, current rating, number of phases, connection type, short circuit interrupting rating, and circuit number shall be shown
 - 3. Identify all receptacles and lighting switches, by the circuit number shown on the drawings using 1/4-inch high white characters on 1/2-inch wide black stick-on tape placed on the wall directly above the device if the device is wall mounted. Place the tape on the device enclosure if the device is not wall mounted.
 - 4. All motors, starters, disconnect switches, Time Switches, Special Function Pushbuttons and Switches, and miscellaneous control devices shall be identified by function and

circuit number, with ¼-inch high white characters on a ½-inch wide black stick-on tape where installed indoors and engraved plastic nameplates where installed outdoors.

5. All underground raceway or cable shall be marked with buried warning tape along its entire length.
6. All exposed raceway longer than 10 feet in length shall be identified.
7. Panelboard Directories: Furnish all panelboards with a complete 8-1/2-inch by 11-inch typewritten directory mounted in the inner door under a clear plastic cover set in a metal frame.

B. Branch circuits and devices:

1. Label all individual receptacle outlets at the outlet faceplate to indicate the panelboard of origin and branch circuit number. Label modular furniture feeds at the power pole drop in a visible and consistent location. Labels shall be self adhesive, thermal machine printed type such as Brothers, Panduit, or T&B and shall be clear plastic with black lettering.
2. All branch circuits in outlet boxes shall be identified with circuit number using wrap-around labels (T&B, BRADY or 3M).
3. As an alternative to separate nameplates, device plates may be engraved directly with lettering filled with black enamel.

1.4 SUBMITTALS

- A. Catalog data for nameplates, labels, and markers.
- B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under regulatory requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.5 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70 – National Electrical Code.
- B. Furnish products listed and classified by Underwriters' Laboratories, Inc. (UL), Electrical Testing Laboratories, Inc. (ETL), or other recognized, approved testing and listing agencies as suitable for the purpose specified and shown.

PART 2 - PRODUCTS

2.1 NAMEPLATES AND LABELS

A. Nameplates

1. Engraved three-layer laminated plastic, white letters on black background for normal power and white letters on red background for emergency power. Communications and control cabinets shall be labeled with white letters on green background.
2. Locations
 - a. Each electrical distribution and control equipment enclosure.

- b. Communication cabinets.
- c. Motor control centers, including each combination module.

3. Letter Size

- a. Use 1/8-inch letters for identifying individual equipment and loads.
- b. Use 1/4-inch letters for identifying grouped equipment, loads, panelboards, and transfer switch.
- c. Use 1/2-inch letters for identifying the main switchboard, motor control centers, and large distribution switchboards.

B. Labels

- 1. Embossed adhesive tape, with 3/16-inch white letters on colored background to match color scheme of plastic laminate labels in 2.1.1. Use only for identification of individual wall switches and receptacles, control device stations, and multi-outlet devices.
- 2. Thickness
 - a. 1/16-inch for units up to 20 square inches or 8-inch length; 1/8-inch for larger units.

2.2 WIRE MARKERS

A. Manufacturers

- 1. Brady
- 2. Thomas & Betts
- 3. 3-M Co.

B. Description: Cloth, tape, split sleeve, or tubing type wire markers, self-adhesive.

C. Locations: Each conductor at panelboard gutters, pull boxes, outlet and junction boxes, control panels, motor controllers and starters, and each load connection.

D. Legend

- 1. Power and Lighting Circuits: Branch circuit or feeder number indicated on contract drawings.
- 2. Control Circuits: Control wire number indicated on shop drawings.
- 3. Neutral Conductors: Clearly indicate the branch circuit or feeder number the neutral serves. In multi-wire circuits where the neutral is shared, mark the neutral with the circuit number of the "A" phase.

2.3 CONDUIT MARKERS

- A. Provide manufacturer's standard preprinted, flexible or semi-rigid, permanent, plastic-sheet conduit markers, minimum of 3 mils thick and 1-1/2-inch wide extending 360 degrees around conduits; designed for self-adhesive attachment to conduit. Except as otherwise indicated, provide lettering that indicates the voltage of the conductor(s) in the conduit. Provide 8-inch minimum length for 2-inch and smaller conduit, 12-inch minimum length for larger conduit.

- B. Identify conduits containing conductors above 600-volts with the following alternating markers
 - 1. DANGER - HIGH VOLTAGE
 - 2. The voltage, as applicable (i.e. – 12-kV, 4.16-kV, 480-Volts, 240-Volts, etc.)
- C. Location: Furnish markers for each conduit longer than 10 feet.
- D. Spacing: 20 feet on center.
- E. Color: Unless otherwise indicated or required by governing regulation, provide orange markers with black letters.
 - 1. Fire Alarm System: Red w/black letters.
 - 2. Telephone System: Green w/yellow letters.
 - 3. Data/Communication. System: White w/black letters.
 - 4. Emergency System: Orange w/black letters.
- F. Legend:
 - 1. 208 Volt System: Normal 208/120-volts.
 - 2. Fire Alarm System: Fire alarm.
 - 3. Telephone System: Telephone.
 - 4. Data/Communication System: Data/communications.

2.4 FASTENERS

- A. Secure all labels and nameplates with self-tapping stainless steel screws. Use contact type permanent adhesive where screws cannot or should not penetrate the substrate.

2.5 BAKED ENAMEL DANGER SIGNS

- A. Provide manufacturer's standard "DANGER" signs of baked enamel finish on 20 gage steel; of standard red, black and white graphics; 14-inch by 10-inch size except where 10-inch by 7-inch is the largest size which can be applied where needed, and except where larger size is needed for adequate vision; with recognized standard explanation wording (e.g. HIGH VOLTAGE, KEEP AWAY, BURIED CABLE, DO NOT TOUCH SWITCH).
 - 1. At each entry doors of Electrical Rooms: "DANGER HIGH VOLTAGE – KEEP OUT, AUTHORIZED PERSONNEL ONLY"

2.6 LETTERING AND GRAPHICS

- A. Coordinate names, abbreviations and other designations used in the electrical identification work, with the corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of the electrical systems and equipment.

2.7 UNDERGROUND WARNING TAPE

- A. Three-inch minimum width, 5 mil thickness, foil bonded polyethylene tape, detectable type, with suitable continuous warning legend describing buried electrical lines. Tape color shall conform to APWA uniform color code using ANSI Z535.1 safety colors. Text shall be black, 2-inch minimum letters.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.
- B. Coordination: Where identification is to be applied to surfaces that require finish, install identification after completion of painting.
- C. Regulations: Comply with governing regulations and the requests of governing authorities for the identification of electrical work.

3.2 APPLICATION

- A. Install nameplate and label parallel to equipment lines.
- B. Secure nameplate to equipment front using screws, rivets, or adhesive.
- C. Secure nameplate to outside moveable surface of door on panelboard.
- D. Conduit Identification:
 - 1. Where electrical conduit is exposed in spaces with exposed mechanical piping, which is identified by a color-coded method, apply color-coded identification on the electrical conduit in a manner similar to the piping identification. Except as otherwise indicated, use orange as the coded color for conduit.
 - 2. Paint red band or provide red tape on each fire alarm conduit longer than 10 feet, minimum 20 feet on center.
- E. Cable/Conductor Identification:
 - 1. Apply cable/conductor identification on each cable and conductor in each box/enclosure/cabinet where the wires of more than one circuit or communication/signal system are present, except where another form of identification (such as color-coded conductors) is provided.
 - 2. Match identification with marking system used in panelboards, shop drawings, contract documents, and similar previously established identification for project electrical work.
- F. Operational Identification and Warnings
 - 1. Wherever reasonably required to ensure safe and efficient operation and maintenance of the electrical systems, and electrically connected mechanical systems and general

systems and equipment, including the prevention of misuse of electrical facilities by unauthorized personnel, install self-adhesive plastic signs or similar equivalent identification, instruction or warnings on switches, outlets and other controls, devices and covers of electrical enclosures. Where detailed instructions or explanations are needed, provide plasticized tags with clearly written messages adequate for the intended purposes.

G. Danger Signs

1. In addition to the installation of danger signs required by governing regulations and authorities, install appropriate danger signs at the locations indicated and at locations subsequently identified by the Installer of electrical work as constituting similar dangers for persons in or about the project.
2. High Voltage
 - a. Install danger signs wherever it is possible, under any circumstances, for persons to come into contact with electrical power of voltages higher than 110-120 volts.
 - b. Critical Switches/Controls
 - c. Install danger signs on switches and similar controls, regardless of whether concealed or locked up, where untimely or inadvertent operation (by anyone) could result in significant danger to persons, or damage to or loss of property.

H. Equipment/System Identification Signs

1. Install an engraved plastic-laminate sign on each major unit of electrical equipment in the building; including the central or master unit of each electrical system and the communication/signal systems, unless the unit is specified with its own self-explanatory identification or signal system.
 2. Except as otherwise indicated or specified, provide single line of text, 1/2-inch high lettering on 1-1/2-inch high sign (2-inch high where two lines are required), white lettering in black field.
 3. Provide text matching terminology and numbering of the contract documents and shop drawings.
 4. Provide signs for each unit of the following categories of electrical work
 - a. Major electrical switchboard
 - b. Electrical substation
 - c. Motor control center
 - d. Fire alarm control panel and annunciators.
- I. Install signs at locations indicated or, where not otherwise indicated, at location for best convenience of viewing without interference with operation and maintenance of equipment. Secure to substrata with fasteners, except use adhesive where fasteners should not or cannot penetrate the substrata.
- J. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.

END OF SECTION

SECTION 262726

WIRING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Wiring devices are defined as single discrete units of electrical distribution systems that are intended to carry but not utilize electric energy. The types of general purpose wiring devices required for the project include, but are not limited to the following line voltage devices:
 - 1. Connectors
 - 2. Plugs
 - 3. Receptacles
 - 4. Switches
 - 5. Wall plates

1.2 RELATED SECTIONS

- A. Section 260500: Common Work Results for Electrical
- B. Section 260519: 600-Volt Power Conductors and Cables
- C. Section 260553: Identification for Electrical Systems

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. IEC 529 Degrees of Protection provided by Enclosures.
- B. NEMA WD 1 General Purpose Wiring Devices
- C. NEMA WD 6 Wiring Device Configurations.

1.4 CONTRACTOR SUBMITTALS

- A. Product Information:
 - 1. Catalog cut of each device showing Manufacturer name, catalog number, voltage and current rating and dimensions.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five (5) years experience.

- B. Installer: A firm with at least five (5) years of successful installation experience on projects with electrical installation work similar to that required for the project.

1.6 REGULATORY REQUIREMENTS

- A. Furnish products listed and classified by Underwriters Laboratories, Inc. (UL), Electrical Testing Laboratories, Inc. (ETL), or other recognized, acceptable testing and listing agencies as suitable for the purpose specified and shown.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide factory fabricated wiring devices in the type, color, electrical rating for service indicated, and/or as shown on the drawings.

2.2 MANUFACTURERS

- A. Provide products produced by one of the following for each type of wiring device, or acceptable alternate:
 - 1. Appleton
 - 2. Arrow-Hart, Inc.
 - 3. Bryant Electric Co.
 - 4. Crouse-Hinds Co.
 - 5. General Electric Co.
 - 6. Hubbell Wiring Device Division
 - 7. Pass & Seymour
 - 8. Pyle National
 - 9. Russell & Stoll
 - 10. Slater
 - 11. Wiremold (multi-outlet assemblies)

2.3 WALL SWITCHES

- A. Provide specification grade, quiet type, flush, 1-pole, 2-pole, three and four-way toggle switches, 20 ampere, 120/277-volts AC, with mounting yoke insulated from mechanism equipped with plaster ears and side wired screw terminals, ivory plastic body with toggle handle, NEMA WD-1.
 - 1. Device Number: #1221, #1222, #1223, #1224
 - 2. Manufacturers: Hubbell, Pass & Seymour, Bryant

2.4 RECEPTACLES

- A. Provide specification grade, grounding type, heavy-duty receptacles with ivory plastic body, green hexagonal equipment ground screw terminal and grounding poles internally connected to mounting yoke; metal plaster ears; side wiring NEMA WD-6 as follows:
1. Duplex Receptacle: Two pole, 3 wire, 20-ampere, 125-volt duplex receptacle, NEMA configuration 5-20R unless otherwise indicated.
 2. GFCI Receptacle: Two pole, 3 wire, 20-ampere, 125-volt duplex receptacle with integral ground fault circuit interrupter to meet regulatory requirements.
 3. Special Purpose: Two pole, 3 wire, 20-ampere, 125-volt single receptacle, twist-lock, NEMA configuration L5-20R as indicated.
 4. Two pole, 3 wire, 20-ampere, 250-volt single receptacle, twist-lock, NEMA configuration L6-20R as indicated.
 5. Two pole, 3 wire, 20-ampere, 277-volt single receptacle, twist-lock, NEMA configuration L7-20R as indicated.
 6. Two pole, 3 wire, 30-ampere, 125-volt single receptacle, twist-lock, NEMA configuration L5-30R as indicated.
 7. Two pole, 3 wire, 30-ampere, 250-volt single receptacle, twist-lock, NEMA configuration L6-30R as indicated.
 8. Two pole, 3 wire, 30-ampere, 277-volt single receptacle, twist-lock, NEMA configuration L7-30R as indicated.
 9. Three phase, 4 wire, 20-ampere, 125/250-volt single receptacle, twist-lock, NEMA configuration L14-20R as indicated.
 10. Three phase, 4 wire, 20-ampere, 250-volt single receptacle, twist-lock, NEMA configuration L15-20R as indicated.
 11. Three phase, 4 wire, 20-ampere, 480-volt single receptacle, twist-lock, NEMA configuration L16-20R as indicated.
 12. Three pole, 4 wire, 30-ampere, 125/250-volt single receptacle, twist-lock, NEMA configuration L14-30R as indicated.
 13. Three pole, 4 wire, 30-ampere, 250-volt single receptacle, twist-lock, NEMA configuration L15-30R as indicated.
 14. Special Purpose Receptacle: Type as required meeting the requirements of this Section and the equipment shown on the drawings and elsewhere specified.

2.5 PLUGS AND CONNECTORS

- A. Comply with NEMA Standards Publication No. WD-1. Provide 20 ampere, 125-volts, bakelite body connectors, 3-wire grounding, parallel blades, double wipe contact, with cord clamp.
- B. Matching Insulgrip, corrosion resistant nylon plugs, IP20, shall be provided for each twist-lock type receptacles unless indicated otherwise.
- C. Manufacturers: Hubbell, Pass & Seymour, Bryant.

2.6 WALL PLATES

- A. Decorative Cover Plate: High impact, smooth nylon and smooth satin in finished areas. Color of nylon cover plate shall be ivory unless noted otherwise. Stainless steel cover plate in unfinished areas or where device is embedded in concrete.

- B. For areas where two separate power sources are provided, each power source receptacle shall have a different color cover plate such as black, gray, or brown. Emergency power source receptacles shall have a red cover plate.
- C. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device cover. Cover for duplex devices shall be designed such that each device is independently covered.

2.7 MULTI-OUTLET ASSEMBLIES

- A. Provide fixed multi-outlet assemblies consisting of #5362 grounding type, 20 ampere, 125-volt, two poles, three wire receptacles as an integral part, on 12-inch centers, unless otherwise noted.
- B. Where more than one circuit is indicated, do not connect adjacent receptacles to the same circuit. Include raceway snap-on covers with punched holes to accurately align receptacles.

2.8 HAZARDOUS RATED AREAS

- A. Switches, receptacles and other devices installed in hazardous areas shall be explosion-proof type in accordance with NFPA 70 and as shown on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify outlet boxes are installed at proper height.
- B. Verify wall openings are neatly cut and will be completely covered by wall plates.
- C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- D. Inspect each item of materials or equipment immediately prior to installation, and reject damaged and defective items.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface, if necessary.
- B. Clean debris from all boxes.

3.3 INSTALLATION

- A. Install wiring devices where indicated, in accordance with the manufacturer's written instructions, the applicable requirements of the NEC and the NECA "Standard of Installation",

and in accordance with recognized industry practices to ensure that products serve the intended function.

- B. Comply with the manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in the contract documents.
 - 1. Install devices plumb and level. Install switches with OFF position down
 - 2. Install vertically oriented grounded receptacles with grounding pole on top
 - 3. Connect wiring device grounding terminal to equipment grounding conductor as specified in Section 16050 – Basic Materials and Methods.
 - 4. Connect isolated ground (IG) receptacle equipment (yoke) grounding terminal only at metallic box with bonding jumper
 - 5. Install decorative plates on switch, receptacle, and blank outlets in finished areas
 - 6. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets in utility areas. (Does not include multi-outlet assemblies, other similar locations.).
 - 7. Identify wiring devices as specified in Section 260553 – Electric Equipment Identification.

