

CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT

INVITATION FOR BID

BID No.: B20/21-07

DOMESTIC WATER BOOSTER SYSTEM PROJECT AT LAS POSITAS COLLEGE

**Proposal Due:
Thursday, January 28, 2021 at 2:00 P.M.**



Return Proposals to:
District Office
Purchasing & Warehouse Services Department
Attn: Marie Hampton
7600 Dublin Blvd., 3rd Floor
Dublin, CA 94568

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NOTICE TO CONTRACTORS CALLING FOR BIDS

DISTRICT	CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT
PROJECT DESCRIPTION	BID NO.: B20/21-07, Domestic Water Booster System Project
LATEST TIME/DATE FOR RFI'S SUBMITTALS	Wednesday, January 20, 2021 at 2:00 P.M.
LATEST TIME/DATE FOR SUBMISSION OF BIDS PROPOSALS	Thursday, January 28, 2021 at 2:00 P.M.
LOCATION FOR SUBMISSION OF BID PROPOSALS	<p>Contact Michael McClung, Bond Buyer, at (925) 485-5205 to arrange time and date for receipt of bid package (during normal business hours) prior to January 28, 2021.</p> <p>On January 28, 2021, Michael McClung will be on site from 8:00AM to 2:00PM to accept bids. Please plan accordingly for time prior to 2:00PM to call (925) 485-5205 on arrival for bid acceptance.</p> <p>Due to current ACDPH guidelines, the CLPCCD District Office is not open for normal access/delivery therefore UPS, FedEx, and USPS deliveries are not regularly received.</p>
LOCATION FOR OBTAINING BID AND CONTRACT DOCUMENTS	<p>District Website at: http://www.clpccd.org/business/open.php</p>

NOTICE IS HEREBY GIVEN that the above-named California Community College District, acting by and through its Board of Trustees, hereinafter "the District" will receive up to, but not later than the above-stated date and time, sealed Bid Proposals for the Contract for the Work of the Project generally described as: **BID NO.: B20/21-07, Domestic Water Booster System Project**

1. Submittal of Bid Proposals. All Bid Proposals shall be submitted on forms furnished by the District. Bid Proposals must conform with, and be responsive to, the Bid and Contract Documents, copies of which may be obtained from the District's website as set forth above. Only Bid Proposals submitted to the District at or prior to the date and time set forth above for the public opening and reading of Bid Proposals shall be considered.

2. Bid and Contract Documents. The Bid and Contract Documents are available at the District's website at: <http://www.clpccd.org/business/open.php> under Bid No. B20/21-07, Domestic Water Booster System Project.

3. Documents Accompanying Bid Proposal. Each Bid Proposal shall be accompanied by: (a) the required Bid Security; (b) Subcontractors List; (c) Non-Collusion Affidavit; (d) Certification of Pre-Bid Site Visit; (e) Statement of Bidder's Qualifications; and (f) Public Works Contractor Registration Certification Form. All information or responses of a Bidder in its Bid Proposal and other documents accompanying the Bid Proposal shall be complete, accurate and true; incomplete, inaccurate or untrue responses or information provided therein by a Bidder shall be grounds for the District to reject such Bidder's Bid Proposal for non-responsiveness.

4. Prevailing Wage Rates. Pursuant to California Labor Code §1773, the Director of the Department of Industrial Relations of the State of California has determined the generally prevailing rates of wages in the locality in which the Work is to be performed. Copies of these determinations, entitled "PREVAILING WAGE SCALE" are filed at the District's Administrative Offices located at 7600 Dublin Blvd., 3rd Floor, Dublin, CA 94568, and are available to any interested party upon request. Alternatively, prevailing wage rate classifications and determinations may be viewed and obtained by accessing the Division of Labor Standards Enforcement databases at <http://www.dir.ca.gov/dirdatabases.html>. The Contractor awarded the Contract for the Work shall post a copy of all applicable prevailing wage rates for the Work at conspicuous locations at the Site of the Work. The Contractor and all Subcontractors performing any portion of the Work shall pay not less than the applicable prevailing wage rate for the classification of labor provide by their respective workers in prosecution and execution of the Work.

5. Contractors License Classification. In accordance with the provisions of California Public Contract Code §3300, the District requires that Bidders possess the following classification(s) of California Contractors License A and/or B. Any Bidder not so duly and properly licensed shall be subject to all penalties imposed by law. No payment shall be made for work, labor, materials or services provided under the Contract for the Work unless and until the Registrar of Contractors verifies to the District that the Bidder awarded the Contract is properly and duly licensed to perform the Work.

6. Contract Time. The date(s) for completion of portions of the Work, if applicable, and for achieving Substantial Completion of the Work shall be achieved as set forth in the Special Conditions. Failure to complete designated portions of the Work within the time(s) established in the Special Conditions and/or failure to achieve Substantial Completion of the Work within the Contract Time established in the Special Conditions shall subject the Contractor to assessment of Liquidated Damages as set forth in the Special Conditions.

7. Labor Compliance Program (AB 1506). The District has established a Labor Compliance Program ("LCP") pursuant to Labor Code §1771.5. The Contractor awarded the Contract for the Work shall comply with the LCP and provisions of the Contract Documents relating to implementation, compliance with, and enforcement of the LCP. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

8. Bid Security. Each Bid Proposal shall be accompanied by Bid Security in an amount not less than ten percent (10%) of the maximum amount of the Bid Proposal, inclusive of any additive Alternate Bid Item(s). Failure of any Bid Proposal to be accompanied by Bid Security in the form and in the amount required shall render such Bid Proposal to be non-responsive and rejected by the District.