3.4 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes to obtain mounting heights compliant with ADA.
- B. Install wall switch at 42 inches to top of the maximum reach above finished floor for forward reach applications, 48 inches to top of reach for side reach applications. The lower reach shall be at or above 18 inches for forward reach and for side reach, unless otherwise noted.
- C. Install convenience receptacle 18 inches to center above finished floor, unless otherwise noted.
- D. Install convenience receptacle 6 inches to center above backsplash of counter, unless otherwise noted.
- E. Install dimmer 42 inches to center above finished floor, unless otherwise noted.
- F. Install telephone and/or data jacks 18 inches to center above finished floor, unless otherwise noted.
- G. Install telephone jack for wall telephone 42 inches to top of reach above finished floor for forward reach applications, and 48 inches above finished floor to top of reach for side reach applications to comply with the ADA. Receiver hook shall not be above 54 inches to its highest point above finished floor.

3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.

- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.
- F. Verify that each telephone and data jack is properly connected and circuit is operational.

3.6 ADJUSTING

- A. Adjust devices and wall plates to be flush, plumb and level.

END OF SECTION

SECTION 265000

LIGHTING

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Lighting fixtures, lamps, ballasts, hangars, trim and diffusers.
- B. Supports, suspension systems, and blocking.
- C. Occupancy sensors, and automatic control systems.

1.2 WORK NOT INCLUDED

- A. (Not used on this section)

1.3 SUBMITTALS

- A. Provide submittals for the following:
 - 1. Light fixtures.
 - 2. Lamps.
 - 3. Ballasts.
 - 4. Occupancy sensors, remote switches, and power packs.

PART 2 - PRODUCTS

2.1 LIGHTING FIXTURES

- A. Provide lighting fixtures, lamps, ballasts and accessories complete and ready for operation. Furnish the fixtures as indicated on the Drawings and as listed in the fixture schedule. Verify in all cases, the lengths and quantity of fixtures necessary to achieve the indicated results.
- B. Provide lighting fixtures in the finishes and colors as noted on the Drawings. Where fixture finishes are noted to be "By Architect", include the available finishes when making fixture submittals, and obtain the Architects written selection of fixture finishes prior to ordering lighting fixtures.
- C. Prominently indicate in the submittals those fixture that are proposed to be provided with remote or separately mounted ballasts. Such fixtures must be specifically approved by the Architect in writing prior to ordering the fixtures.
- D. Provide the Underwriters Laboratories and IBEW labels on all lighting fixtures.

- E. Equip fluorescent fixtures with CBM-ETL labeled ballasts provided with internally mounted automatic reset thermal protectors and silver plated sockets.
- F. All lighting fixtures shall have published photometric tests conducted by Electrical Testing Laboratories. Make available the test results upon request. Testing shall include candlepower distribution curves, total fixture efficiency, brightness and shielding angles in longitudinal and transverse directions.
- G. Observe the requirements of the California Building Code Section 5209 regarding plastic lighting diffusers. Fixtures and auxiliary equipment mounted against combustible material shall be approved for such installation.
- H. Make-up fixtures with Type AF or equal fixture wire. Provide an identified, approved landing lug for equipment ground wires.

2.2 LENSES, REFLECTORS, AND TRIM

- A. Provide substantial light sealing and separation between individual lamp rows in the louver assemblies of 3-lamp recessed parabolic fluorescent fixtures. This shall be accomplished by the provisioning of ballast compartment covers between cells even if no ballasts are contained therein.

2.3 LAMPS

A. LED Lighting systems:

- 1. Lamps shall be DLC (DesignLights Consortium) listed for energy efficiency.
- 2. Acceptable manufacturers: GE Current, Philips/Signify, Sylvania/LEDVANCE, or approved equal.

B. Compact and Specialty LED Lamps:

- 1. Minimum 3500–4000 Kelvin, minimum CRI 80+, rated life 25,000 hours L70 at 25°C.
- 2. Acceptable manufacturers: Philips/Signify, Sylvania/LEDVANCE, GE Current, or approved equal.

C. Exterior and High-Output LED Lamps:

- 1. Provide LED sources at exterior applications.
- 2. Minimum 4000–5000 Kelvin, minimum CRI 70+, rated life 50,000 hours L70 at 25°C.
- 3. Fixtures and lamps shall be DLC listed for outdoor or high-output use.
- 4. Furnish all LED high-output lamps of the same type and manufacturer for consistency.

D. General Requirements:

- 1. All products shall be ENERGY STAR certified or DLC listed.

2. All lamps shall carry a minimum 5-year manufacturer's warranty.

2.4 OCCUPANCY SENSORS

- A. Provide occupancy sensing systems complete and ready for operation. Occupancy sensors, remote switches, and power packs shall be located as indicated on the Drawings. Observe the proper use of infrared or ultrasonic sensors as scheduled on the Drawings.
- B. All devices shall utilize the "manual on, manual/automatic off" mode of operation and shall fit in standard "Decora" style wall plates.
- C. Provide occupancy sensing devices that are UL- listed and certified and listed in the Directory of Automatic Lighting Control Devices as published by the CEC, and carry a 5 year warranty.
- D. Self contained wall sensor switches shall have the following features:
 1. 100-300 Volt, Coverage of 180 degrees, maximum 300 sq ft, 150 sq ft for desktop activity.
 2. Time delays: SmartSet (automatic), fixed (5,10,15,20,or 30 minutes), walk-through, test-mode.
 3. Sensitivity adjustment: SmartSet (automatic) or reduced sensitivity.
 4. 1.0 mm hard, poly IR 2 lens; 2 level lens for superior desktop detection.
 5. Advanced control logic based on RISC microcontroller with detection signature processing to eliminate false triggers and provides immunity to RFI and EMI, walk-through mode to turn lights off 3 minutes after the area is vacated, one-step light level control setup that learns desired hold-off level.
 6. Optional alerts for impending shut-off including light flash, audible, or both; LED to indicate occupancy detection.
- E. Occupancy sensors shall be Watt,Stopper, or Approved Equal brand with the following model numbers :
 1. Wall sensor switch, 1-circuit, line voltage, passive IR: Watt-Stopper # WA-200.
 2. Wall sensor switch, 2-circuit, line voltage, passive IR: Watt-Stopper # WA-300.
 3. Ceiling sensor, line voltage, 360° coverage, dual-technology: Watt-Stopper #DT-355.
 4. Ceiling sensor, low voltage, 360° coverage, dual-technology, for use with power-pack: Watt Stopper #DT-300.
 5. Power pack, 1-circuit: Watt-Stopper #B120E-P.
 6. Power pack, 2-circuit: Watt-Stopper #LC-100.

2.5 TIME-SWITCHES AND PHOTO-SWITCHES

- A. Provide time-switches and photo-switches of the style and rating as indicated on the Drawings. Manufacturer shall be Tork or approved equal.
- B. Time-switches shall have a minimum of two circuits, a battery carry-over feature, lockable metal enclosure, and dead-front user accessible controls.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install fixtures in straight, true lines and without visible gaps between fixtures and building surfaces and between fixtures in continuous rows. For linear wall mounted fixtures, ensure that the wall surface is finished flat, straight, and free of imperfections prior to mounting the fixtures. Replace or repair lighting fixture installations that are out of plumb or that have obvious gaps or misalignment.
- B. Provide fixtures with the appropriate trim frames, flanges, canopies, and finish accessories to accommodate the ceiling conditions. Prior to ordering fixtures, and throughout the Project, verify the exact ceiling types, finishes, and thicknesses and coordinate the fixture installation therewith.
- C. Refer to the Drawings, particularly the architectural elevations and reflected ceiling plans, in determining the exact mounting location and height of lighting fixtures. For wall mounted or suspended fixtures that do not have the mounting heights clearly indicated, contact the Architect for clarification prior to ordering pendants and installing the fixtures.
- D. Provide final touchup painting to repair fixture finishes which are nicked or marred during installation. Obtain the paint from the fixture manufacturer.

3.2 AUDIBILITY

- A. Fixtures shall be free from any undesirable hum, vibration, or noise. Provide lighting equipment suitable for the intended ambient sound levels. Where necessary to meet this criteria, provide additional means of sound deadening, whether or not specifically indicated. Fixtures that are found to be unsatisfactory in the opinion of the Architect shall be removed and replaced at the Contractor's expense.

3.3 SUPPORTS AND BLOCKING

- A. Provide hangers, suspension cables, and blocking for lighting fixtures that will provide support independent of suspended ceilings, ceiling or wall surfaces, and electrical outlet boxes. Exception: Fixtures less than 12 inches in all dimensions and weighing less than six pounds may be permitted to be supported from the electrical outlet box if the box itself is independently supported by blocking or hangars.
- B. Refer to the Drawings for specific blocking details and seismic mounting details for lighting fixtures.

3.4 OBSTRUCTIONS

- A. Verify throughout the Project that mounting locations and suspension systems remain free of obstructions. Suspended or pendant mounted fixtures must be free to swing 45 degrees in all directions without hitting obstructions or other fixtures. Provide seismic rated swivel ball hangars for pendant mounted lighting fixtures to achieve the proper swing.

Luther Burbank Gold Ridge Experiment Farm
Restroom and Access Path Addition
7777 Bodega Avenue, Sebastopol, CA
IR Project 2022-033-01
9/19/2025

END OF SECTION

APPENDIX A

CITY OF SEBASTOPOL

General Guidelines for Construction Activities Erosion and Sediment Control and Minimization of Hazardous Materials Contact with Stormwater

General

1. The *Erosion and Sediment Control Field Manual, Third Edition, June 1999*, by the California Regional Water Quality Control Board, San Francisco Bay Region, forms the basis for these requirements, and is incorporated herein in its entirety. A copy of the *Field Manual* may be obtained from the California Environmental Protection Agency State Water Resources Control Board Water Quality home page, <http://www.waterboards.ca.gov/stormwtr/training.html> under "Publications Available".
2. The City shall periodically inspect the Contractor's work to ensure that work conforms to these erosion control guidelines and requirements.
3. For public projects, the City shall perform erosion control follow-up and maintenance and be responsible for post construction stormwater protection following completion of the project, in accord with the provisions of the *Field Manual* and the City's Storm Water Management Plan.
4. The Contractor shall conform to all of the requirements contained in the approved plans and these contract documents and specifications and any other documents referenced herein.

EROSION CONTROL

Contractor shall conform with the requirements contained in Part IV, Specifications, Section 02770, Soil Erosion Control, and these guidelines.

GENERAL PRACTICES TO MINIMIZE HAZARDOUS MATERIALS CONTACT WITH STORM WATER (to be used in conjunction with the *Field Manual*)

1. Scheduling: The key to keeping potentially hazardous construction materials (PHCM) out of storm water is to perform most of the construction (earthwork and foundation work) during the dry season. All erosion control facilities shall be in place by October 15, or before the first rains - which ever comes first. All PHCMs shall be covered with tarps and elevated off the ground if rain is predicted.
2. Chemical Storage: Chemicals shall be stored in their original containers or in well-labeled, sealed containers in designated areas.
3. Drainage: PHCMs shall not be transported, applied, or washed within areas which drain to the City Storm Drain System.
4. Construction Equipment and Vehicles - Maintenance
 - a. Maintain all construction equipment to prevent oil or other fluid leaks.
 - b. Use drip pans for any oil or fluid changes that are required for maintenance of equipment. Keep vehicles and equipment clean. Do not allow excessive build-up of oil and grease.
 - c. Use off-site repair shops as much as possible.
 - d. Always use secondary containment, such as a drain pans or drop cloths, to catch spills or leaks when removing or changing fluids.
 - e. Place stockpiled spill cleanup materials where they will be readily accessible. Regularly

inspect on-site vehicles and equipment for leaks, and repair immediately. Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site.

- f. Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, and hydraulic and transmission fluids.
5. Construction Equipment and Vehicles – Fueling
- a. Use off site fueling stations as much as possible.
 - b. If fueling must occur on-site, use designated areas, located away from drainage. Locate on-site fuel storage tanks over a retention area designed to hold the total tank volume.
 - c. Cover the retention area with an impervious material and install it in a manner to ensure that any spills will be contained in the retention area.
 - d. Discourage "topping-off" of fuel tanks, as it frequently leads to fuel spillage.
 - e. Always use secondary containment, such as a drain pans or drop cloths, when fueling to catch spills/leaks.
 - f. Place stockpiled spill cleanup materials where they will be readily accessible.
 - g. Avoid mobile fueling of mobile construction equipment around the site; transport the equipment to designated fueling areas.
6. Construction equipment and Vehicles – Washing
- a. Use off-site commercial washing businesses as much as possible.
 - b. Washing vehicles and equipment outdoors or in areas where wash water flows onto paved surfaces or into drainage pathways can pollute storm water. If you wash a large number of vehicles or pieces of equipment, conduct this work at an off-site commercial facility.
 - c. Do not permit steam cleaning on-site. Steam cleaning can generate significant pollutant concentrations.
7. Construction Equipment and Vehicles – Storage
- a. Locate vehicle and equipment storage, cleaning, and maintenance areas in designated, confined areas. These areas should be located away from significant drainage courses.
 - b. Direct any concentrated storm water run-on/runoff around storage and service areas. Minimize contact of storm water and run-on/runoff with stored equipment by raising equipment on pallets or other similar devices.
8. Toxic Materials: Through proper material use, waste disposal, and training of employees, the discharge of toxic pollutants can be prevented. Such methods include the following:
- a. Dispose of all wastes in accordance with Federal, State, and local regulations.
 - b. Use the entire product before disposing of the container.
 - c. Do not remove the container's original product label prior to disposal. It contains important safety and disposal information.
 - d. Do not clean out brushes or paint containers on dirt or into streets, gutters, storm drains,

or streams. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.

- e. Select and site designated hazardous waste storage areas.
- f. Store hazardous materials and wastes in covered containers and protect from vandalism. Place hazardous material and waste containers in secondary containment.
- g. Do not mix wastes. Mixing can cause chemical reactions, make recycling impossible, and complicate disposal.
- h. Recycle any useful material such as oil or water-based paint. Provide a summary of available recycling and disposal services.
- i. Make sure that toxic liquid wastes and chemicals are not disposed of in dumpsters designated for construction debris.
- j. Arrange for regular waste collection before containers overflow.
- k. Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.

APPENDIX B

HUD-4010

A. APPLICABILITY

The Project or Program to which the construction work covered by this Contract pertains is being assisted by the United States of America, and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

1. Minimum wages and fringe benefits

- i. All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in 29 CFR 5.5(d) and (e), the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act (40 U.S.C. 3141(2)(B)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(v) of these contract clauses; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under 29 CFR 5.5(a)(1)(iii)) and the Davis-Bacon poster (WH-1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

ii. Frequently recurring classifications

- A.** In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in 29 CFR part 1, a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to 29 CFR 5.5(a)(1)(iii), provided that:
1. The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;
 2. The classification is used in the area by the construction industry; and
 3. The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.
- B.** The Administrator will establish wage rates for such classifications in accordance with 29 CFR 5.5(a)(1)(iii)(A)(3). Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

iii. Conformance

- A.** The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be

classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:

1. The work to be performed by the classification requested is not performed by a classification in the wage determination; and
2. The classification is used in the area by the construction industry; and
3. The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- B. The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.
- C. If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to DBAconformance@dol.gov. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
- D. In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to DBAconformance@dol.gov, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.
- E. The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division under 29 CFR 5.5 (a)(1)(iii)(C) and (D). The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to 29 CFR 5.5 (a)(1)(iii)(C) or (D) must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

iv. Fringe benefits not expressed as an hourly rate

Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

v. Unfunded plans

If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in 29 CFR 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

- vi. Interest** In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

2. Withholding

i. Withholding requirements

The U. S. Department of Housing and Urban Development may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in 29 CFR 5.5(a) for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in 29 CFR 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work (or otherwise working in construction or development of the project under a development statute) all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in 29 CFR 5.5(a)(3)(iv), HUD may on its own initiative and after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

ii. Priority to withheld funds

The Department has priority to funds withheld or to be withheld in accordance with 29 CFR 5.5(a)(2)(i) or (b)(3)(i), or both, over claims to those funds by:

- A.** A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- B.** A contracting agency for its procurement costs;
- C.** A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- D.** A contractor's assignee(s);
- E.** A contractor's successor(s); or
- F.** A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901-3907.

3. Records and certified payrolls

i. Basic record requirements

A. Length of record retention. All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

B. Information required Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in 40 U.S.C. 3141(2)(B) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

C. Additional records relating to fringe benefits. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(v) that the wages of any laborer or mechanic include the amount of any

costs reasonably anticipated in providing benefits under a plan or program described in 40 U.S.C. 3141(2)(B) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

D. Additional records relating to apprenticeship Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

ii. Certified payroll requirements

A. Frequency and method of submission The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to HUD if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the certified payrolls to the applicant, sponsor, owner, or other entity, as the case may be, that maintains such records, for transmission to HUD. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system

B. Information required The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i)(B), except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (e.g., the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <https://www.dol.gov/sites/dolgov/files/WHD/legacy/files/wh347.pdf> or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the sponsoring government agency (or the applicant, sponsor, owner, or other entity, as the case may be, that maintains such records).

C. Statement of Compliance Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

1. That the certified payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information and basic records are being maintained under 29 CFR 5.5 (a)(3)(i), and such information and records are correct and complete;
2. That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly

from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3; and

3. That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.
 - D. **Use of Optional Form WH-347** The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the “Statement of Compliance” required by 29 CFR 5.5(a)(3)(ii)(C).
 - E. **Signature** The signature by the contractor, subcontractor, or the contractor’s or subcontractor’s agent must be an original handwritten signature or a legally valid electronic signature.
 - F. **Falsification** The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 3729.
 - G. **Length of certified payroll retention** The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.
- iii. **Contracts, subcontracts, and related documents** The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.
- iv **Required disclosures and access**
- A. **Required record disclosures and access to workers** The contractor or subcontractor must make the records required under 29 CFR 5.5(a)(3)(i)–(iii), and any other documents that HUD or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by 29 CFR 5.1, available for inspection, copying, or transcription by authorized representatives of HUD or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.
 - B. **Sanctions for non-compliance with records and worker access requirements** If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to 29 CFR 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under 29 CFR part 6 any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.
 - C. **Required information disclosures** Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address of each covered worker, and must provide them upon request to HUD if the agency is a party to

the contract, or to the Wage and Hour Division of the Department of Labor. If the Federal agency is not such a party to the contract, the contractor, subcontractor, or both, must, upon request, provide the full Social Security number and last known address, telephone number, and email address of each covered worker to the applicant, sponsor, owner, or other entity, as the case may be, that maintains such records, for transmission to HUD, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

4. Apprentices and equal employment opportunity

i. Apprentices

- A. Rate of pay** Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- B. Fringe benefits** Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.
- C. Apprenticeship ratio** The allowable ratio of apprentices to journeymen on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to 29 CFR 5.5(a)(4)(i)(D). Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in 29 CFR 5.5(a)(4)(i)(A), must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.
- D. Reciprocity of ratios and wage rates** Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

- ii Equal employment opportunity** The use of apprentices and journeymen under this part must be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

5 Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6 Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (11), along with the applicable wage determination(s) and such other clauses or contract modifications as the U.S. Department of Housing and Urban Development may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate.

7 Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8 Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9 Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

i. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of 40 U.S.C. 3144(b) or 29 CFR 5.12(a).

ii. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of 40 U.S.C. 3144(b) or 29 CFR 5.12(a).

iii. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, 18 U.S.C. 1001.

11 Anti-retaliation It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

i. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, or 29 CFR parts 1, 3, or 5;

ii. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, or 29 CFR parts 1, 3, or 5;

iii. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, or 29 CFR parts 1, 3, or 5; or

iv. Informing any other person about their rights under the DBA, Related Acts, or 29 CFR parts 1, 3, or 5.

B. Contract Work Hours and Safety Standards Act (CWHSSA)

The Agency Head must cause or require the contracting officer to insert the following clauses set forth in 29 CFR 5.5(b)(1), (2), (3), (4), and (5) in full, or (for contracts covered by the Federal Acquisition Regulation) by reference, in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses must

be inserted in addition to the clauses required by 29 CFR 5.5(a) or 4.6. As used in this paragraph, the terms “laborers and mechanics” include watchpersons and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in 29 CFR 5.5(b)(1) the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchpersons and guards, employed in violation of the clause set forth in 29 CFR 5.5(b)(1), in the sum of \$31 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in 29 CFR 5.5(b)(1).

3. Withholding for unpaid wages and liquidated damages

i. Withholding process The U.S Department of Housing and Urban Development or the recipient of Federal assistance may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in 29 CFR 5.5(b) on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in 29 CFR 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

ii Priority to withheld funds The Department has priority to funds withheld or to be withheld in accordance with 29 CFR 5.5(a)(2)(i) or (b)(3)(i), or both, over claims to those funds by:

- A.** A contractor’s surety(ies), including without limitation performance bond sureties and payment bond sureties;
- B.** A contracting agency for its procurement costs;
- C.** A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor’s bankruptcy estate;
- D.** A contractor’s assignee(s);
- E.** A contractor’s successor(s); or
- F.** A claim asserted under the Prompt Payment Act, 31 U.S.C. 3901-3907.

4. Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses set forth in 29 CFR 5.5(b)(1) through (5) and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in 29 CFR 5.5(b)(1) through (5). In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss,

due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

- 5 Anti-retaliation** It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

- i. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in 29 CFR part 5;
- ii. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or 29 CFR part 5;
- iii. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or 29 CFR part 5; or
- iv. Informing any other person about their rights under CWHSSA or 29 CFR part 5.

- C. CWHSSA required records clause** In addition to the clauses contained in 29 CFR 5.5(b), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other laws referenced by 29 CFR 5.1, the Agency Head must cause or require the contracting officer to insert a clause requiring that the contractor or subcontractor must maintain regular payrolls and other basic records during the course of the work and must preserve them for a period of 3 years after all the work on the prime contract is completed for all laborers and mechanics, including guards and watchpersons, working on the contract. Such records must contain the name; last known address, telephone number, and email address; and social security number of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid; daily and weekly number of hours actually worked; deductions made and actual wages paid. Further, the Agency Head must cause or require the contracting officer to insert in any such contract a clause providing that the records to be maintained under this paragraph must be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview workers during working hours on the job.

- D. Incorporation of contract clauses and wage determinations by reference** Although agencies are required to insert the contract clauses set forth in this section, along with appropriate wage determinations, in full into covered contracts, and contractors and subcontractors are required to insert them in any lower-tier subcontracts, the incorporation by reference of the required contract clauses and appropriate wage determinations will be given the same force and effect as if they were inserted in full text.

- E. Incorporation by operation of law** The contract clauses set forth in this section (or their equivalent under the Federal Acquisition Regulation), along with the correct wage determinations, will be considered to be a part of every prime contract required by the applicable statutes referenced by 29 CFR 5.1 to include such clauses, and will be effective by operation of law, whether or not they are included or incorporated by reference into such contract, unless the Administrator grants a variance, tolerance, or exemption from the application of this paragraph. Where the clauses and applicable wage determinations are effective by operation of law under this paragraph, the prime contractor must be compensated for any resulting increase in wages in accordance with applicable law.

F. HEALTH AND SAFETY

The provisions of this paragraph (F) are applicable where the amount of the prime contract exceeds **\$100,000**.

1. No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his or her health and safety, as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.
2. The contractor shall comply with all regulations issued by the Secretary of Labor pursuant to 29 CFR Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96), 40 U.S.C. § 3701 et seq.
3. The contractor shall include the provisions of this paragraph in every subcontract, so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

APPENDIX C

HUD Section 3 Compliance

HUD Section 3 Compliance

- a. The work to be performed under this Contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended (12 U.S.C. §1701u) ("**Section 3**"). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted developments covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons including persons who are recipients of HUD assistance for housing, with preference for both targeted workers living in the service area or neighborhood of the Development and Youthbuild participants, as defined at 24 CFR Part 75 ("**Section 3 Regulations**")..
- b. The Parties agree to comply with HUD's regulations in Section 3 Regulations, which implement Section 3. As evidenced by their execution of this Contract, the Parties certify that they are under no contractual or other impediment that would prevent them from complying with the Section 3 Regulations.
- c. The Development Owner agrees to send to each labor organization or representative of workers with which the Development Owner has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the Development Owner's commitments under this section of the Contract, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference and shall set forth the following: (i) minimum number and job titles subject to hire, (ii) availability of apprenticeship and training positions, (iii) qualifications for each, (iv) name and location of the person(s) taking applications for each of the positions, and (v) the anticipated date the work shall begin.
- d. The Development Owner agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in Section 3 Regulations and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in Section 3 Regulations. The Development Owner will not subcontract with any subcontractor where the Development Owner has notice or knowledge that the subcontractor has been found in violation of the regulations in Section 3 Regulations.
- e. The Development Owner will certify that any vacant employment positions, including training positions, that are filled (i) after a contractor is selected but before the contract is executed, and (ii) with persons other than those to whom the regulations of Section 3 Regulations require employment opportunities to be directed, were not filled to circumvent the Development Owner's obligations under Section 3 Regulations.
- f. Noncompliance with HUD's regulations in Section 3 Regulations may result in sanctions, termination of this Contract for default, and debarment or suspension from future HUD assisted contracts.

APPENDIX D

**US Dept of Labor – Payroll Form
And other required forms**

PAYROLL
(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)



Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

Rev. Dec. 2008

OMB No.:1235-0008
Expires: 07/31/2024

NAME OF CONTRACTOR ☐				OR SUBCONTRACTOR ☐				ADDRESS												
PAYROLL NO.				FOR WEEK ENDING				PROJECT AND LOCATION				PROJECT OR CONTRACT NO.								
(1)	(2)	(3)	(4) DAY AND DATE	(5)	(6)	(7)	(8) DEDUCTIONS				(9)									
NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	NO. OF WITHHOLDING EXEMPTIONS	WORK CLASSIFICATION	OT OR ST	HOURS WORKED EACH DAY							TOTAL HOURS	RATE OF PAY	GROSS AMOUNT EARNED	FICA	WITH- HOLDING TAX			OTHER	TOTAL DEDUCTIONS	NET WAGES PAID FOR WEEK
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

Date _____

I, _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by _____ on the _____
(Contractor or Subcontractor)
_____ ; that during the payroll period commencing on the _____
(Building or Work)
_____ day of _____, _____, and ending the _____ day of _____, _____,
all persons employed on said project have been paid the full weekly wages earned, that no rebates have
been or will be made either directly or indirectly to or on behalf of said
_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly
from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part
3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948,
63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are
correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the
applicable wage rates contained in any wage determination incorporated into the contract; that the classifications
set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship
program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and
Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered
with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:
(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ — in addition to the basic hourly wage rates paid to each laborer or mechanic listed in
the above referenced payroll, payments of fringe benefits as listed in the contract
have been or will be made to appropriate programs for the benefit of such employees,
except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ — Each laborer or mechanic listed in the above referenced payroll has been paid,
as indicated on the payroll, an amount not less than the sum of the applicable
basic hourly wage rate plus the amount of the required fringe benefits as listed
in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR
SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 3729 OF
TITLE 31 OF THE UNITED STATES CODE.

CERTIFICATION OF UNDERSTANDING
AND AUTHORIZATION

PROJECT NAME: _____

PROJECT NUMBER: _____

This is to certify that the principals and the authorized payroll officer, below, have read and understand the Minutes of the Preconstruction Conference and the Labor Standards clauses pertaining to the subject project.

The following person(s) is designated as the payroll officer for the undersigned and is authorized to sign the Statement of Compliance which will accompany our weekly certified payroll reports for this project:

Payroll Officer (Name)

Payroll Officer (Signature)

IRS Employer Identification Number

Contractor/Subcontractor

By _____
Signature

Title

Phone Number

Date

FORM A-2

To be completed by
All Subcontractors

**CERTIFICATION OF UNDERSTANDING
AND AUTHORIZATION**

PROJECT NAME: _____

PROJECT NUMBER: _____

A copy of the Minutes of the Preconstruction Conference and the Labor Standards clauses pertaining to the project are on file with the Prime Contractor. A copy of the Federal Wage Decision applicable to this project is also available on file with the Prime Contractor.

The following person(s) is designated as the payroll officer for the undersigned and is authorized to sign the Statement of Compliance which will accompany our weekly certified payroll reports for this project:

Payroll Officer (Name)

Payroll Officer (Signature)

IRS Employer Identification Number

Contractor/Subcontractor

By _____
Signature

Title

Phone Number

Date

FORM BTo be completed by Prime
and All Subcontractors**CERTIFICATION OF APPLICABLE FRINGE BENEFIT PAYMENTS**

Project Name: _____

Project Number: _____

Use this form to identify those bona fide fringe benefit plan(s) in which your employees are participating. List third party plans, funds or trustees to which your firm makes fringe benefit payments in the interest of your employees. Provide an hourly equivalent of each fringe type (in dollars). If your firm does not participate in approved fringe benefit type plans, then check the box below.

Classification and
Fringe Benefit Provided:Hourly
Rate:Name and Address of
Plan or Fund:

1)	<u>Health and Welfare</u>	_____	_____
	<u>Pension</u>	_____	_____
	<u>Vacation</u>	_____	_____
	<u>Apprentice/Training</u>	_____	_____
	_____	_____	_____
2)	<u>Health and Welfare</u>	_____	_____
	<u>Pension</u>	_____	_____
	<u>Vacation</u>	_____	_____
	<u>Apprentice/Training</u>	_____	_____
	_____	_____	_____
3)	<u>Health and Welfare</u>	_____	_____
	<u>Pension</u>	_____	_____
	<u>Vacation</u>	_____	_____
	<u>Apprentice/Training</u>	_____	_____
	_____	_____	_____

OR: (Check if Applicable)

☐ I certify that I do not make payments to approved fringe benefit plans, funds or programs._____
Contractor Company NameBy _____
Signature_____
Phone Number_____
Title_____
Date

CONTRACTORS NOTIFICATION OF SUBCONTRACTS AWARDED

(One to be completed before commencement of work, one prior to final payment request,
and/or if any change or addition in subcontractors occurs.)

FORM C

To be completed by
Prime Contractor only

Project Name: _____

Covered Area: Sonoma County

Sub-Contractor Name & Address	Contract Amount	Tax ID Number	MBE/ WBE Yes or No	Estimated		Crafts to be used
				Start Date	End Date	

The Undersigned hereby certifies that:

1. The Equal Opportunity clauses are indicated in each of the listed subcontracts
2. Each Subcontractor or lower tier Subcontractor has been notified in writing prior to their beginning construction, of his respective obligations under the Affirmative Action Requirements, if applicable.

By: _____
Signature

General Contractor

Name and Title

Contractor's Address

CLASSIFICATION/PREVAILING WAGE SHEET

Prime Contractor and Sub Contractors: Please complete this form in its entirety by stating the name of the project, the Federal General Wage Decision number, Modification Number, and publication date found on the wage decision locked in for this project. List all trade classifications likely to be used on this project.

Note that there are no exceptions to the prevailing wage requirements for relatives or for self-employed laborers and mechanics.

Project Name: _____

General Decision CA # _____ **Modification #** _____ **Publication Date:** _____

Classification Title	Classification Number	Wage Rate	Fringe Benefit	Total

Contractor/Subcontractor Company Name

Authorized Signature

Phone Number

Date

FORM E

To be completed by Prime
and all Subcontractors

Davis-Bacon Apprenticeship Training Verification & Certification

The only workers who can be paid less than the wage rate on the wage decision for their work classification are “apprentices” and “trainees” registered in approved apprenticeship or training programs, including Step-Up apprenticeship programs designed for Davis-Bacon construction work. Approved programs are those that have been registered with the DOL, Bureau of Apprenticeship and Training (BAT) or a BAT-recognized State Apprenticeship Agency (SAC). Apprentices and trainees are paid wage rates in accordance with the wage schedule in the approved program, usually expressed as a series of percentages tied to the amount of time spent in the program.

Probationary Apprentice: can be paid as an apprentice if the DOL or SAC has certified that the person is eligible for probationary employment as an apprentice.

Pre-apprentice: a trainee that is not registered in a program and who hasn’t been DOL or SAC certified for probationary apprenticeship is NOT considered to be an “apprentice” and must be paid the full journeyman’s rate on the wage decision for the classification of work they perform.

Documentation of registration must be attached. Please provide a copy of the union dispatch letter of other approved program membership.

**Name of Union
or Training**

Program: _____ **Telephone:** _____

Address: _____ **Fax:** _____

City, State, Zip: _____ **E-mail
address:** _____

Contact Person’s Name: _____

I certify that I have read, understand, and will abide by the above requirements.