9. No Withdrawal of Bid Proposals. Bid Proposals shall not be withdrawn by any Bidder for a period of sixty (60) days after the opening of Bid Proposals. During this time, all Bidders shall guarantee prices quoted in their respective Bid Proposals.

10. Job-Walk. The District will conduct a **Mandatory Job Walk on Tuesday, January 12, 2021 beginning at 10:00 AM.** Bidders are to meet at **Las Positas College, 3000 Campus Hill Drive, Facilities Management Office Trailer, Conference Room 1, adjacent to Building 1300, Livermore, California 94551. Bidders must attend the Site Walk to be eligible to participate in the bid.** Campus maps are available at www.laspositascollege.edu/. The Job Walk is mandatory. If a Bid Proposal is submitted by a Bidder whose representative(s) did not attend the entirety of the Mandatory Job Walk, such bid will be rejected by the District as being non-responsive.

11. Substitute Security. In accordance with the provisions of California Public Contract Code §22300, substitution of eligible and equivalent securities for any monies withheld by the District to ensure the Contractor's performance under the Contract will be permitted at the request and expense of the Contractor and in conformity with California Public Contract Code §22300. The foregoing notwithstanding, the Bidder to whom the Contract is awarded shall submit its written request to the District to permit the

substitution of securities for retention under California Public Contract Code §22300 prior to the submission of its first Application for Progress Payment. The failure of such Bidder to make such written request to the District prior to submission of its first Application for Progress Payment shall be deemed a waiver of the Bidder's rights under California Public Contract Code §22300.

12. Waiver of Irregularities. The District reserves the right to reject any or all Bid Proposals or to waive any irregularities or informalities in any Bid Proposal or in the bidding.

13. Award of Contract. The Contract for the Work, if awarded, will be by action of the District's Board of Trustees to the responsible and responsive Bidder submitting the lowest priced Bid Proposal. If Alternate Bid Items are included in the bidding, the lowest total priced Bid Proposal will be determined on the basis of the Base Bid Proposal (only) in accordance with the applicable provisions of the Instructions for Bidders.

CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT

Publication Dates:

**December 11, 2020
December 18, 2020
January 8, 2021**

ADVERTISEMENT**NOTICE TO BIDDERS**

Notice is hereby given that the Chabot-Las Positas Community College District, State of California, hereby calls for sealed bids – **Bid No. B20/21-07 Domestic Water Booster System Project** to be delivered to the Bond Buyer, 7600 Dublin Blvd., Dublin, CA 94568 until **Thursday, January 28, 2021 at 2:00 p.m.**

To arrange for bid delivery before call Michael McClung, Bond Buyer, at 925-485-5205 to schedule a time during business hours to meet at the CLPCCD District Office. On January 28, 2020 the Bond Buyer will be on site from 8:00AM until 2:00PM to receive bids, but you will need to call 925-485-5205 on arrival to deliver the bid. Please plan for time accordingly.

At close of bid acceptance, said bids will be opened via Zoom Conference:

Topic: B20/21-07 Domestic Water Booster Pump Project
Time: Jan 28, 2021 2:30 PM Pacific Time (US and Canada)

Join from PC, Mac, Linux, iOS or Android: <https://cccconfer.zoom.us/j/99280145648>

Or iPhone one-tap (US Toll): +16699006833,99280145648# or +12532158782,99280145648#

Or Telephone:

Dial:

+1 669 900 6833 (US Toll)

+1 253 215 8782 (US Toll)

+1 346 248 7799 (US Toll)

+1 312 626 6799 (US Toll)

+1 646 876 9923 (US Toll)

+1 301 715 8592 (US Toll)

Meeting ID: 992 8014 5648

International numbers available: <https://cccconfer.zoom.us/j/99280145648>

Or Skype for Business (Lync):

SIP:99280145648@lync.zoom.us

Faxed or emailed bids will not be accepted.

There will be a Mandatory, Pre-Bid Conference and Job Walk, January 12, 2021 at 10:00 a.m. **Las Positas College, 3000 Campus Hill Drive, Facilities Management Office Trailer, Conference Room 1, adjacent to Building 1300, Livermore, California 94551. Bidders must attend the Site Walks to be eligible to participate in the bid.** Campus maps are available at www.laspositascollege.edu/.

No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

Bids shall be presented in accordance with the specifications for the same, which are on file with the Purchasing and Warehouse Manager at the office address listed above. Bid specifications will be available by Friday, December 11, 2020 at the District's website: <http://www.clpccd.org/business/open.php>

Inquiries regarding this bid should be directed to office of the Purchasing and Warehouse Manager, Marie Hampton at mhampton@clpccd.org and in the subject line reference **Bid No. B20/21-07** on all email inquiries.

The Board of Trustees reserves the right to reject any and all bids and any and all items of such bids. This bid shall also be subject to any and all applicable laws, regulations and standards. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