Authorized Company Official Name

Title

Signature

Date

**Apprentice(s) to be employed on
this project:**

Social Security #	Last Name	First Name	Wage Rate	% Journey Rate	Date Registered

Form F

To be completed by Prime and
Subcontractors if Certified Payroll
Reports are not consecutively numbered

Notification of No Work Performed

There may be instances where your firm has no workers on this project for an entire work week. This form may be used to communicate that fact.

(NOTE: If payrolls are numbered sequentially, this form is not necessary)

Project Name: _____

Contractor Name: _____

Payroll Number: _____

Week Ending: _____

I do hereby state that I pay or supervise the payment of employees of the above mentioned contractor and that no construction workers spent time in this project for the week identified above.

Signature

Phone Number

Date

APPENDIX E

Wage Decision 2025 - California

Statement of Applicable Wage Decision

The following Federal Wage Decision is included as general information. It was the most current wage decision available at the time these bid documents were assembled. The Federal Wage Decision is updated periodically by the U.S. Department of Labor. The wage decision applicable for this project will be locked in 10 days prior to the bid opening date and will be made part of the contract by addendum.

Contact the Community Development Commission at the following address if you have any questions regarding the applicable wage decision:

Sonoma County Community Development Commission
141 Stony Circle, Suite 210
Santa Rosa, CA 95407

(707) 565-7514

"General Decision Number: CA20250007 09/26/2025

Superseded General Decision Number: CA20240007

State: California

Construction Types: Building, Heavy (Heavy and Dredging)
and
Highway

Counties: Alpine, Amador, Butte, Colusa, El Dorado, Glenn,
Lassen, Marin, Modoc, Napa, Nevada, Placer, Plumas,
Sacramento,
Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Tehama,
Trinity, Yolo and Yuba Counties in California.

BUILDING CONSTRUCTION PROJECTS (excluding Amador County
only);
DREDGING CONSTRUCTION PROJECTS (does not include hopper
dredge
work); HEAVY CONSTRUCTION PROJECTS (does not include water
well
drilling); AND HIGHWAY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are
generally
required to pay at least the applicable minimum wage rate
required under Executive Order 14026 or Executive Order
13658.

Please note that these Executive Orders apply to covered
contracts entered into by the federal government that are
subject to the Davis-Bacon Act itself, but do not apply to
contracts subject only to the Davis-Bacon Related Acts,
including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered	. Executive Order 14026
into on or after January 30,	generally applies to the

2022, or the contract is	contract.
renewed or extended (e.g., an	. The contractor must pay
option is exercised) on or	all covered workers at
after January 30, 2022:	least \$17.75 per hour (or
	the applicable wage rate
	listed on this wage
	determination, if it is
	higher) for all hours
	spent performing on the
	contract in 2025.

If the contract was awarded on	. Executive Order 13658
or between January 1, 2015 and	generally applies to the
January 29, 2022, and the	contract.
contract is not renewed or	. The contractor must pay
all	
extended on or after January	covered workers at least
30, 2022:	\$13.30 per hour (or the
	applicable wage rate
listed	
	on this wage
determination,	
	if it is higher) for all
	hours spent performing on
	that contract in 2025.

| _____ |
_____|

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/03/2025
1	01/10/2025
2	02/07/2025
3	02/21/2025
4	02/28/2025
5	03/07/2025
6	03/21/2025
7	06/13/2025
8	06/27/2025
9	07/04/2025
10	07/18/2025
11	08/01/2025
12	08/08/2025
13	08/15/2025
14	08/22/2025
15	09/05/2025
16	09/19/2025
17	09/26/2025

ASBE0016-001 01/01/2024

AREA 1: MARIN, NAPA, SAN BENITO, SAN FRANCISCO, SOLANO, & SONOMA COUNTIES

AREA 2: ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN,

MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA,
SISKIYOU, SUTTER, TEHEMA, TRINITY, YOLO, & YUBA COUNTIES

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, Protective Coverings, Coatings, and Finishes to all types of mechanical systems)		
Area 1.....	\$ 84.76	25.07
Area 2.....	\$ 64.56	25.07

* ASBE0016-007 05/01/2025

AREA 1 : ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN,
LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA,
SIERRA, SISKIYOU, SOLANO, SONOMA, SUTTER, TEHAMA, TRINITY,
YOLO
& YUBA COUNTIES

AREA 2: MARIN & NAPA COUNTIES

	Rates	Fringes
Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not)		
AREA 1.....	\$ 35.31	12.75
AREA 2.....	\$ 44.73	12.75

BOIL0549-002 01/01/2021

	Rates	Fringes
BOILERMAKER		
(1) Marin & Solano Counties..	\$ 49.62	41.27
(2) Remaining Counties.....	\$ 45.60	38.99

 BRCA0003-001 08/01/2024

	Rates	Fringes
MARBLE FINISHER.....	\$ 42.06	19.80

 BRCA0003-004 05/01/2024

AREA 1: ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN,
 LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA,
 SIERRA, SUTTER, TEHAMA, YOLO AND YUBA COUNTIES

AREA 2: MARIN, NAPA, SISKIYOU, SOLANO, SONOMA AND TRINITY
 COUNTIES

	Rates	Fringes
BRICKLAYER		
AREA 1.....	\$ 52.76	25.01
AREA 2.....	\$ 57.02	28.50

SPECIALTY PAY:

(A) Underground work such as tunnel work, sewer work,
 manholes, catch basins, sewer pipes and telephone conduit
 shall be paid \$1.25 per hour above the regular rate.

Work

in direct contact with raw sewage shall receive \$1.25 per
 hour in addition to the above.

(B) Operating a saw or grinder shall receive \$1.25 per
 hour
 above the regular rate.

(C) Guniting nozzle person shall receive \$1.25 per hour
 above
 the regular rate.

BRCA0003-008 07/01/2024

	Rates	Fringes
TERRAZZO FINISHER.....	\$ 44.93	20.98
TERRAZZO WORKER/SETTER.....	\$ 60.58	29.79

BRCA0003-010 04/01/2024

	Rates	Fringes
TILE FINISHER		
Area 1.....	\$ 35.00	17.44
Area 2.....	\$ 34.76	19.22
Area 3.....	\$ 37.75	19.28
Area 4.....	\$ 35.78	19.23
Tile Layer		
Area 1.....	\$ 55.55	21.08
Area 2.....	\$ 55.17	22.52
Area 3.....	\$ 59.92	22.62
Area 4.....	\$ 56.79	22.54

AREA 1: Butte, Colusa, El Dorado, Glenn, Lassen, Modoc,
Nevada, Placer, Plumas, Sacramento, Shasta, Sierra,
Sutter,
Tehema, Yolo, Yuba
AREA 2: Alpine, Amador
AREA 3: Marin, Napa, Solano, Siskiyou
AREA 4: Sonoma

BRCA0003-014 08/01/2024

	Rates	Fringes
MARBLE MASON.....	\$ 61.72	30.31

CARP0034-001 07/01/2021

	Rates	Fringes
Diver		
Assistant Tender, ROV		
Tender/Technician.....	\$ 54.10	34.69
Diver standby.....	\$ 60.51	34.69
Diver Tender.....	\$ 59.51	34.69
Diver wet.....	\$ 103.62	34.69
Manifold Operator (mixed		
gas).....	\$ 64.51	34.69
Manifold Operator (Standby).	\$ 59.51	34.69

DEPTH PAY (Surface Diving):

050 to 100 ft	\$2.00 per foot
101 to 150 ft	\$3.00 per foot
151 to 220 ft	\$4.00 per foot
221 ft.-deeper	\$5.00 per foot

SATURATION DIVING:

The standby rate shall apply until saturation starts.
The
saturation diving rate applies when divers are under
pressure continuously until work task and decompression
are
complete. The diver rate shall be paid for all saturation
hours.

DIVING IN ENCLOSURES:

Where it is necessary for Divers to enter pipes or
tunnels,
or other enclosures where there is no vertical ascent,
the
following premium shall be paid: Distance traveled from
entrance 26 feet to 300 feet: \$1.00 per foot. When it
is
necessary for a diver to enter any pipe, tunnel or other
enclosure less than 48"" in height, the premium will be
\$1.00 per foot.

WORK IN COMBINATION OF CLASSIFICATIONS:

Employees working in any combination of classifications
within the diving crew (except dive supervisor) in a
shift

are paid in the classification with the highest rate for that shift.

CARP0034-003 07/01/2021

	Rates	Fringes
Piledriver.....	\$ 54.10	34.69

CARP0035-001 08/01/2020

AREA 1: MARIN, NAPA, SOLANO & SONOMA

AREA 3: SACRAMENTO, WESTERN EL DORADO (Territory west of an including highway 49 and the territory inside the city limits of Placerville), WESTERN PLACER (Territory west of and including highway 49), & YOLO

AREA 4: ALPINE, BUTTE, COLUSA, EASTERN EL DORADO, GLENN, LASSEN, MODOC, NEVADA, EASTERN PLACER, PLUMAS, SHASTA, SIERRA, SISKIYOU, SUTTER, TEHAMA, TRINITY, & YUBA

	Rates	Fringes
Drywall Installers/Lathers:		
Area 1.....	\$ 52.65	31.26
Area 3.....	\$ 47.27	31.26
Area 4.....	\$ 45.92	31.26
Drywall Stocker/Scrapper		
Area 1.....	\$ 26.33	18.22
Area 3.....	\$ 23.64	18.22
Area 4.....	\$ 22.97	18.22

CARP0035-009 07/01/2020

Marin County

	Rates	Fringes
CARPENTER		
Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 52.80	30.82
Journeyman Carpenter.....	\$ 52.65	30.82
Millwright.....	\$ 52.75	32.41

CARP0035-010 07/01/2020

AREA 1: Marin, Napa, Solano & Sonoma Counties

AREA 2: Monterey, San Benito and Santa Cruz

AREA 3: Alpine, Butte, Colusa, El Dorado, Glenn, Lassen,
Modoc,
Nevada, Placer, Plumas, Sacramento, Shasta, Sierra,
Siskiyou,
Sutter, Tehama, Trinity, Yolo & Yuba counties

	Rates	Fringes
Modular Furniture Installer		
Area 1		
Installer.....	\$ 28.76	22.53
Lead Installer.....	\$ 32.21	23.03
Master Installer.....	\$ 36.43	23.03
Area 2		
Installer.....	\$ 26.11	22.53
Lead Installer.....	\$ 29.08	23.03
Master Installer.....	\$ 32.71	23.03
Area 3		
Installer.....	\$ 25.16	22.53
Lead Installer.....	\$ 27.96	23.03
Master Installer.....	\$ 31.38	23.03

CARP0046-001 07/01/2023

El Dorado (West), Placer (West), Sacramento and Yolo
Counties

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 60.39	33.52
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 54.66	33.52
Journeyman Carpenter.....	\$ 54.51	33.52
Millwright.....	\$ 57.01	35.11

Footnote: Placer County (West) includes territory West of
and
including Highway 49 and El Dorado County (West) includes
territory West of and including Highway 49 and territory
inside the city limits of Placerville.

CARP0046-002 07/01/2023

Alpine, Colusa, El Dorado (East), Nevada, Placer (East),
Sierra, Sutter and Yuba Counties

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 60.39	33.52
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 53.31	33.52
Journeyman Carpenter.....	\$ 53.16	33.52
Millwright.....	\$ 55.66	35.11

CARP0152-003 07/01/2020

Amador County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 45.57	30.82
Journeyman Carpenter.....	\$ 45.42	30.82
Millwright.....	\$ 47.92	32.41

CARP0180-001 07/01/2021

Solano County

	Rates	Fringes
Carpenters		
Bridge Builder/Highway Carpenter.....	\$ 54.85	31.49
Hardwood Floorlayer, Shingler, Power Saw Operator, Steel Scaffold & Steel Shoring Erector, Saw Filer.....	\$ 55.00	31.49
Journeyman Carpenter.....	\$ 54.85	31.49
Millwright.....	\$ 54.95	33.08

CARP0751-001 07/01/2021

Napa and Sonoma Counties

Rates	Fringes

Carpenters

Bridge Builder/Highway		
Carpenter.....	\$ 54.85	31.49
Hardwood Floorlayer,		
Shingler, Power Saw		
Operator, Steel Scaffold &		
Steel Shoring Erector, Saw		
Filer.....	\$ 55.00	31.49
Journeyman Carpenter.....	\$ 54.85	31.49
Millwright.....	\$ 54.95	33.08

CARP1599-001 07/01/2020

Butte, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou,
Tehama
and Trinity Counties

	Rates	Fringes

Carpenters

Bridge Builder/Highway		
Carpenter.....	\$ 52.65	30.82
Hardwood Floorlayer,		
Shingler, Power Saw		
Operator, Steel Scaffold &		
Steel Shoring Erector, Saw		
Filer.....	\$ 45.57	30.82
Journeyman Carpenter.....	\$ 45.42	30.82
Millwright.....	\$ 47.92	32.41

ELEC0180-001 06/01/2025

NAPA AND SOLANO COUNTIES

	Rates	Fringes

CABLE SPLICER.....	\$ 69.26	3%+29.28
ELECTRICIAN.....	\$ 61.56	3%+29.28

ELEC0180-003 12/01/2023

NAPA AND SOLANO COUNTIES

	Rates	Fringes
Sound & Communications		
Installer.....	\$ 48.44	27.60
Technician.....	\$ 55.71	27.82

SCOPE OF WORK INCLUDES-

SOUND & VOICE TRANSMISSION (Music, Intercom, Nurse Call, Telephone); FIRE ALARM SYSTEMS [excluding fire alarm work

when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs],

TELEVISION & VIDEO SYSTEMS, SECURITY SYSTEMS, COMMUNICATIONS

SYSTEMS that transmit or receive information and/or control

systems that are intrinsic to the above.

EXCLUDES-

Excludes all other data systems or multiple systems which include control function or power supply; excludes installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having

floors located more than 75' above the lowest floor level

having building access); excludes energy management systems.

ELEC0340-002 03/01/2025

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, NEVADA, PLACER, PLUMAS, SACRAMENTO, TRINITY, YOLO, YUBA COUNTIES

Rates	Fringes

Communications System

Sound & Communications

Installer.....\$ 40.00 25.50

Sound & Communications

Technician.....\$ 46.00 25.68

SCOPE OF WORK

Includes the installation testing, service and maintenance,
of the following systems which utilize the transmission and/or transference of voice, sound, vision and digital for
commercial, education, security and entertainment purposes
for the following TV monitoring and surveillance, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call system, radio page, school intercom and sound, burglar alarms, and
low voltage master clock systems.

A. SOUND AND VOICE TRANSMISSION/TRANSFERENCE SYSTEMS

Background foreground music Intercom and telephone interconnect systems, Telephone systems, Nurse call systems, Radio page systems, School intercom and sound systems, Burglar alarm systems, Low voltage master clock systems, Multi-media/multiplex systems, Sound and musical entertainment systems, RF systems, Antennas and Wave Guide.

B. FIRE ALARM SYSTEMS

Installation, wire pulling and testing

C. TELEVISION AND VIDEO SYSTEMS Television monitoring and

surveillance systems, Video security systems, Video entertainment systems, Video educational systems, Microwave transmission systems, CATV and CCTV

D. SECURITY SYSTEMS Perimeter security systems

Vibration sensor systems Card access systems
Access
control systems Sonar/infrared monitoring equipment

E. COMMUNICATIONS SYSTEMS THAT TRANSMIT OR RECEIVE
INFORMATION AND/OR CONTROL SYSTEMS THAT ARE INTRINSIC
TO
THE ABOVE LISTED SYSTEMS SCADA (Supervisory Control
and
Data Acquisition) PCM (Pulse Code Modulation)
Inventory Control Systems Digital Data Systems
Broadband and Baseband and Carriers Point of Sale
Systems VSAT Data Systems Data Communication
Systems RF and Remote Control Systems Fiber Optic
Data Systems WORK EXCLUDED Raceway systems are not
covered

(excluding Ladder-Rack for the purpose of the above
listed
systems). Chases and/or nipples (not to exceed 10 feet)
may be installed on open wiring systems. Energy
management

systems. SCADA (Supervisory Control and Data
Acquisition)

when not intrinsic to the above listed systems (in the
scope). Fire alarm systems when installed in raceways
(including wire and cable pulling) shall be performed at
the electrician wage rate, when either of the following
two

(2) conditions apply:

1. The project involves new or major remodel building
trades
construction.

2. The conductors for the fire alarm system are
installed in
conduit.

ELEC0340-003 08/01/2025

ALPINE (West of Sierra Mt. Watershed), AMADOR, BUTTE,
COLUSA,
EL DORADO (West of Sierra Mt. Watershed), GLENN, LASSEN,
NEVADA

(West of Sierra Mt. Watershed), PLACER, PLUMAS, SACRAMENTO,
SHASTA, SIERRA (West of Sierra Mt. Watershed), SUTTER,
TEHAMA,
TRINITY, YOLO & YUBA COUNTIES

	Rates	Fringes
ELECTRICIAN		
Remaining area.....	\$ 52.70	38.68
Sierra Army Depot, Herlong..	\$ 48.83	18.54
Tunnel work.....	\$ 41.01	18.54

CABLE SPLICER: Receives 110% of the Electrician basic
hourly
rate.

ELEC0401-005 01/01/2025

ALPINE (east of the main watershed divide), EL DORADO (east
of
the main watershed divide), NEVADA (east of the main
watershed), PLACER (east of the main watershed divide) and
SIERRA (east of the main watershed divide) COUNTIES:

	Rates	Fringes
ELECTRICIAN.....	\$ 48.50	23.04

ZONE RATE:

70-90 miles - \$10.00 per hour
91+ miles - \$15.00 per hour

ELEC0551-004 06/01/2024

MARIN AND SONOMA COUNTIES

Rates	Fringes

ELECTRICIAN.....\$ 59.17 32.04

ELEC0551-005 12/01/2024

MARIN & SONOMA COUNTIES

	Rates	Fringes
Sound & Communications		
Installer.....	\$ 51.59	28.20
Technician.....	\$ 59.33	28.43

SCOPE OF WORK INCLUDES-

SOUND & VOICE TRANSMISSION (Music, Intercom, Nurse Call, Telephone); FIRE ALARM SYSTEMS [excluding fire alarm work

when installed in raceways (including wire and cable pulling) and when performed on new or major remodel building projects or jobs],

TELEVISION & VIDEO SYSTEMS, SECURITY SYSTEMS, COMMUNICATIONS

SYSTEMS that transmit or receive information and/or control

systems that are intrinsic to the above.

EXCLUDES-

Excludes all other data systems or multiple systems which include control function or power supply; excludes installation of raceway systems, line voltage work, industrial work, life-safety systems (all buildings having

floors located more than 75' above the lowest floor level

having building access); excludes energy management systems.

ELEC0659-006 01/01/2025

MODOC and SISKIYOU COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 45.58	20.70

ELEC0659-008 02/01/2023

DEL NORTE, MODOC & SISKIYOU COUNTIES

	Rates	Fringes
Line Construction		
(1) Cable Splicer.....	\$ 67.80	4.5%+22.15
(2) Lineman, Pole Sprayer, Heavy Line Equipment Man....	\$ 60.54	4.5%+22.15
(3) Tree Trimmer.....	\$ 37.84	4.5%+14.30
(4) Line Equipment Man.....	\$ 53.82	4.5%+19.40
(5) Powdermen, Jackhammermen.....	\$ 40.37	4.5%+14.30
(6) Groundman.....	\$ 33.37	4.5%+14.30

ELEC1245-004 01/01/2025

ALL COUNTIES EXCEPT DEL NORTE, MODOC & SISKIYOU

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer..	\$ 70.16	24.71
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment).....	\$ 53.30	22.26
(3) Groundman.....	\$ 40.76	21.76
(4) Powderman.....	\$ 51.87	18.79

HOLIDAYS: New Year's Day, M.L. King Day, Memorial Day,
Independence Day, Labor Day, Veterans Day, Thanksgiving
Day

and day after Thanksgiving, Christmas Day

ELEV0008-001 01/01/2025

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 84.05	38.435+a+b

FOOTNOTE:

a. PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.

b. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

ENGI0003-008 08/01/2024

	Rates	Fringes
Dredging: (DREDGING: CLAMSHELL & DIPPER DREDGING; HYDRAULIC SUCTION DREDGING:)		
AREA 1:		
(1) Leverman.....	\$ 60.61	39.55
(2) Dredge Dozer; Heavy duty repairman.....	\$ 55.65	39.55
(3) Booster Pump Operator; Deck Engineer; Deck mate; Dredge Tender; Winch Operator.....	\$ 54.53	39.55
(4) Bargeman; Deckhand; Fireman; Leveehand; Oiler..	\$ 51.23	39.55
AREA 2:		
(1) Leverman.....	\$ 62.61	39.55

(2) Dredge Dozer; Heavy duty repairman.....	\$ 57.65	39.55
(3) Booster Pump Operator; Deck Engineer; Deck mate; Dredge Tender; Winch Operator.....	\$ 56.53	39.55
(4) Bargeman; Deckhand; Fireman; Leveehand; Oiler..	\$ 53.23	39.55

AREA DESCRIPTIONS

AREA 1: ALAMEDA, BUTTE, CONTRA COSTA, KINGS, MARIN,
MERCED,
NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN,
SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS,
SUTTER, YOLO, AND YUBA COUNTIES

AREA 2: MODOC COUNTY

THE REMAINGING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA
2
AS NOTED BELOW:

ALPINE COUNTY:
Area 1: Northernmost part
Area 2: Remainder

CALAVERAS COUNTY:
Area 1: Remainder
Area 2: Eastern part

COLUSA COUNTY:
Area 1: Eastern part
Area 2: Remainder

ELDORADO COUNTY:
Area 1: North Central part
Area 2: Remainder

FRESNO COUNTY:
Area 1: Remainder
Area 2: Eastern part

GLENN COUNTY:

Area 1: Eastern part

Area 2: Remainder

LASSEN COUNTY:

Area 1: Western part along the Southern portion of
border

with Shasta County

Area 2: Remainder

MADERA COUNTY:

Area 1: Except Eastern part

Area 2: Eastern part

MARIPOSA COUNTY

Area 1: Except Eastern part

Area 2: Eastern part

MONTERREY COUNTY

Area 1: Except Southwestern part

Area 2: Southwestern part

NEVADA COUNTY:

Area 1: All but the Northern portion along the border of
Sierra County

Area 2: Remainder

PLACER COUNTY:

Area 1: All but the Central portion

Area 2: Remainder

PLUMAS COUNTY:

Area 1: Western portion

Area 2: Remainder

SHASTA COUNTY:

Area 1: All but the Northeastern corner

Area 2: Remainder

SIERRA COUNTY:

Area 1: Western part

Area 2: Remainder

SISKIYOU COUNTY:

Area 1: Central part
Area 2: Remainder

SONOMA COUNTY:

Area 1: All but the Northwestern corner
Area 2: Remainder

TEHAMA COUNTY:

Area 1: All but the Western border with Mendocino &
Trinity
Counties
Area 2: Remainder

TRINITY COUNTY:

Area 1: East Central part and the Northeastern border
with
Shasta County
Area 2: Remainder

TUOLUMNE COUNTY:

Area 1: Except Eastern part
Area 2: Eastern part

ENGI0003-019 06/30/2025

SEE AREA DESCRIPTIONS BELOW

	Rates	Fringes
OPERATOR: Power Equipment (LANDSCAPE WORK ONLY)		
GROUP 1		
AREA 1.....	\$ 55.85	28.56
AREA 2.....	\$ 57.85	28.56
GROUP 2		
AREA 1.....	\$ 52.25	28.56
AREA 2.....	\$ 54.25	28.56
GROUP 3		
AREA 1.....	\$ 47.64	28.56
AREA 2.....	\$ 49.64	28.56

GROUP DESCRIPTIONS:

GROUP 1: Landscape Finish Grade Operator: All finish grade work regardless of equipment used, and all equipment with a rating more than 65 HP.

GROUP 2: Landscape Operator up to 65 HP: All equipment with a manufacturer's rating of 65 HP or less except equipment covered by Group 1 or Group 3. The following equipment shall be included except when used for finish work as long as manufacturer's rating is 65 HP or less: A-Frame and Winch Truck, Backhoe, Forklift, Hydragraphic Seeder Machine, Roller, Rubber-Tired and Track Earthmoving Equipment, Skiploader, Straw Blowers, and Trencher 31 HP up to 65 HP.

GROUP 3: Landscae Utility Operator: Small Rubber-Tired Tractor, Trencher Under 31 HP.

AREA DESCRIPTIONS:

AREA 1: ALAMEDA, BUTTE, CONTRA COSTA, KINGS, MARIN, MERCED, NAPA, SACRAMENTO, SAN BENITO, SAN FRANCISCO, SAN JOAQUIN, SAN MATEO, SANTA CLARA, SANTA CRUZ, SOLANO, STANISLAUS, SUTTER, YOLO, AND YUBA COUNTIES

AREA 2 - MODOC COUNTY

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA 2 AS NOTED BELOW:

ALPINE COUNTY:

Area 1: Northernmost part

Area 2: Remainder

CALAVERAS COUNTY:

Area 1: Except Eastern part

Area 2: Eastern part

COLUSA COUNTY:

Area 1: Eastern part

Area 2: Remainder

DEL NORTE COUNTY:

Area 1: Extreme Southwestern corner

Area 2: Remainder

ELDORADO COUNTY:

Area 1: North Central part

Area 2: Remainder

FRESNO COUNTY

Area 1: Except Eastern part

Area 2: Eastern part

GLENN COUNTY:

Area 1: Eastern part

Area 2: Remainder

HUMBOLDT COUNTY:

Area 1: Except Eastern and Southwestern parts

Area 2: Remainder

LAKE COUNTY:

Area 1: Southern part

Area 2: Remainder

LASSEN COUNTY:

Area 1: Western part along the Southern portion of border
with Shasta County

Area 2: Remainder

MADERA COUNTY

Area 1: Remainder

Area 2: Eastern part

MARIPOSA COUNTY

Area 1: Remainder

Area 2: Eastern part

MENDOCINO COUNTY:

Area 1: Central and Southeastern parts

Area 2: Remainder

MONTEREY COUNTY

Area 1: Remainder

Area 2: Southwestern part

NEVADA COUNTY:

Area 1: All but the Northern portion along the border of
Sierra County

Area 2: Remainder

PLACER COUNTY:

Area 1: All but the Central portion

Area 2: Remainder

PLUMAS COUNTY:

Area 1: Western portion

Area 2: Remainder

SHASTA COUNTY:

Area 1: All but the Northeastern corner

Area 2: Remainder

SIERRA COUNTY:

Area 1: Western part

Area 2: Remainder

SISKIYOU COUNTY:

Area 1: Central part

Area 2: Remainder

SONOMA COUNTY:

Area 1: All but the Northwestern corner

Area 2: Reaminder

TEHAMA COUNTY:

Area 1: All but the Western border with mendocino &
Trinity
Counties

Area 2: Remainder

TRINITY COUNTY:

Area 1: East Central part and the Northeaster border with
Shasta County

Area 2: Remainder

TULARE COUNTY;

Area 1: Remainder

Area 2: Eastern part

TUOLUMNE COUNTY:

Area 1: Remainder

Area 2: Eastern Part

ENGI0003-038 06/30/2025

""AREA 1"" WAGE RATES ARE LISTED BELOW

""AREA 2"" RECEIVES AN ADDITIONAL \$2.00 PER HOUR ABOVE AREA
1
RATES.

SEE AREA DEFINITIONS BELOW

	Rates	Fringes
OPERATOR: Power Equipment		
(AREA 1:)		
GROUP 1.....	\$ 66.96	32.53
GROUP 2.....	\$ 65.43	32.53
GROUP 3.....	\$ 63.95	32.53
GROUP 4.....	\$ 62.57	32.53
GROUP 5.....	\$ 61.30	32.53
GROUP 6.....	\$ 59.98	32.53
GROUP 7.....	\$ 58.84	32.53
GROUP 8.....	\$ 57.70	32.53
GROUP 8-A.....	\$ 55.49	32.53
OPERATOR: Power Equipment		
(Cranes and Attachments -		
AREA 1:)		
GROUP 1		
Cranes.....	\$ 68.59	32.53
Oiler.....	\$ 43.79	31.15
Truck crane oiler.....	\$ 46.08	31.15
GROUP 2		

Cranes.....	\$ 66.08	32.53
Oiler.....	\$ 42.83	31.15
Truck crane oiler.....	\$ 45.07	31.15
GROUP 3		
Cranes.....	\$ 64.34	32.53
Hydraulic.....	\$ 60.61	32.53
Oiler.....	\$ 42.55	31.15
Truck crane oiler.....	\$ 44.83	31.15
GROUP 4		
Cranes.....	\$ 61.30	32.53
OPERATOR: Power Equipment		
(Piledriving - AREA 1:)		
GROUP 1		
Lifting devices.....	\$ 52.64	31.15
Oiler.....	\$ 43.38	31.15
Truck Crane Oiler.....	\$ 45.66	31.15
GROUP 2		
Lifting devices.....	\$ 50.82	31.15
Oiler.....	\$ 43.11	31.15
Truck Crane Oiler.....	\$ 45.41	31.15
GROUP 3		
Lifting devices.....	\$ 49.14	31.15
Oiler.....	\$ 42.89	31.15
Truck Crane Oiler.....	\$ 45.12	31.15
GROUP 4		
Lifting devices.....	\$ 47.37	31.15
GROUP 5		
Lifting devices.....	\$ 44.73	31.15
GROUP 6		
Lifting devices.....	\$ 42.50	31.15
OPERATOR: Power Equipment		
(Steel Erection - AREA 1:)		
GROUP 1		
Cranes.....	\$ 68.81	32.53
Oiler.....	\$ 43.72	31.15
Truck Crane Oiler.....	\$ 45.95	31.15
GROUP 2		
Cranes.....	\$ 67.04	32.53
Oiler.....	\$ 43.45	31.15
Truck Crane Oiler.....	\$ 45.73	31.15
GROUP 3		
Cranes.....	\$ 65.56	32.53
Hydraulic.....	\$ 45.07	31.15
Oiler.....	\$ 43.23	31.15

Truck Crane Oiler.....	\$ 45.46	31.15
GROUP 4		
Cranes.....	\$ 63.54	32.53
GROUP 5		
Cranes.....	\$ 62.24	32.53
OPERATOR: Power Equipment		
(Tunnel and Underground Work		
- AREA 1:)		
SHAFTS, STOPES, RAISES:		
GROUP 1.....	\$ 63.06	32.53
GROUP 1-A.....	\$ 65.53	32.53
GROUP 2.....	\$ 61.80	32.53
GROUP 3.....	\$ 60.47	32.53
GROUP 4.....	\$ 59.33	32.53
GROUP 5.....	\$ 58.19	32.53
UNDERGROUND:		
GROUP 1.....	\$ 62.96	32.53
GROUP 1-A.....	\$ 65.43	32.53
GROUP 2.....	\$ 61.70	32.53
GROUP 3.....	\$ 60.37	32.53
GROUP 4.....	\$ 59.23	32.53
GROUP 5.....	\$ 58.09	32.53

FOOTNOTE: Work suspended by ropes or cables, or work on a Yo-Yo Cat: \$.60 per hour additional.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Operator of helicopter (when used in erection work);
Hydraulic excavator, 7 cu. yds. and over; Power shovels, over 7 cu. yds.

GROUP 2: Highline cableway; Hydraulic excavator, 3-1/2 cu. yds. up to 7 cu. yds.; Licensed construction work boat operator, on site; Power blade operator (finish); Power shovels, over 1 cu. yd. up to and including 7 cu. yds. m.r.c.