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INSTRUCTIONS FOR BIDDERS

1. **Preparation and Submittal of Bid Proposal.**
 - 1.1 **Bid Proposal Preparation.** All information required by the bid forms must be completely and accurately provided. Numbers shall be stated in both words and figures where so indicated in the bid forms; conflicts between a number stated in words and in figures are governed by the words. Partially completed Bid Proposals or Bid Proposals submitted on other than the bid forms included herein are non-responsive and will be rejected. Bid Proposals not conforming to these Instructions for Bidders and the Notice to Contractors Calling for Bids ("Call for Bids") may be deemed non-responsive and rejected.
 - 1.2 **Bid Proposal Submittal.** Bid Proposals shall be submitted at the place designated in the Call for Bids in sealed envelopes bearing on the outside the Bidder's name and address along with an identification of the Work for which the Bid Proposal is submitted. Bidders are solely responsible for timely submission of Bid Proposals to the District at the place designated in the Call for Bids.
 - 1.3 **Bidders Statement of Qualifications.** In order to be qualify to bid and be awarded a contract for the Project, the successful entity must review and answer prequalification questions under section 4 of the Statement of Qualifications.
 - 1.4 **Date and Time of Bid Proposal Submittal.** The District will place a clock ("the District Clock") in a conspicuous location at the place designated for submittal of Bid Proposals. For purposes of determining the time that a Bid Proposal is submitted, the District Clock shall be controlling. The foregoing notwithstanding, whether or not Bid Proposals are opened exactly at the time fixed in the Call for Bids, no Bid Proposals shall be received or considered by the District after it has commenced the public opening and reading of Bid Proposals; Bid Proposals submitted after such time are non-responsive and will be returned to the Bidder unopened.
2. **Bid Security.** Each Bid Proposal shall be accompanied by Bid Security in the form of: (a) cash, (b) a certified or cashier's check made payable to the District or (c) a Bid Bond, in the form and content attached hereto, in favor of the District executed by the Bidder as a principal and a Surety as surety (the "Bid Security") in an amount not less than the percentage of the maximum amount of the Bid Proposal. Any Bid Proposal submitted without the required Bid Security is non-responsive and will be rejected. If the Bid Security is in the form of a Bid Bond, the Bidder's Bid Proposal shall be deemed responsive only if the Bid Bond is in the form and content included herein and the Surety is an Admitted Surety Insurer under Code of Civil Procedure §995.120.
3. **Documents Accompanying Bid Proposal; Signatures.** The Bid Proposal must be submitted with: Bid Security, Subcontractors List, Statement of Qualifications, Certification of Pre-Bid Site Visit, Public Works Contractor Registration Certification Form and Non-Collusion Affidavit. The Bid Proposal, Statement of Qualifications and the Non-Collusion Affidavit shall be executed by an individual duly authorized to execute the same on behalf of the Bidder.
4. **Modifications.** Changes to the bid forms which are not specifically called for or permitted may result in the District's rejection of the Bid Proposal as being non-responsive. No oral or telephonic modification of any submitted Bid Proposal will be considered. A written modification may be considered only if actually received by the District prior to the scheduled closing time for receipt of Bid Proposals and the public opening thereof.
5. **Erasures; Inconsistent or Illegible Bid Proposals.** Bid Proposals must not contain any erasures, interlineations or other corrections unless the same are suitably authenticated by affixing in the

margin immediately opposite such erasure, interlineations or correction the surname(s) of the person(s) signing the Bid Proposal. Any Bid Proposal not conforming to the foregoing may be deemed by the District to be non-responsive. If any Bid Proposal or portions thereof, is determined by the District to be illegible, ambiguous or inconsistent, whether by virtue of any erasures, interlineations, corrections or otherwise, the District may reject such a Bid Proposal as being non-responsive.

6. **Examination of Site and Contract Documents.** Each Bidder shall, at its sole cost and expense, inspect the Site and to become fully acquainted with the Contract Documents and conditions affecting the Work. The failure of a Bidder to receive or examine any of the Contract Documents or to inspect the Site shall not relieve such Bidder from any obligation with respect to the Bid Proposal, or the Work required under the Contract Documents. The District assumes no responsibility or liability to any Bidder for, nor shall the District be bound by, any understandings, representations or agreements of the District's agents, employees or officers concerning the Contract Documents or the Work made prior to execution of the Contract which are not in the form of Bid Addenda duly issued by the District. The submission of a Bid Proposal shall be deemed prima facie evidence of the Bidder's full compliance with the requirements of this section.
7. **Withdrawal of Bid Proposal.** Any Bidder may withdraw its Bid Proposal by of written request actually received by the District prior to the scheduled closing time for the receipt of Bid Proposals and the District's public opening and reading of Bid Proposals. A written notice of withdrawal of a submitted Bid Proposal received after the scheduled closing time for receipt of Bid Proposals or the District's public opening and reading of Bid Proposals shall not be considered by the District, nor effective to withdraw such Bid Proposal.
8. **Agreement and Bonds.** The Agreement which the successful Bidder, as Contractor, will be required to execute along with the forms and amounts of the Labor and Material Payment Bond, Performance Bond and other documents and instruments which will be required to be furnished are included in the Contract Documents and shall be carefully examined by the Bidder.
9. **Interpretation of Drawings, Specifications or Contract Documents.** Any Bidder in doubt as to the true meaning of any part of the Contract Documents; finds discrepancies, errors or omissions therein; or finds variances in any of the Contract Documents with applicable rules, regulations, ordinances and/or laws, a written request for an interpretation or correction thereof may be submitted to the District. It is the sole and exclusive responsibility of the Bidder to submit such request not less than three (3) days prior to the scheduled closing date for the receipt of Bid Proposals. Interpretations or corrections of the Contract Documents will be by written addendum issued by the District or the Architect. A copy of any such addendum will be mailed, faxed, emailed or delivered to each Bidder receiving a set of the Contract Documents. No person is authorized to render an oral interpretation or correction of any portion of the Contract Documents to any Bidder, and no Bidder is authorized to rely on any such oral interpretation or correction. Failure to request interpretation or clarification of any portion of the Contract Documents pursuant to the foregoing is a waiver of any discrepancy, defect or conflict therein.
10. **District's Right to Modify Contract Documents.** Before the public opening and reading of Bid Proposals, the District may modify the Work, the Contract Documents, or any portion(s) thereof by the issuance of written addenda disseminated to all Bidders who have obtained a copy of the Specifications, Drawings and Contract Documents pursuant to the Call for Bids. If the District issues any addenda during the bidding, the failure of any Bidder to acknowledge such addenda in its Bid Proposal will render the Bid Proposal non-responsive and rejected.
11. **Non-Collusion Affidavit.** No person, firm, corporation or other entity shall submit or be interested in more than one Bid Proposal for the same Work; provided, however, that a person, firm or corporation that has submitted a sub-proposal to a Bidder or who has quoted prices for materials

to a Bidder is not thereby disqualified from submitting a sub-proposal, quoting prices to other Bidders or submitting a Bid Proposal for the proposed Work to the District. The form of Non-Collusion Affidavit included in the Contract Documents must be completed and duly executed on behalf of the Bidder; failure of a Bidder to submit a completed and executed Non-Collusion Affidavit with its Bid Proposal will render the Bid Proposal non-responsive.