GROUP 3: Asphalt milling machine; Cable backhoe; Combination

backhoe and loader over 3/4 cu. yds.; Continuous flight tie
back machine assistant to engineer or mechanic; Crane mounted continuous flight tie back machine, tonnage to apply; Crane mounted drill attachment, tonnage to apply; Dozer, slope brd; Gradall; Hydraulic excavator, up to 3 1/2

cu. yds.; Loader 4 cu. yds. and over; Long reach excavator;

Multiple engine scraper (when used as push pull); Power shovels, up to and including 1 cu. yd.; Pre-stress wire wrapping machine; Side boom cat, 572 or larger; Track loader 4 cu. yds. and over; Wheel excavator (up to and including 750 cu. yds. per hour)

GROUP 4: Asphalt plant engineer/box person; Chicago boom; Combination backhoe and loader up to and including 3/4 cu.

yd.; Concrete batch plant (wet or dry); Dozer and/or push cat; Pull- type elevating loader; Gradesetter, grade checker (GPS, mechanical or otherwise); Grooving and grinding machine; Heading shield operator; Heavy-duty drilling equipment, Hughes, LDH, Watson 3000 or similar; Heavy-duty repairperson and/or welder; Lime spreader; Loader under 4 cu. yds.; Lubrication and service engineer (mobile and grease rack); Mechanical finishers or

spreader

machine (asphalt, Barber-Greene and similar); Miller Formless M-9000 slope paver or similar; Portable crushing and screening plants; Power blade support; Roller operator,

asphalt; Rubber-tired scraper, self-loading (paddle-wheels,

etc.); Rubber- tired earthmoving equipment (scrapers); Slip

form paver (concrete); Small tractor with drag; Soil stabilizer (P & H or equal); Spider plow and spider puller;

Tubex pile rig; Unlicensed constuction work boat operator,

on site; Timber skidder; Track loader up to 4 yds.; Tractor-drawn scraper; Tractor, compressor drill combination; Welder; Woods-Mixer (and other similar Pugmill

equipment)

GROUP 5: Cast-in-place pipe laying machine; Combination slusher and motor operator; Concrete conveyor or concrete pump, truck or equipment mounted; Concrete conveyor, building site; Concrete pump or pumpcrete gun; Drilling equipment, Watson 2000, Texoma 700 or similar; Drilling and

boring machinery, horizontal (not to apply to waterliners,

wagon drills or jackhammers); Concrete mixer/all; Person and/or material hoist; Mechanical finishers (concrete) (Clary, Johnson, Bidwell Bridge Deck or similar types); Mechanical burm, curb and/or curb and gutter machine, concrete or asphalt); Mine or shaft hoist; Portable crusher; Power jumbo operator (setting slip-forms, etc., in

tunnels); Screed (automatic or manual); Self-propelled compactor with dozer; Tractor with boom D6 or smaller; Trenching machine, maximum digging capacity over 5 ft. depth; Vermeer T-600B rock cutter or similar

GROUP 6: Armor-Coater (or similar); Ballast jack tamper; Boom- type backfilling machine; Assistant plant engineer; Bridge and/or gantry crane; Chemical grouting machine, truck-mounted; Chip spreading machine operator; Concrete saw (self-propelled unit on streets, highways, airports and

canals); Deck engineer; Drilling equipment Texoma 600, Hughes 200 Series or similar up to and including 30 ft. m.r.c.; Drill doctor; Helicopter radio operator; Hydro-hammer or similar; Line master; Skidsteer loader, Bobcat larger than 743 series or similar (with attachments); Locomotive; Lull hi-lift or similar; Oiler, truck mounted equipment; Pavement breaker, truck-mounted, with compressor combination; Paving fabric installation and/or laying machine; Pipe bending machine (pipelines only); Pipe wrapping machine (tractor propelled and supported); Screed (except asphaltic concrete paving); Self- propelled pipeline wrapping machine; Tractor; Self-loading chipper; Concrete barrier moving machine

GROUP 7: Ballast regulator; Boom truck or dual-purpose A-frame truck, non-rotating - under 15 tons; Cary lift or

similar; Combination slurry mixer and/or cleaner;
Drilling
equipment, 20 ft. and under m.r.c.; Firetender (hot
plant);
Grouting machine operator; Highline cableway
signalperson;
Stationary belt loader (Kolman or similar); Lift slab
machine (Vagtborg and similar types); Maginnes internal
full slab vibrator; Material hoist (1 drum); Mechanical
trench shield; Pavement breaker with or without
compressor
combination); Pipe cleaning machine (tractor propelled
and
supported); Post driver; Roller (except asphalt); Chip
Seal; Self-propelled automatically applied concrete
curing
mahcine (on streets, highways, airports and canals);
Self-propelled compactor (without dozer); Signalperson;
Slip-form pumps (lifting device for concrete forms); Tie
spacer; Tower mobile; Trenching machine, maximum digging
capacity up to and including 5 ft. depth; Truck- type
loader

GROUP 8: Bit sharpener; Boiler tender; Box operator;
Brakeperson; Combination mixer and compressor
(shotcrete/gunite); Compressor operator; Deckhand; Fire
tender; Forklift (under 20 ft.); Generator;
Gunite/shotcrete equipment operator; Hydraulic monitor;
Ken
seal machine (or similar); Mixermobile; Oiler; Pump
operator; Refrigeration plant; Reservoir-debris tug
(self-
propelled floating); Ross Carrier (construction site);
Rotomist operator; Self-propelled tape machine;
Shuttlecar;
Self-propelled power sweeper operator (includes vacuum
sweeper); Slusher operator; Surface heater;
Switchperson;
Tar pot firetender; Tugger hoist, single drum; Vacuum
cooling plant; Welding machine (powered other than by
electricity)

GROUP 8-A: Elevator operator; Skidsteer loader-Bobcat 743

series or smaller, and similar (without attachments);
Mini
excavator under 25 H.P. (backhoe-trencher); Tub grinder
wood chipper

ALL CRANES AND ATTACHMENTS

GROUP 1: Clamshell and dragline over 7 cu. yds.; Crane,
over
100 tons; Derrick, over 100 tons; Derrick barge
pedestal-mounted, over 100 tons; Self-propelled boom-type
lifting device, over 100 tons

GROUP 2: Clamshell and dragline over 1 cu. yd. up to and
including 7 cu. yds.; Crane, over 45 tons up to and
including 100 tons; Derrick barge, 100 tons and under;
Self-propelled boom-type lifting device, over 45 tons;
Tower crane

GROUP 3: Clamshell and dragline up to and including 1 cu.
yd.; Cranes 45 tons and under; Self-propelled boom-type
lifting device 45 tons and under;

GROUP 4: Boom Truck or dual purpose A-frame truck,
non-rotating over 15 tons; Truck-mounted rotating
telescopic boom type lifting device, Manitex or similar
(boom truck) over 15 tons; Truck-mounted rotating
telescopic boom type lifting device, Manitex or similar
(boom truck) - under 15 tons;

PILEDRIVERS

GROUP 1: Derrick barge pedestal mounted over 100 tons;
Clamshell over 7 cu. yds.; Self-propelled boom-type
lifting
device over 100 tons; Truck crane or crawler, land or
barge
mounted over 100 tons

GROUP 2: Derrick barge pedestal mounted 45 tons to and

including 100 tons; Clamshell up to and including 7 cu. yds.; Self-propelled boom-type lifting device over 45 tons;

Truck crane or crawler, land or barge mounted, over 45 tons

up to and including 100 tons; Fundex F-12 hydraulic pile rig

GROUP 3: Derrick barge pedestal mounted under 45 tons; Self-

propelled boom-type lifting device 45 tons and under; Skid/scow piledriver, any tonnage; Truck crane or crawler, land or barge mounted 45 tons and under

GROUP 4: Assistant operator in lieu of assistant to engineer;

Forklift, 10 tons and over; Heavy-duty repairperson/welder

GROUP 5: Deck engineer

GROUP 6: Deckhand; Fire tender

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STEEL ERECTORS

GROUP 1: Crane over 100 tons; Derrick over 100 tons; Self-propelled boom-type lifting device over 100 tons

GROUP 2: Crane over 45 tons to 100 tons; Derrick under 100 tons; Self-propelled boom-type lifting device over 45 tons to 100 tons; Tower crane

GROUP 3: Crane, 45 tons and under; Self-propelled boom-type lifting device, 45 tons and under

GROUP 4: Chicago boom; Forklift, 10 tons and over; Heavy-duty
repair person/welder

GROUP 5: Boom cat

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TUNNEL AND UNDERGROUND WORK

GROUP 1-A: Tunnel bore machine operator, 20' diameter or more

GROUP 1: Heading shield operator; Heavy-duty
repairperson;
Mucking machine (rubber tired, rail or track type);
Raised
bore operator (tunnels); Tunnel mole bore operator

GROUP 2: Combination slusher and motor operator; Concrete
pump or pumpcrete gun; Power jumbo operator

GROUP 3: Drill doctor; Mine or shaft hoist

GROUP 4: Combination slurry mixer cleaner; Grouting
Machine
operator; Motorman

GROUP 5: Bit Sharpener; Brakeman; Combination mixer and
compressor (guniting); Compressor operator; Oiler; Pump
operator; Slusher operator

AREA DESCRIPTIONS:

POWER EQUIPMENT OPERATORS, CRANES AND ATTACHMENTS, TUNNEL
AND

UNDERGROUND [These areas do not apply to Piledrivers and
Steel Erectors]

AREA 1: DEL NORTE, HUMBOLDT, LAKE, MENDOCINO

AREA 2 -NOTED BELOW

THE REMAINING COUNTIES ARE SPLIT BETWEEN AREA 1 AND AREA
2 AS

NOTED BELOW:

DEL NORTE COUNTY:

Area 1: Extreme Southwest corner

Area 2: Remainder

HUMBOLDT COUNTY:

Area 1: Except Eastern and Southwestern parts

Area 2: Remainder

LAKE COUNTY:

Area 1: Southern part

Area 2: Remainder

MENDOCINO COUNTY:

Area 1: Central and Southeastern Parts

Area 2: Remainder

IRON0118-012 01/01/2025

ALPINE, LASSEN, MODOC, SISKIYOU and TRINITY COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 43.75	34.45

IRON0118-013 01/01/2025

AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, MARIN, NAPA, NEVADA,
PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SOLANO, SONOMA,
SUTTER, TEHAMA, YOLO and YUBA COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 50.70	35.15

LABO0067-003 07/01/2024

AREA ""1"" - MARIN and NAPA COUNTIES

AREA ""2"" - ALPINE, AMADOR, BUTTE COLUSA EL DORADO,
GLENN,
LASSEN, MODOC, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA,
SIERRA, SISKIYOU, SOLANO, SONOMA, SUTTER, TEHAMA, TRINITY,
YOLO, AND YUBA COUNTIES

	Rates	Fringes
LABORER (ASBESTOS/MOLD/LEAD LABORER)		
Marin and Napa Counties.....	\$ 37.75	29.69
Remaining Counties.....	\$ 36.75	29.69

LABO0067-005 01/01/2024

AREA ""A"" - ALAMEDA, CONTRA COSTA, SAN FRANCISCO, SAN
MATEO AND
SANTA CLARA COUNTIES

AREA ""B"" - ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA,
DEL
NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, KINGS, LAKE,
LASSEN,
MADERA, MARIPOSA, MENDOCINO, MERCED, MODOC, MONTEREY,
NEVADA,
PLACER, PLUMAS, SANCREMENTO, SAN BENITO, SAN JOAQUIN, SANTA
CRUZ, SIERRA, SHASTA, SISKIYOU, STANISLAUS, TEHAMA,
TRINITY,
TULARE, TUOLUMNE, YOLO AND YUBA COUNTIES

	Rates	Fringes
LABORER (TRAFFIC CONTROL/LANE CLOSURE)		
Escort Driver, Flag Person		

Area A.....	\$ 37.26	27.32
Area B.....	\$ 36.26	27.32
Traffic Control Person I		
Area A.....	\$ 37.56	27.32
Area B.....	\$ 36.56	27.32
Traffic Control Person II		
Area A.....	\$ 35.06	27.32
Area B.....	\$ 34.06	27.32

TRAFFIC CONTROL PERSON I: Layout of traffic control,
crash
cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of
temporary/permanent signs, markers, delineators and crash
cushions.

LABO0185-002 07/01/2023

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN,
MODOC,
NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA,
SISKIYOU,
SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

	Rates	Fringes
LABORER		
Mason Tender-Brick.....	\$ 36.29	25.55

LABO0185-005 06/26/2023

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN,
MODOC,
NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA,
SISKIYOU,
SUTTER, TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

	Rates	Fringes

Tunnel and Shaft Laborers:

GROUP 1.....	\$ 45.89	27.72
GROUP 2.....	\$ 45.66	27.72
GROUP 3.....	\$ 45.41	27.72
GROUP 4.....	\$ 44.96	27.72
GROUP 5.....	\$ 44.42	27.72
Shotcrete Specialist.....	\$ 46.41	27.72

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading;
Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer,
Segment Erector, Tunnel Muck Hauler, Steel Form raiser and
setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LAB00185-006 06/26/2023

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN,
 MODOC,
 NEVADA, PLACER, PLUMAS, SACRAMENTO, SHIESTA, SIERRA,
 SISKIYOU,
 SUTTER, TEHAMA, TRINITY, YOLO, YUBA COUNTIES

	Rates	Fringes
LABORER (CONSTRUCTION CRAFT LABORERS - AREA B:)		
Construction Specialist		
Group.....	\$ 36.20	27.30
GROUP 1.....	\$ 35.50	27.30
GROUP 1-a.....	\$ 35.72	27.30
GROUP 1-c.....	\$ 35.55	27.30
GROUP 1-e.....	\$ 36.05	27.30
GROUP 1-f.....	\$ 30.37	23.20
GROUP 2.....	\$ 35.35	27.30
GROUP 3.....	\$ 35.25	27.30
GROUP 4.....	\$ 28.94	27.30
See groups 1-b and 1-d under laborer classifications.		
LABORER (GARDENERS, HORTICULTURAL & LANDSCAPE LABORERS - AREA B:)		
(1) New Construction.....	\$ 35.25	27.30
(2) Establishment Warranty Period.....	\$ 28.94	27.30
LABORER (GUNITITE - AREA B:)		
GROUP 1.....	\$ 36.46	27.30
GROUP 2.....	\$ 35.96	27.30
GROUP 3.....	\$ 35.37	27.30
GROUP 4.....	\$ 35.25	27.30
LABORER (WRECKING - AREA B:)		
GROUP 1.....	\$ 35.50	27.30
GROUP 2.....	\$ 35.35	27.30

FOOTNOTES:

Laborers working off or with or from bos'n chairs,
 swinging
 scaffolds, belts shall receive \$0.25 per hour above the
 applicable wage rate. This shall not apply to workers
 entitled to receive the wage rate set forth in Group 1-a
 below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill;
Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2

yd. and under; Concrete pan work; Concrete sander; Concrete saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and buckler; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches;

Jackson and similar type compactor; Kettle tender, pot and worker applying asphalt, lay-kold, creosote, lime, caustic

and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting,

whaling, bracing, trenchjacking, lagging hammer; Magnesite,

epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder;

Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work;
Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder;
All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above Group 1 wage rates. "Sewer cleaner" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers'

work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds.

All

employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts

thereof, and work on and in deep footings. (A deep footing

is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and

every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting

or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work);

Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100

lbs. pressure); Loading and unloading, carrying and hauling

of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under

inches

GROUP 3: Construction laborers, including bridge and general laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building including but not limited to: street cleaner; cleaning and washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification "material cleaner" is to be utilized under the following conditions:
A: at demolition site for the salvage of the material.
B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.
C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of "form stripping, cleaning and oiling and moving to the next point of erection".

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Gunite laborer

WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash,
windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other
building
materials)

LABO0185-008 07/01/2023

	Rates	Fringes
Plasterer tender.....	\$ 39.77	28.54

Work on a swing stage scaffold: \$1.00 per hour additional.

LABO0261-002 07/01/2023

MARIN COUNTY

	Rates	Fringes
LABORER (TRAFFIC CONTROL/LANE CLOSURE)		
Escort Driver, Flag Person..	\$ 37.26	27.30
Traffic Control Person I....	\$ 37.56	27.30
Traffic Control Person II...	\$ 35.06	27.30

TRAFFIC CONTROL PERSON I: Layout of traffic control,
crash
cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of
temporary/permanent signs, markers, delineators and crash
cushions.

LABO0261-004 06/26/2023

MARIN COUNTY

	Rates	Fringes
Tunnel and Shaft Laborers:		
GROUP 1.....	\$ 45.89	27.72
GROUP 2.....	\$ 45.66	27.72
GROUP 3.....	\$ 45.41	27.72
GROUP 4.....	\$ 44.96	27.72
GROUP 5.....	\$ 44.42	27.72
Shotcrete Specialist.....	\$ 46.41	27.72

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading;
Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer,
Segment Erector, Tunnel Muck Hauler, Steel Form raiser and
setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LABO0261-007 07/01/2023

MARIN COUNTY

	Rates	Fringes
LABORER		
Mason Tender-Brick.....	\$ 37.54	25.55

LABO0261-010 06/26/2023

MARIN COUNTY

	Rates	Fringes
LABORER (CONSTRUCTION CRAFT		
LABORERS - AREA A:)		
Construction Specialist		
Group.....	\$ 37.20	27.30
GROUP 1.....	\$ 36.50	27.30
GROUP 1-a.....	\$ 36.72	27.30
GROUP 1-c.....	\$ 36.55	27.30
GROUP 1-e.....	\$ 37.05	27.30
GROUP 1-f.....	\$ 31.37	23.20
GROUP 2.....	\$ 36.35	27.30
GROUP 3.....	\$ 36.25	27.30
GROUP 4.....	\$ 29.94	27.30

See groups 1-b and 1-d under laborer classifications.

LABORER (GARDENERS,
HORTICULTURAL & LANDSCAPE
LABORERS - AREA A:)

(1) New Construction.....	\$ 36.25	27.30
(2) Establishment Warranty		
Period.....	\$ 29.94	27.30

LABORER (GUNITE - AREA A:)

GROUP 1.....	\$ 37.46	27.30
GROUP 2.....	\$ 36.96	27.30
GROUP 3.....	\$ 36.37	27.30
GROUP 4.....	\$ 36.25	27.30

LABORER (WRECKING - AREA A:)

GROUP 1.....	\$ 36.50	27.30
GROUP 2.....	\$ 36.35	27.30

FOOTNOTES:

Laborers working off or with or from bos'n chairs, swinging scaffolds, belts shall receive \$0.25 per hour above the applicable wage rate. This shall not apply to workers entitled to receive the wage rate set forth in Group 1-a below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker; Chainsaw; Laser beam in connection with laborers' work; Cast-in- place manhole form setter; Pressure pipelayer; Davis trencher - 300 or similar type (and all small trenchers); Blaster; Diamond driller; Multiple unit drill;

Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko, Wacker and similar type tampers; Buggymobile; Caulker, bander, pipewrapper, conduit layer, plastic pipelayer; Certified hazardous waste worker including Leade Abatement; Compactors of all types; Concrete and magnesite mixer, 1/2

yd. and under; Concrete pan work; Concrete sander; Concrete

saw; Cribber and/or shoring; Cut granite curb setter; Dri-pak-it machine; Faller, logloader and buckler; Form raiser, slip forms; Green cutter; Headerboard, Hubsetter, aligner, by any method; High pressure blow pipe (1-1/2" or

over, 100 lbs. pressure/over); Hydro seeder and similar type; Jackhammer operator; Jacking of pipe over 12 inches;

Jackson and similar type compactor; Kettle tender, pot and

worker applying asphalt, lay-kold, creosote, lime, caustic and similar type materials (applying means applying, dipping or handling of such materials); Lagging, sheeting, whaling, bracing, trenchjacking, lagging hammer; Magnesite, epoxyresin, fiberglass, mastic worker (wet or dry); No joint pipe and stripping of same, including repair of voids; Pavement breaker and spader, including tool grinder; Perma curb; Pipelayer (including grade checking in connection with pipelaying); Precast-manhole setter; Pressure pipe tester; Post hole digger, air, gas and electric; Power broom sweeper; Power tampers of all types (except as shown in Group 2); Ram set gun and stud gun; Riprap stonepaver and rock-slinger, including placing of sacked concrete and/or sand (wet or dry) and gabions and similar type; Rotary scarifier or multiple head concrete chipping scarifier; Roto and Ditch Witch; Rototiller; Sandblaster, pot, gun, nozzle operators; Signalling and rigging; Tank cleaner; Tree climber; Turbo blaster; Vibrascreed, bull float in connection with laborers' work; Vibrator; Hazardous waste worker (lead removal); Asbestos and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model DH143 and similar type drills; Track driller; Jack leg driller; Wagon driller; Mechanical drillers, all types regardless of type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above

Group 1 wage rates. "Sewer cleaner" means any worker who

handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers'

work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All

employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts

thereof, and work on and in deep footings. (A deep footing

is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and

every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work);

Concrete bucket dumper and chute; Concrete chipping and

grinding; Concrete laborer (wet or dry); Driller tender,
chuck tender, nipper; Guinea chaser (stake), grout crew;
High pressure nozzle, adductor; Hydraulic monitor (over
100
lbs. pressure); Loading and unloading, carrying and
hauling
of all rods and materials for use in reinforcing concrete
construction; Pittsburgh chipper and similar type brush
shredders; Sloper; Single foot, hand-held, pneumatic
tamper; All pneumatic, air, gas and electric tools not
listed in Groups 1 through 1-f; Jacking of pipe - under
12
inches

GROUP 3: Construction laborers, including bridge and
general
laborer; Dump, load spotter; Flag person; Fire watcher;
Fence erector; Guardrail erector; Gardener, horticultural
and landscape laborer; Jetting; Limber, brush loader and
piler; Pavement marker (button setter); Maintenance,
repair
track and road beds; Streetcar and railroad construction
track laborer; Temporary air and water lines, Victaulic
or
similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and
building
including but not limited to: street cleaner; cleaning
and
washing windows; brick cleaner (jobsite only); material
cleaner (jobsite only). The classification "material
cleaner" is to be utilized under the following
conditions:
A: at demolition site for the salvage of the material.
B: at the conclusion of a job where the material is to be
salvaged and stocked to be reused on another job.
C: for the cleaning of salvage material at the jobsite or
temporary jobsite yard.

The material cleaner classification should not be used
in
the performance of "form stripping, cleaning and oiling
and moving to the next point of erection".

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Guniting laborer

WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash,
windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other
building
materials)

LAB00261-015 07/01/2023

	Rates	Fringes
Plasterer tender.....	\$ 39.77	28.54

Work on a swing stage scaffold: \$1.00 per hour additional.

LAB00324-004 07/01/2023

NAPA, SOLANO, AND SONOMA, COUNTIES

	Rates	Fringes
LABORER (TRAFFIC CONTROL/LANE CLOSURE)		
Escort Driver, Flag Person..	\$ 36.26	27.30

Traffic Control Person I....\$ 36.56	27.30
Traffic Control Person II...\$ 34.06	27.30

TRAFFIC CONTROL PERSON I: Layout of traffic control, crash cushions, construction area and roadside signage.

TRAFFIC CONTROL PERSON II: Installation and removal of temporary/permanent signs, markers, delineators and crash cushions.

LAB00324-008 06/26/2023

NAPA, SOLANO, AND SONOMA COUNTIES

	Rates	Fringes
Tunnel and Shaft Laborers:		
GROUP 1.....\$ 45.89		27.72
GROUP 2.....\$ 45.66		27.72
GROUP 3.....\$ 45.41		27.72
GROUP 4.....\$ 44.96		27.72
GROUP 5.....\$ 44.42		27.72
Shotcrete Specialist.....\$ 46.41		27.72

TUNNEL AND SHAFT CLASSIFICATIONS

GROUP 1: Diamond driller; Groundmen; Gunite and shotcrete nozzlemen

GROUP 2: Rodmen; Shaft work & raise (below actual or excavated ground level)

GROUP 3: Bit grinder; Blaster, driller, powdermen, heading;
Cherry pickermen - where car is lifted; Concrete finisher in tunnel; Concrete screedman; Grout pumpman and potman; Gunite & shotcrete gunman & potman; Headermen; High pressure nozzleman; Miner - tunnel, including top and bottom man on shaft and raise work; Nipper; Nozzleman on slick line; Sandblaster - potman, Robotic Shotcrete Placer,

Segment Erector, Tunnel Muck Hauler, Steel Form raiser and setter; Timberman, retimberman (wood or steel or substitute materials therefore); Tugger (for tunnel laborer work); Cable tender; Chuck tender; Powderman - primer house

GROUP 4: Vibrator operator, pavement breaker; Bull gang - muckers, trackmen; Concrete crew - includes rodding and spreading, Dumpmen (any method)

GROUP 5: Grout crew; Reboundman; Swamper/ Brakeman

LABO0324-010 07/01/2023

SOLANO AND SONOMA COUNTIES

	Rates	Fringes
LABORER		
Mason Tender-Brick.....	\$ 36.84	26.24

LABO0324-013 06/26/2023

NAPA, SOLANO, AND SONOMA COUNTIES

	Rates	Fringes
LABORER (CONSTRUCTION CRAFT		
LABORERS - AREA B:)		
Construction Specialist		
Group.....	\$ 36.20	27.30
GROUP 1.....	\$ 35.50	27.30
GROUP 1-a.....	\$ 35.72	27.30
GROUP 1-c.....	\$ 35.55	27.30
GROUP 1-e.....	\$ 36.05	27.30
GROUP 1-f.....	\$ 36.08	27.30
GROUP 2.....	\$ 35.35	27.30
GROUP 3.....	\$ 35.25	27.30
GROUP 4.....	\$ 28.94	27.30

See groups 1-b and 1-d under laborer classifications.

LABORER (GARDENERS,
HORTICULTURAL & LANDSCAPE
LABORERS - AREA B:)

(1) New Construction.....	\$ 35.25	27.30
(2) Establishment Warranty Period.....	\$ 28.94	27.30
LABORER (GUNITE - AREA B:)		
GROUP 1.....	\$ 36.46	27.30
GROUP 2.....	\$ 35.96	27.30
GROUP 3.....	\$ 35.37	27.30
GROUP 4.....	\$ 35.25	27.30
LABORER (WRECKING - AREA B:)		
GROUP 1.....	\$ 35.50	27.30
GROUP 2.....	\$ 35.35	27.30

FOOTNOTES:

Laborers working off or with or from bos'n chairs,
swinging
scaffolds, belts shall receive \$0.25 per hour above the
applicable wage rate. This shall not apply to workers
entitled to receive the wage rate set forth in Group 1-a
below.

LABORER CLASSIFICATIONS

CONSTRUCTION SPECIALIST GROUP: Asphalt ironer and raker;
Chainsaw; Laser beam in connection with laborers' work;
Cast-in- place manhole form setter; Pressure pipelayer;
Davis trencher - 300 or similar type (and all small
trenchers); Blaster; Diamond drilller; Multiple unit
drill;
Hydraulic drill

GROUP 1: Asphalt spreader boxes (all types); Barko,
Wacker
and similar type tampers; Buggymobile; Caulker, bander,
pipewrapper, conduit layer, plastic pipelayer; Certified
hazardous waste worker including Leade Abatement;
Compactors of all types; Concrete and magnesite mixer,
1/2

yd. and under; Concrete pan work; Concrete sander;
Concrete
saw; Cribber and/or shoring; Cut granite curb setter;
Dri-pak-it machine; Faller, logloader and buckler; Form
raiser, slip forms; Green cutter; Headerboard, Hubsetter,
aligner, by any method; High pressure blow pipe (1-1/2"
or
over, 100 lbs. pressure/over); Hydro seeder and similar
type; Jackhammer operator; Jacking of pipe over 12
inches;
Jackson and similar type compactor; Kettle tender, pot
and
worker applying asphalt, lay-kold, creosote, lime,
caustic
and similar type materials (applying means applying,
dipping or handling of such materials); Lagging,
sheeting,
whaling, bracing, trenchjacking, lagging hammer;
Magnesite,
epoxyresin, fiberglass, mastic worker (wet or dry); No
joint pipe and stripping of same, including repair of
voids; Pavement breaker and spader, including tool
grinder;
Perma curb; Pipelayer (including grade checking in
connection with pipelaying); Precast-manhole setter;
Pressure pipe tester; Post hole digger, air, gas and
electric; Power broom sweeper; Power tampers of all types
(except as shown in Group 2); Ram set gun and stud gun;
Riprap stonepaver and rock-slinger, including placing of
sacked concrete and/or sand (wet or dry) and gabions and
similar type; Rotary scarifier or multiple head concrete
chipping scarifier; Roto and Ditch Witch; Rototiller;
Sandblaster, pot, gun, nozzle operators; Signalling and
rigging; Tank cleaner; Tree climber; Turbo blaster;
Vibrascreed, bull float in connection with laborers'
work;
Vibrator; Hazardous waste worker (lead removal); Asbestos
and mold removal worker

GROUP 1-a: Joy drill model TWM-2A; Gardner-Denver model
DH143
and similar type drills; Track driller; Jack leg driller;
Wagon driller; Mechanical drillers, all types regardless
of

type or method of power; Mechanical pipe layers, all types regardless of type or method of power; Blaster and powder; All work of loading, placing and blasting of all powder and explosives of whatever type regardless of method used for such loading and placing; High scalers (including drilling of same); Tree topper; Bit grinder

GROUP 1-b: Sewer cleaners shall receive \$4.00 per day above

Group 1 wage rates. "Sewer cleaner" means any worker who handles or comes in contact with raw sewage in small diameter sewers. Those who work inside recently active, large diameter sewers, and all recently active sewer manholes shall receive \$5.00 per day above Group 1 wage rates.

GROUP 1-c: Burning and welding in connection with laborers' work; Synthetic thermoplastics and similar type welding

GROUP 1-d: Maintenance and repair track and road beds. All

employees performing work covered herein shall receive \$.25 per hour above their regular rate for all work performed on underground structures not specifically covered herein. This paragraph shall not be construed to apply to work below ground level in open cut. It shall apply to cut and cover work of subway construction after the temporary cover has been placed.

GROUP 1-e: Work on and/or in bell hole footings and shafts

thereof, and work on and in deep footings. (A deep footing is a hole 15 feet or more in depth.) In the event the depth of the footing is unknown at the commencement of excavation, and the final depth exceeds 15 feet, the deep footing wage rate would apply to all employees for each and

every day worked on or in the excavation of the footing from the date of inception.

GROUP 1-f: Wire winding machine in connection with guniting
or shot crete

GROUP 2: Asphalt shoveler; Cement dumper and handling dry cement or gypsum; Choke-setter and rigger (clearing work);

Concrete bucket dumper and chute; Concrete chipping and grinding; Concrete laborer (wet or dry); Driller tender, chuck tender, nipper; Guinea chaser (stake), grout crew; High pressure nozzle, adductor; Hydraulic monitor (over 100 lbs. pressure); Loading and unloading, carrying and hauling
of all rods and materials for use in reinforcing concrete construction; Pittsburgh chipper and similar type brush shredders; Sloper; Single foot, hand-held, pneumatic tamper; All pneumatic, air, gas and electric tools not listed in Groups 1 through 1-f; Jacking of pipe - under 12 inches

GROUP 3: Construction laborers, including bridge and general
laborer; Dump, load spotter; Flag person; Fire watcher; Fence erector; Guardrail erector; Gardener, horticultural and landscape laborer; Jetting; Limber, brush loader and piler; Pavement marker (button setter); Maintenance, repair
track and road beds; Streetcar and railroad construction track laborer; Temporary air and water lines, Victaulic or
similar; Tool room attendant (jobsite only)

GROUP 4: Final clean-up work of debris, grounds and building
including but not limited to: street cleaner; cleaning and
washing windows; brick cleaner (jobsite only); material cleaner (jobsite only). The classification "material

cleaner"" is to be utilized under the following conditions:

A: at demolition site for the salvage of the material.

B: at the conclusion of a job where the material is to be salvaged and stocked to be reused on another job.

C: for the cleaning of salvage material at the jobsite or temporary jobsite yard.

The material cleaner classification should not be used in the performance of ""form stripping, cleaning and oiling and moving to the next point of erection"".

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Structural Nozzleman

GROUP 2: Nozzleman, Gunman, Potman, Groundman

GROUP 3: Reboundman

GROUP 4: Guniting laborer

WRECKING WORK LABORER CLASSIFICATIONS

GROUP 1: Skilled wrecker (removing and salvaging of sash, windows and materials)

GROUP 2: Semi-skilled wrecker (salvaging of other building materials)

LABO0324-019 07/01/2023

	Rates	Fringes
Plasterer tender.....	\$ 39.77	28.54

Work on a swing stage scaffold: \$1.00 per hour additional.

PAIN0016-004 01/01/2025

MARIN, NAPA, SOLANO & SONOMA COUNTIES

	Rates	Fringes
Painters:.....	\$ 53.38	28.04

PREMIUMS:

EXOTIC MATERIALS - \$1.25 additional per hour.

SPRAY WORK: - \$0.50 additional per hour.

INDUSTRIAL PAINTING - \$0.25 additional per hour

[Work on industrial buildings used for the manufacture
and

processing of goods for sale or service; steel
construction

(bridges), stacks, towers, tanks, and similar structures]

HIGH WORK:

over 50 feet - \$2.00 per hour additional

100 to 180 feet - \$4.00 per hour additional

Over 180 feet - \$6.00 per hour additional

PAIN0016-005 01/01/2025

ALPINE, BUTTE, COLUSA, EL DORADO (west of the Sierra Nevada

Mountains), GLENN, LASSEN (west of Hwy. 395, excluding

Honey

Lake); MARIN, MODOC, NAPA, NEVADA (west of the Sierra
Nevada

Mountains), PLACER (west of the Sierra Nevada Mountains),

PLUMAS, SACRAMENTO, SHASTA, SIERRA (west of the Sierra
Nevada

Mountains), SISKIYOU, SOLANO, SONOMA, SUTTER, TEHAMA,
TRINITY,

YOLO AND YUBA COUNTIES

	Rates	Fringes

DRYWALL FINISHER/TAPER.....	\$ 59.63	31.29

PAIN0016-007 01/01/2025

ALPINE, AMADOR, BUTTE, COLUSA. EL DORADO (west of the Sierra Nevada Mountains), GLENN, LASSEN (west of Highway 395, excluding Honey Lake), MODOC, NEVADA (west of the Sierra Nevada Mountains), PLACER (west of the Sierra Nevada Mountains), PLUMAS, SACRAMENTO, SHASTA, SIERRA (west of the Sierra Nevada Mountains), SISKIYOU, SUTTER, TEHAMA, TRINITY, YOLO & YUBA COUNTIES

Rates	Fringes

Painters:.....	\$ 43.45	22.80

SPRAY/SANDBLAST: \$0.50 additional per hour.