12. Award of Contract.

12.1 Waiver of Irregularities or Informalities. The District reserves the right to reject any and all Bid Proposals or to waive any irregularities or informalities in any Bid Proposal or in the bidding.

12.2 Award to Lowest Responsive and Responsible Bidder. The award of the Contract, if made by the District through action of its Board of Trustees, will be to the responsible Bidder submitting the lowest priced responsive Bid Proposal on the basis of the Base Bid Proposal, in accordance with these Instructions for Bidders. The low responsive and responsible bidder will be determined by the sum of Bid Items 1 and 2.

12.3 Selection of Alternate Bid Items. Not Used.

12.4 Alternate Bid Items Not Included in Award of Contract. Bidders are referred to the provisions of the Contract Documents permitting the District, during performance of the Work, to add or delete from the scope of the Work any or all of the Alternate Bid Items with the cost or credit of the same being the amount(s) set forth by in the Alternate Bid Items Proposal.

12.5 Responsive Bid Proposal. A responsive Bid Proposal shall mean a Bid Proposal which conforms, in all material respects, to the Bid and Contract Documents.

12.6 Responsible Bidder. A responsible Bidder is a Bidder who has the capability in all respects, to perform fully the requirements of the Contract Documents and the moral and business integrity and reliability, which will assure good faith performance. In determining responsibility, the following criteria will be considered: (i) the ability, capacity and skill of the Bidder to perform the Work of the Contract Documents; (ii) whether the Bidder can perform the Work promptly and within the time specified, without delay or interference; (iii) the character, integrity, reputation, judgement, experience and efficiency of the Bidder; (iv) the quality of performance of the Bidder on previous contracts, by way of example only, the following information will be considered: (a) the administrative, consultant or other cost overruns incurred by the District on previous contracts with the Bidder; (b) the Bidder's compliance record with contract general conditions on other projects; (c) the submittal by the Bidder of excessive and/or unsubstantiated extra cost proposals and claims on other projects; (d) the Bidder's record for completion of work within the contract time and the Bidder's compliance with the scheduling and coordination requirements on other projects; (e) the Bidder's demonstrated cooperation with the District and other contractors on previous contracts; (f) whether the work performed and materials furnished on previous contracts was in accordance with the Contract Documents; (v) the previous and existing compliance by the Bidder with laws and ordinances relating to contracts; (vi) the sufficiency of the financial resources and ability of the Bidder to perform the work of the Contract Documents; (vii) the quality, availability and adaptability of the goods or services to the particular use required; (viii) the ability of the Bidder to provide future maintenance and service for the warranty period of the Contract; (ix) whether the Bidder is in arrears on debt or contract or is a defaulter on any surety bond; (x) such other information as may be secured by the District having a bearing on the decision to award the Contract, to include without limitation the ability, experience and commitment of the Bidder to properly and

reasonably plan, schedule, coordinate and execute the Work of the Contract Documents and whether the Bidder has ever been debarred from bidding or found ineligible for bidding on any other projects. The ability of a Bidder to provide the required bonds will not of itself demonstrate responsibility of the Bidder.

13. Subcontractors.

13.1 Designation of Subcontractors; Subcontractors List. Each Bidder shall submit a list of its proposed Subcontractors for the proposed Work as required by the Subletting and Subcontracting Fair Practices Act (California Public Contract Code §§4100 et seq.) on the form furnished. The failure of any Bid Proposal to include all information required by the Subcontractors List will result in rejection of the Bid Proposal for non-responsiveness. Each Subcontractor shall maintain annual compliance with Senate Bill 854 and Workers Compensation/Employers Liability Insurance and Commercial General Liability Insurance as required by the Contract.

13.2 Work of Subcontractors. All Bidders are referred to the Contract Documents and the notation therein that all Contract Documents are intended to be complimentary and that the organization or arrangements of the Specifications and Drawings shall not limit the extent of the Work of the Contract Documents. Accordingly, all Bidders are encouraged to disseminate all of the Specifications, Drawings and other Contract Documents to all persons or entities submitting sub-bids to the Bidder. The omission of any portion or item of Work from the Bid Proposal or from the sub-bidders' sub-bids which is/are necessary to produce the intended results and/or which are reasonably inferable from the Contract Documents is not a basis for adjustment of the Contract Price or the Contract Time. Dissemination of the Contract Documents to sub-bidders and dissemination of addenda issued during the bidding process is solely the responsibility of each Bidder.

13.3 Subcontractor Bonds. In accordance with California Public Contract Code §4108, if a Bidder requires a bond or bonds of its Subcontractor(s), whether the expense of procuring such bond or bonds are to be borne by the Bidder or the Subcontractor(s), such requirements shall be specified in the Bidder's written or published request for sub-bids. Failure of the Bidder to comply with these requirements shall preclude the Bidder from imposing bonding requirements upon its Subcontractor(s) or rejection of a Subcontractor's bid under California Public Contract Code §4108(b).

14. Workers' Compensation Insurance. Pursuant to California Labor Code §3700, the successful Bidder shall secure Workers' Compensation Insurance for its employees engaged in the Work of the Contract. The successful bidder shall sign and deliver to the District the following certificate prior to performing any of the Work under the Contract:

“I am aware of the provisions of §3700 of the California Labor Code which require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that Code and I will comply with such provisions before commencing the performance of the Work of the Contract.”

The form of such Certificate is included as part of the Contract Documents.

15. Bid Security Return. The Bid Security of the three or more low Bidders, the number being solely at the discretion of the District, will be held by the District for ten (10) days after the period for which Bid Proposals must be held open (which is set forth in the Call for Bids) or until posting by the successful Bidder(s) of the bonds, certificates of insurance required and return of executed copies of the Agreement, whichever first occurs, at which time the Bid Security of such other Bidders will be returned to them.

16. **Forfeiture of Bid Security.** If the Bidder awarded the Contract fails or refuses to execute the Agreement within ten (10) calendar days from the date of receiving notification that it is the Bidder to whom the Contract has been awarded, the District may declare the Bidder's Bid Security forfeited as damages caused by the failure of the Bidder to enter into the Contract and may thereupon award the Contract for the Work to the responsible Bidder submitting the next lowest Bid Proposal or may call for new bids, in its sole and exclusive discretion.
17. **Contractor's License.** No Bid Proposal will be considered from a Bidder who, at the time Bid Proposals are opened, is not licensed to perform the Work, in accordance with the Contractors License Law, California Business & Professions Code §§7000 et seq. This requirement is not a mere formality and will not be waived by the District or its Board of Trustees. The required California Contractor's License classification(s) for the Work is/are set forth in the Call for Bids.
18. **Anti-Discrimination.** It is the policy of the District that there is no discrimination against any prospective or active employee engaged in the Work because of race, color, ancestry, national origin, religious creed, sex, age or marital status. All Bidders agree to comply with the District's anti-discrimination policy and all applicable Federal and California anti-discrimination laws including but not limited to the California Fair Employment & Housing Act beginning with California Government Code §§12940 et seq. and California Labor Code §1735. In addition, all Bidders agree to require like compliance by any Subcontractor employed by them on the Work of the Contract.
19. **Bidder's Qualifications.** Each Bidder shall submit with its Bid Proposal the form of Statement of Bidder's Qualifications, which is included within the Contract Documents. All information required by Statement of Bidder's Qualifications shall be completely and fully provided. Any Bid Proposal not accompanied by the Statement of Bidder's Qualifications completed with all information required and bearing the signature of the Bidder's duly authorized representative under penalty of perjury will render the Bid Proposal non-responsive and rejected. If the District determines that any information provided by a Bidder in the Statement of Bidder's Qualifications is false or misleading, or is incomplete so as to be false or misleading, the District may reject the Bid Proposal submitted by such Bidder as being non-responsive.
20. **Job-Walk.** The District will conduct a Job-Walk at the time(s) and place(s) designated in the Call for Bids. The District may, in its sole and exclusive discretion, elect to conduct one or more Job-Walk(s) in addition to that set forth in the Call for Bids, in which event the District shall notify all Bidders who have theretofore obtained the Contract Documents pursuant to the Call for Bids of any such additional Job-Walk. If the District elects to conduct any Job-Walk in addition to that set forth in the Call for Bids, the District shall, in its notice of any such additional Job-Walk(s), indicate whether Bidders' attendance at such additional Job-Walk(s) is/are mandatory. If attendance at the Job Walk is indicated in the Call for Bids as being mandatory, the failure of any Bidder to have its authorized representative present at the entirety of the Job-Walk will render the Bid Proposal of such Bidder to be non-responsive. Where the Job-Walk is mandatory, a Bidder may have more than one authorized representative and/or representatives of its Subcontractors present at the Job-Walk; provided, however that attendance by representatives of the Bidder's Subcontractors without attendance by a representative of the Bidder shall not be sufficient to meet the Bidder's obligations hereunder and will render the Bid Proposal of such Bidder to be non-responsive. The District will reject the Bid Proposal of a Bidder who obtains the Bid and Contract Documents after the date of the Mandatory Job-Walks set forth in the Call for Bids unless a Job-Walk is requested by such Bidder and a Job-Walk is conducted by the District in accordance with the following provisions. The District may, in its sole and exclusive discretion, conduct such requested Job-Walk taking into consideration factors such as the time remaining prior to the scheduled opening of Bid Proposals. Any such requested Job Walk will be conducted only upon the requesting Bidder's agreement to reimburse the District for the actual and/or reasonable costs for the District's staff and its agents and representatives in arranging for and conducting such additional Job-Walk.

- 21. Public Records.** Bid Proposals and other documents responding to the Call for Bids become the exclusive property of the District upon submittal to the District. At such time as the District issues the Notice of Intent to award the Contract pursuant to these Instructions for Bidders, all Bid Proposals and other documents submitted in response to the Call for Bids become a matter of public record and shall be thereupon be considered public records, except for information contained in such Bid Proposals deemed to be Trade Secrets (as defined in California Civil Code §3426.1) and information provided in response to the Statement of Qualifications. A Bidder that indiscriminately marks all or most of its Bid Proposal as exempt from disclosure as a public record, whether by the notations of "Trade Secret," "Confidential," "Proprietary," or otherwise, may result render the Bid Proposal non-responsive and rejected. The District is not liable or responsible for the disclosure of such records, including those exempt from disclosure if disclosure is deemed required by law, by an order of Court, or which occurs through inadvertence, mistake or negligence on the part of the District or its officers, employees or agents. At such time as Bid Proposals are deemed a matter of public record, pursuant to the above, any Bidder or other party shall be afforded access for inspection and/or copying of such Bid Proposals, by request made to the District in conformity with the California Access to Public Records Act, California Government Code §§6250, et. seq. If the District is required to defend or otherwise respond to any action or proceeding wherein request is made for the disclosure of the contents of any portion of a Bid Proposal deemed exempt from disclosure hereunder, the Bidder submitting the materials sought by such action or proceeding agrees to defend, indemnify and hold harmless the District in any action or proceeding from and against any liability, including without limitation attorneys' fees arising therefrom. The party submitting materials sought by any other party shall be solely responsible for the cost and defense in any action or proceeding seeking to compel disclosure of such materials; the District's sole involvement in any such action shall be that of a stakeholder, retaining the requested materials until otherwise ordered by a court of competent jurisdiction.
- 22. Drug Free Workplace Certificate.** In accordance with California Government Code §§8350 et seq., the Drug Free Workplace Act of 1990, the successful Bidder will be required to execute a Drug Free Workplace Certificate concurrently with execution of the Agreement. The successful Bidder will be required to implement and take the affirmative measures outlined in the Drug Free Workplace Certificate and in California Government Code §§8350 et seq. Failure of the successful Bidder to comply with the measures outlined in the Drug Free Workplace Certificate and in California Government Code §§8350 et seq. may result in penalties, including without limitation, the termination of the Agreement, the suspension of any payment of the Contract Price otherwise due under the Contract Documents and/or debarment of the successful Bidder.
- 23. Public Works Contractor Registration Certificate.** Pursuant to California Senate Bill 854, the qualified Contractor shall be registered with the California's Department of Industrial Relations (DIR) and its subcontractors who intend to bid or perform work on any public works project, as defined under Labor Code Section 1720. The qualified Contractor shall sign and deliver to the District the form of Public Works Contractor Registration Certification included with the Contract Documents.
- 24. Compliance with Immigration Reform and Control Act of 1986.** The Bidder is solely and exclusively responsible for employment of individuals for the Work of the Contract in conformity with the Immigration Reform and Control Act of 1986, 8 USC §§1101 et seq. (the "IRCA"); the successful Bidder shall also require that any person or entity employing labor in connection with any of the Work of the Contract shall so similarly comply with the IRCA.
- 25. Notice of Intent to Award Contract.** Following the public opening and reading of Bid Proposals, the District will issue a Notice of Intent to Award the Contract, identifying the Bidder to whom the District intends to award the Contract and the date/time/place of the District's Board of Trustees meeting at which award of the Contract will be considered.

- 26. Bid Protest.** Any Bidder submitting a Bid Proposal to the District may file a protest of the District's intent to award the Contract provided that each and all of the following are complied with:
- (i) The bid protest is in writing;
 - (ii) The bid protest is filed and received by the District's Vice-Chancellor, Facilities Planning and Management not more than five (5) calendar days following the date of issuance of the District's Notice of Intent to Award the Contract; and
 - (iii) The written bid protest sets forth, in detail, all grounds for the bid protest, including without limitation all facts, supporting documentation, legal authorities and argument in support of the grounds for the bid protest; any matters not set forth in the written bid protest shall be deemed waived. All factual contentions must be supported by competent, admissible and creditable evidence.

Any bid protest not conforming to the foregoing shall be rejected by the District as invalid. Provided that a bid protest is filed in strict conformity with the foregoing, the District's Vice-Chancellor, Facilities Planning and Management or such individual(s) as may be designated by him/her, shall review and evaluate the basis of the bid protest. Either, the District's Vice-Chancellor, Facilities Planning and Management or other individual designated by him/her shall provide the bidder submitting the bid protest with a written statement concurring with or denying the bid protest. The District's Board of Trustees will render a final determination and disposition of a bid protest by taking action to adopt, modify or reject the disposition of a bid protest as reflected in the written statement of the District's Vice-Chancellor, Facilities Planning and Management or his/her designee. Action by the District's Board of Trustees relative to a bid protest shall be final and not subject to appeal or reconsideration by the District's Vice-Chancellor, Facilities Planning and Management any other employee or officer of the District or the District's Board of Trustees. The rendition of a written statement by the District's Vice-Chancellor, Facilities Planning and Management (or his/her designee) and action by the District's Board of Trustees to adopt, modify or reject the disposition of the bid protest reflected in such written statement shall be express conditions precedent to the institution of any legal or equitable proceedings relative to the bidding process, the District's intent to award the Contract, the District's disposition of any bid protest or the District's decision to reject all Bid Proposals. In the event that any such legal or equitable proceedings are instituted and the District is named as a party thereto, the prevailing party(ies) shall recover from the other party(ies), as costs, all attorneys' fees and costs incurred in connection with any such proceeding, including any appeal arising therefrom.

End of Section

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NON-COLLUSION AFFIDAVIT

STATE OF CALIFORNIA)
COUNTY OF _____)

PROJECT: BID NO.: B20/21-07, Domestic Water Booster System Project

I, _____, being first duly sworn, deposes and says that I
(Typed or Printed Name)
am the _____ of _____, the party
(Title) (Bidder Name)
submitting the foregoing Bid Proposal ("the Bidder"). In connection with the foregoing Bid Proposal, the undersigned declares, states and certifies that:

1. The Bid Proposal is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization or corporation.
2. The Bid Proposal is genuine and not collusive or sham.
3. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any other bidder or anyone else to put in sham bid, or to refrain from bidding.
4. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price, or that of any other bidder, or to fix any overhead, profit or cost element of the bid price or that of any other bidder, or to secure any advantage against the public body awarding the contract or of anyone interested in the proposed contract.
5. All statements contained in the Bid Proposal and related documents are true.
6. The bidder has not, directly or indirectly, submitted the bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any person, corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Executed this ____ day of _____, 2021 at _____.
(City, County and State)

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Signature

(Address)

Name Printed or Typed

(City, County and State)

(_____) _____
(Area Code and Telephone Number)

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STATEMENT OF BIDDER'S QUALIFICATIONS

1. Bidder's Organization

1.1 Form of entity of Bidder, i.e., corporation, partnership, etc. _____

1.1.1 If a corporation, state the following:

State of incorporation: _____

Date of incorporation: _____

President/Chief Executive Officer: _____

Secretary: _____

Treasurer/Chief Financial Officer: _____

1.1.2 If a partnership, state the following:

Type of partnership, i.e., general partnership, limited partnership: _____

Names of all general partners, if any of the general partners are not natural persons, provide the information for each such general partner requested by Paragraphs 1.1.1, 1.1.2 and 1.1.4 as appropriate: _____

1.1.3 If a proprietorship, state the names of all proprietors: _____

1.1.4 If a joint venture, state the following

Date of organization: _____

Names of all joint venture members. For each member of the joint venture, provide the information requested by Paragraphs 1.1.1, 1.1.2 and 1.1.3 for each joint venture member, as applicable: _____

1.2 Number of years your organization has been in business as a contractor: _____

1.3 Number of years your organization has conducted business under its present name:

1.4 If your organization has conducted business under a name or name style different than your organization's present name, identify all prior name(s) or name style(s):

1.5 Your organization's Federal Tax Identification Number: _____

1.6 Your Public Works Contractor Registration Number: _____

2. Licensing

2.1 California Contractors License: Number: _____
Expiration Date: _____
Responsible Managing Employee/Officer: _____
License Classification(s): _____

2.2 Has a claim or other demand ever been made against your organization's California Contractors License Bond? _____ Yes _____ No
If yes, on a separate attachment, state the following: (i) the name, address and telephone number of each person or entity making claim or demand; (ii) the date of each claim or demand; (iii) the circumstances giving rise to each such claim or demand; and (iv) the disposition of each such claim or demand.

2.3 Has a complaint ever been filed against your organization's California Contractors License with the California Contractors State License Board? _____ Yes _____ No
If yes, on a separate attachment, state the following for each complaint: (i) the name, address and telephone number of each person or entity making the complaint; (ii) the date of each complaint; (iii) the circumstances giving rise to each such complaint; and (iv) the disposition of each such complaint, including without limitation, any disciplinary or other action imposed or taken by the California Contractors State License Board as a result of any such complaint.

2.4 Has your contractors' license(s) been consistently active for at least five (5) years without revocation or suspension? _____ Yes _____ No

3. Experience

3.1 Categories of work (other than management/supervision) your organization typically performs with your own forces _____

3.2 On a separate attachment, list similar sized construction project completed by your organization in the past five (5) years and for each project identified, state: (i) a general description of the work performed by your organization on the project; (ii) the dollar value of the work performed or to be performed by your organization, percentage of change orders for the project, original completion date and final completion date (iii) the project owner's name, address, telephone number and email address, the name of the project owner's representative, address, telephone number and email address; and (iv) the project architect's name, address, telephone number, contact person and their email address.

3.3 On a separate attachment, list all construction projects your organization has in progress and for each project listed, state: (i) a general description of the work performed by your organization on the project; (ii) the dollar value of the work performed or to be performed

by your organization; (iii) the project owner's name, name of the project owner's representative and the address and telephone number of the project owner and the project owner's representative; (iv) the project architect's name, address, telephone number and contact person; (v) percent presently complete; and (vi) the current scheduled completion date.

4. Performance History

- 4.1 Claims and lawsuits (if you answer yes to any of the following, you must attach details).
- 4.1.1 Have any lawsuits or other administrative, legal, arbitration or other proceedings, ever been brought or commenced against your organization or any of its principals, officers or equity owners in connection with any construction contract or construction project? Yes No
- 4.1.2 Has your organization ever filed a lawsuit or commenced other administrative, legal or other proceedings in connection with any construction contract or construction project? Yes No
- 4.1.3 Are there any judgements, orders, decrees or arbitration awards pending, outstanding against your organization or any of the officers, directors, employees or principals of your organization? Yes No
- 4.2 Has your organization ever refused to sign a construction contract awarded to it?
 Yes No
- 4.3 Has your organization ever failed to complete a construction contract? Yes No
- 4.4 Has your organization ever been declared in default of a construction contract within California within the past ten (10) years?
 Yes No
- 4.5 Has any construction contract to which your organization has been or is a party to been terminated for the convenience of the project owner? Yes No
- 4.6 Has a claim or other demand ever been asserted against any Bid Bond, Performance Bond, or Payment Bond posted by your organization in connection with any construction contract or your submittal of a bid proposal for a construction contract?
 Yes No
- 4.7 Has your Firm or an Associated Firm or any of their owners or officers who owns ten percent (10%) or more equity interest of your organization been convicted of a crime under federal, state, or local law involving: bidding for, awarding of, or performance of a contract with a public entity; making a false claim(s) to any public entity; or fraud, theft, or other act of dishonesty to any contracting party within the past ten (10) years?
 Yes No
- 4.8 Has your organization or any predecessor to your organization been charged with a violation of the California False Claims Act or similar federal statute within the past ten (10) years?
 Yes No

4.9 Has any individual or entity who owns ten percent (10%) or more of the equity interest of your organization been an equity owner of ten percent (10%) or more of the equity interest of any other entity or organization, within the past ten (10) years, which has been charged with a violation of the California False Claims Act or similar federal statute within the past ten (10) years?
 Yes No

4.10 Has any individual or entity who owns ten percent (10%) or more of the equity interest of your organization been charged with a violation of the California False Claims Act or similar federal statute within the past ten (10) years?
 Yes No

If "YES" to any of the above questions you will Not qualify for this project.

4.11 Has your Firm contracted for and completed construction of a minimum of three (3) California community college, or other university or college (higher education) projects, each with a value of at least **\$1,000,000**, and all within the past seven (7) years?
 Yes No

5.0 **References** (Include name, contact person, telephone, email and address for each reference provided):

5.1 Trade References (three (3) minimum)

5.2 Bank References

5.3 Public Works Inspectors of Record (K-12 or community college project)

5.4 Owner references (three (3) minimum, California K-12 school districts and/or California community college districts)

6.0 Accuracy and Authority

The undersigned is duly authorized to execute this Statement of Bidders Qualifications under penalty of perjury on behalf of the Bidder. The undersigned warrants and represents that he/she has personal knowledge of each of the responses to this Statement of Bidder's Qualifications and/or that he/she has conducted all necessary and appropriate inquiries to determine the truth, completeness and accuracy of responses to this Statement of Bidder's Qualifications.

The undersigned declares and certifies that the responses to this Statement of Bidder's Qualifications are complete and accurate; there are no omissions of material fact or information that render any response to be false or misleading and there are no misstatements of fact in any of the responses.

Executed this ___ day of _____ 2021 at _____

(City and State)

I declare under penalty of perjury under California law that the foregoing is true and correct.

(Signature)

(Typed or written name)

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BID BOND

KNOW ALL MEN BY THESE PRESENTS that we, _____, as Surety and _____, as Principal, are jointly and severally, along with their respective heirs, executors, administrators, successors and assigns, held and firmly bound unto **CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT**, hereinafter "the Oblige," for payment of the penal sum hereof in lawful money of the United States, as more particularly set forth herein.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the Principal has submitted the accompanying Bid Proposal to the Oblige for the Work commonly described as the **BID NO.: B20/21-07, Domestic Water Booster System Project**,

WHEREAS, subject to the terms of this Bond, the Surety is firmly bound unto the Oblige in the penal sum of **ten percent (10%)** of the maximum amount of the Bid Proposal submitted by the Principal to the Oblige, as set forth above.

NOW THEREFORE, if the Principal shall not withdraw said Bid Proposal within the period specified therein after the opening of the same, or, if no period be specified, for sixty (60) days after opening of said Bid Proposal; and if the Principal is awarded the Contract, and shall within the period specified therefor, or if no period be specified, within five (5) days after the prescribed forms are presented to him for signature, enter into a written contract with the Oblige, in accordance with the Bid Proposal as accepted and give such bond(s) with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such Contract and for the payment for labor and materials used for the performance of the Contract, or in the event of the withdrawal of said Bid Proposal within the period specified for the holding open of the Bid Proposal or the failure of the Principal to enter into such Contract and give such bonds within the time specified, if the Principal shall pay the Oblige the difference between the amount specified in said Bid Proposal and the amount for which the Oblige may procure the required Work and/or supplies, if the latter amount be in excess of the former, together with all costs incurred by the Oblige in again calling for Bids, then the above obligation shall be void and of no effect, otherwise to remain in full force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or the Call for Bids, the Work to be performed thereunder, the Drawings or the Specifications accompanying the same, or any other portion of the Contract Documents shall in no way affect its obligations under this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said Contract, the Call for Bids, the Work, the Drawings or the Specifications, or any other portion of the Contract Documents.

In the event suit or other proceeding is brought upon this Bond by the Oblige, the Surety shall pay to the Oblige all costs, expenses and fees incurred by the Oblige in connection therewith, including without limitation, attorney's fees.

IN WITNESS WHEREOF, the Principal and Surety have executed this instrument this _____ day of _____, 2021 by their duly authorized agents or representatives.

(Principal's Corporate Seal)

(Principal Name)

By: _____

(Typed or Printed Name)

Title: _____

(Surety's Corporate Seal)

(Surety Name)

By: _____
(Signature of Surety)

(Attach Attorney-in-Fact Certificate)

(Typed or Printed Name)

() _____
(Area Code and Telephone Number of Attorney-in-Fact for Surety)

Contact name, address, telephone number and email address for notices to the Surety

(Contact Name)

(Address)

(Telephone)

(Email address)

CERTIFICATION OF PRE-BID SITE VISIT

The Honorable Board of Trustees
Chabot-Las Positas Community College District
7600 Dublin Blvd., 3rd Floor
Dublin, California 94568

RE: BID NO.: B20/21-07, Domestic Water Booster System Project

Ladies and Gentlemen:

In connection with submitting, a Bid Proposal for the Work described as BID NO.: B20/21-07 Domestic Water Booster System Project, I visited the Site of the Work on Tuesday, January 12, 2021 at 10:00am

on behalf of _____
Bidder Name

to inspect the Site of the proposed work, which will be turned over to the Bidder, if awarded the Contract, in its present condition, with a representative of the Chabot-Las Positas Community College, in order to acquaint the Bidder with the proposed Work so that the Bidder fully understands the facilities, difficulties, and restrictions attendant to execution and completion of the Work. I have also reviewed on behalf of the Bidder, the as-built drawings and/or previous Contract Documents, site conditions and Bid Documents with District representatives and/or Construction Manager for the Project.

I certify all conditions provided for my review and their