EXOTIC MATERIALS: \$1.25 additional per hour.

HIGH TIME: Over 50 ft above ground or water level \$2.00 additional per hour. 100 to 180 ft above ground or water level \$4.00 additional per hour. Over 180 ft above ground or water level \$6.00 additional per hour.

PAIN0016-008 01/01/2024

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

Rates	Fringes

SOFT FLOOR LAYER.....	\$ 59.00	33.03

PAIN0169-004 01/01/2024

MARIN , NAPA & SONOMA COUNTIES; SOLANO COUNTY (west of a line defined as follows: Hwy. 80 corridor beginning at the City of Fairfield, including Travis Air Force Base and Suisun City; going north of Manakas Corner Rd., continue north on Suisun Valley Rd. to the Napa County line; Hwy. 80 corridor south on Grizzly Island Rd. to the Grizzly Island Management area)

	Rates	Fringes
GLAZIER.....	\$ 56.22	34.00

* PAIN0567-001 07/01/2025

EL DORADO COUNTY (east of the Sierra Nevada Mountains); LASSEN COUNTY (east of Highway 395, beginning at Stacey and including Honey Lake); NEVADA COUNTY (east of the Sierra Nevada Mountains); PLACER COUNTY (east of the Sierra Nevada Mountains); AND SIERRA COUNTY (east of the Sierra Nevada Mountains)

	Rates	Fringes
Painters:		
Brush and Roller.....	\$ 39.43	16.16
Paperhanger.....	\$ 42.19	16.16
Spray Painter.....	\$ 41.43	16.16

PREMIUMS:
 Special Coatings (Brush), and Sandblasting = \$0.50/hr
 Special Coatings (Spray), and Steeplejack = \$1.00/hr
 Special Coating Spray Steel = \$1.25/hr
 Swing Stage = \$2.00/hr

*A special coating is a coating that requires the mixing of 2 or more products.

PAIN0567-007 07/01/2022

EL DORADO COUNTY (east of the Sierra Nevada Mountains);
LASSEN
COUNTY (east of Highway 395, beginning at Stacey and
including
Honey Lake); NEVADA COUNTY (east of the Sierra Nevada
Mountains); PLACER COUNTY (east of the Sierra Nevada
Mountains)
AND SIERRA COUNTY (east of the Sierra Nevada Mountains)

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 34.27	16.47

PAIN0567-010 07/01/2024

EL DORADO COUNTY (east of the Sierra Nevada Mountains);
LASSEN
COUNTY (east of Highway 395, beginning at Stacey and
including
Honey Lake); NEVADA COUNTY (east of the Sierra Nevada
Mountains); PLACER COUNTY (east of the Sierra Nevada
Mountains); AND SIERRA COUNTY (east of the Sierra Nevada
Mountains)

	Rates	Fringes
Drywall		
(1) Taper.....	\$ 42.79	16.12
(2) Steeplejack - Taper, over 40 ft with open space below.....	\$ 44.29	16.12

PAIN0767-004 01/01/2024

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN,
MODOC,
NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA,
SISKIYOU,
SOLANO (Remainder), SUTTER, TEHAMA, TRINITY, YOLO, YUBA

	Rates	Fringes
GLAZIER.....	\$ 43.25	35.62

PAID HOLIDAYS: New Year's Day, Martin Luther King, Jr.
Day,
President's Day, Memorial Day, Independence Day, Labor
Day,
Veteran's Day, Thanksgiving Day, and Christmas Day.

Employee required to wear a body harness shall receive
\$1.50
per hour above the basic hourly rate at any elevation.

PAIN1176-001 07/01/2022

HIGHWAY IMPROVEMENT

	Rates	Fringes
Parking Lot Striping/Highway Marking:		
GROUP 1.....	\$ 40.83	17.62
GROUP 2.....	\$ 34.71	17.62
GROUP 3.....	\$ 35.11	17.62

CLASSIFICATIONS

GROUP 1: Striper: Layout and application of painted
traffic
stripes and marking; hot thermo plastic; tape, traffic
stripes and markings

GROUP 2: Gamecourt & Playground Installer

GROUP 3: Protective Coating, Pavement Sealing

PAIN1237-001 01/01/2024

ALPINE; COLUSA; EL DORADO (west of the Sierra Nevada Mountains); GLENN; LASSEN (west of Highway 395, beginning at Stacey and including Honey Lake); MODOC; NEVADA (west of the Sierra Nevada Mountains); PLACER (west of the Sierra Nevada Mountains); PLUMAS; SACRAMENTO; SHASTA; SIERRA (west of the Sierra Nevada Mountains); SISKIYOU; SUTTER; TEHAMA; TRINITY; YOLO AND YUBA COUNTIES

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 48.54	26.59

PLAS0300-003 07/01/2018

	Rates	Fringes
PLASTERER		
AREA 295: Alpine, Amador, Butte, Colusa, El Dorado, Glenn, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sutter, Tehema, Trinity, Yolo & Yuba Counties.....	\$ 32.70	31.68
AREA 355: Marin.....	\$ 36.73	31.68
AREA 355: Napa & Sonoma Counties.....	\$ 32.70	31.68

PLAS0300-005 07/01/2016

Rates	Fringes

CEMENT MASON/CONCRETE FINISHER...\$ 32.15 23.27

PLUM0038-002 07/01/2025

MARIN AND SONOMA COUNTIES

Rates Fringes

PLUMBER (Plumber,
Steamfitter, Refrigeration
Fitter)

(1) Work on wooden frame
structures 5 stories or
less excluding high-rise
buildings and commercial
work such as hospitals,
prisons, hotels, schools,
casinos, wastewater
treatment plants, and
research facilities as well
as refrigeration
pipefitting, service and
repair work - MARKET

RECOVERY RATE.....\$ 69.70 46.38

(2) All other work - NEW

CONSTRUCTION RATE.....\$ 91.00 49.40

PLUM0038-006 07/01/2025

MARIN & SONOMA COUNTIES

Rates Fringes

Landscape/Irrigation Fitter

(Underground/Utility Fitter).....\$ 77.35 36.53

PLUM0228-001 07/01/2025

BUTTE, COLUSA, GLENN, LASSEN, MODOC, PLUMAS, SHASTA,
SIERRA,

SISKIYOU, SUTTER, TEHAMA, TRINITY & YUBA COUNTIES

	Rates	Fringes
PLUMBER.....	\$ 50.55	41.04

PLUM0343-001 07/01/2025		

NAPA AND SOLANO COUNTIES

	Rates	Fringes
PLUMBER/PIPEFITTER		
Light Commercial.....	\$ 30.85	20.40
All Other Work.....	\$ 71.60	38.38

DEFINITION OF LIGHT COMMERCIAL:

Work shall include strip shopping centers, office buildings, schools and other commercial structures which the total plumbing bid does not exceed Two Hundred and Fifty Thousand (\$250,000) and the total heating and cooling does not exceed Two Hundred Fifty Thousand (\$250,000); or Any projects bid in phases shall not qualify unless the total project is less than Two Hundred Fifty Thousand (\$250,000) for the plumbing bid; and Two Hundred Fifty Thousand (\$250,000) for the heating and cooling bid. Excluded are hospitals, jails, institutions and industrial projects, regardless size of the project

FOOTNOTES: While fitting galvanized material: \$.75 per hour additional. Work from trusses, temporary staging, unguarded structures 35' from the ground or water: \$.75 per hour additional. Work from swinging scaffolds, boatswains chairs or similar devices: \$.75 per hour additional.

PLUM0350-001 08/01/2023

EL DORADO COUNTY (Lake Tahoe area only); NEVADA COUNTY
(Lake
Tahoe area only); AND PLACER COUNTY (Lake Tahoe area only)

	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 52.14	18.71

PLUM0355-001 07/01/2025

ALPINE, AMADOR, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN,
MODOC,
NAPA, NEVADA, PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA,
SISKIYOU, SOLANO, SUTTER, TEHAMA, TRINITY, YOLO, AND YUBA
COUNTIES

	Rates	Fringes
Underground Utility Worker /Landscape Fitter.....	\$ 36.01	18.50

PLUM0442-003 07/01/2025

AMADOR (South of San Joaquin River) and ALPINE COUNTIES

	Rates	Fringes
PLUMBER.....	\$ 56.60	38.14

PLUM0447-001 07/01/2025

AMADOR (north of San Joaquin River), EL DORADO (excluding
Lake
Tahoe area), NEVADA (excluding Lake Tahoe area); PLACER
(excluding Lake Tahoe area), SACRAMENTO AND YOLO COUNTIES

	Rates	Fringes
PLUMBER/PIPEFITTER		
Journeyman.....	\$ 67.37	30.00
Light Commercial Work.....	\$ 55.58	24.02

ROOF0081-006 08/01/2024

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

	Rates	Fringes
Roofer.....	\$ 54.94	23.34

ROOF0081-007 08/01/2023

ALPINE, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC,
NEVADA,
PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU,
SUTTER,
TEHAMA, TRINITY, YOLO, AND YUBA COUNTIES

	Rates	Fringes
Roofer.....	\$ 46.73	21.36

SFCA0483-003 08/04/2025

MARIN, NAPA, SOLANO AND SONOMA COUNTIES

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers).....	\$ 82.44	40.10

SFCA0669-003 04/01/2025

ALPINE, BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC,
NEVADA,
PLACER, PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU,
SUTTER,
TEHAMA, TRINITY, YOLO AND YUBA COUNTIES

	Rates	Fringes
SPRINKLER FITTER.....	\$ 52.06	28.56

SHEE0104-006 06/29/2020

MARIN, NAPA, SOLANO SONOMA & TRINITY COUNTIES

	Rates	Fringes
Sheet Metal Worker		
Mechanical Contracts		
\$200,000 or less.....	\$ 55.92	45.29
All other work.....	\$ 64.06	46.83

SHEE0104-009 07/01/2021

AMADOR, COLUSA, EL DORADO, NEVADA, PLACER, SACRAMENTO,
SUTTER,
YOLO AND YUBA COUNTIES

	Rates	Fringes
SHEET METAL WORKER.....	\$ 47.85	41.90

SHEE0104-010 07/01/2020

ALPINE COUNTY

	Rates	Fringes
SHEET METAL WORKER.....	\$ 43.50	37.42

SHEE0104-011 07/01/2020

BUTTE, COLUSA, EL DORADO, GLENN, LASSEN, MODOC, NEVADA,
PLACER,
PLUMAS, SACRAMENTO, SHASTA, SIERRA, SISKIYOU, SUTTER,
TEHAMA,
YOLO AND YUBA COUNTIES

	Rates	Fringes
Sheet Metal Worker (Metal decking and siding only).....	\$ 44.45	35.55

SHEE0104-014 07/01/2020

MARIN, NAPA, SOLANO, SONOMA AND TRINITY COUNTIES

	Rates	Fringes
SHEET METAL WORKER (Metal Decking and Siding only).....	\$ 44.45	35.55

SHEE0104-019 07/01/2020

BUTTE, GLENN, LASSEN, MODOC, PLUMAS, SHASTA, SIERRA,
SISKIYOU
AND TEHAMA COUNTIES

	Rates	Fringes
SHEET METAL WORKER Mechanical Jobs \$200,000 & under.....	\$ 35.16	35.88
Mechanical Jobs over \$200,000.....	\$ 46.60	40.21

TEAM0094-001 07/01/2025

	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 43.26	34.28
GROUP 2.....	\$ 43.56	34.28
GROUP 3.....	\$ 43.86	34.28
GROUP 4.....	\$ 44.21	34.28
GROUP 5.....	\$ 44.56	34.28

FOOTNOTES:

Articulated dump truck; Bulk cement spreader (with or without
auger); Dumpcrete truck; Skid truck (debris box); Dry
pre-batch concrete mix trucks; Dumpster or similar type;
Slurry truck: Use dump truck yardage rate.
Heater planer; Asphalt burner; Scarifier burner;
Industrial
lift truck (mechanical tailgate); Utility and clean-up
truck: Use appropriate rate for the power unit or the
equipment utilized.

TRUCK DRIVER CLASSIFICATIONS

GROUP 1: Dump trucks, under 6 yds.; Single unit flat rack
(2-
axle unit); Nipper truck (when flat rack truck is used
appropriate flat rack shall apply); Concrete pump truck
(when flat rack truck is used appropriate flat rack shall
apply); Concrete pump machine; Fork lift and lift
jitneys;

Fuel and/or grease truck driver or fuel person; Snow
buggy;
Steam cleaning; Bus or personhaul driver; Escort or pilot
car driver; Pickup truck; Teamster oiler/greaser and/or
serviceperson; Hook tender (including loading and
unloading); Team driver; Tool room attendant (refineries)

GROUP 2: Dump trucks, 6 yds. and under 8 yds.; Transit
mixers, through 10 yds.; Water trucks, under 7,000 gals.;
Jetting trucks, under 7,000 gals.; Single-unit flat rack
(3-axle unit); Highbed heavy duty transport; Scissor
truck;

Rubber-tired muck car (not self-loaded); Rubber-tired truck
jumbo; Winch truck and "A" frame drivers; Combination winch
truck with hoist; Road oil truck or bootperson; Buggymobile; Ross, Hyster and similar straddle carriers; Small rubber-tired tractor

GROUP 3: Dump trucks, 8 yds. and including 24 yds.; Transit
mixers, over 10 yds.; Water trucks, 7,000 gals. and over; Jetting trucks, 7,000 gals. and over; Vacuum trucks under 7500 gals. Trucks towing tilt bed or flat bed pull trailers; Lowbed heavy duty transport; Heavy duty transport
tiller person; Self-propelled street sweeper with self-contained refuse bin; Boom truck - hydro-lift or Swedish type extension or retracting crane; P.B. or similar
type self-loading truck; Tire repairperson; Combination bootperson and road oiler; Dry distribution truck (A bootperson when employed on such equipment, shall receive the rate specified for the classification of road oil trucks or bootperson); Ammonia nitrate distributor, driver
and mixer; Snow Go and/or plow

GROUP 4: Dump trucks, over 25 yds. and under 65 yds.; Water
pulls - DW 10's, 20's, 21's and other similar equipment when pulling Aqua/pak or water tank trailers; Helicopter pilots (when transporting men and materials); Lowbedk
Heavy
Duty Transport up to including 7 axles; DW10's, 20's, 21's
and other similar Cat type, Terra Cobra, LeTourneau
Pulls,
Tournorocker, Euclid and similar type equipment when pulling fuel and/or grease tank trailers or other miscellaneous trailers; Vacuum Trucks 7500 gals and over and truck repairman

GROUP 5: Dump trucks, 65 yds. and over; Holland hauler; Low

bed Heavy Duty Transport over 7 axles

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick
Leave
for Federal Contractors applies to all contracts subject to
the
Davis-Bacon Act for which the contract is awarded (and any
solicitation was issued) on or after January 1, 2017. If
this
contract is covered by the EO, the contractor must provide
employees with 1 hour of paid sick leave for every 30 hours
they work, up to 56 hours of paid sick leave each year.
Employees must be permitted to use paid sick leave for
their
own illness, injury or other health-related needs,
including
preventive care; to assist a family member (or person who
is
like family to the employee) who is ill, injured, or has
other
health-related needs, including preventive care; or for
reasons
resulting from, or to assist a family member (or person who
is
like family to the employee) who is a victim of, domestic
violence, sexual assault, or stalking. Additional
information
on contractor requirements and worker protections under the
EO
is available at
<https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included
within
the scope of the classifications listed may be added after

award only as provided in the labor standards contract clauses
(29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than "SU", "UAVG", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated

rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for

the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio.

The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024

in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The "SU" identifier indicates that either a single non-union

rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by

computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted

average rate includes all rates reported in the survey, it may

include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION"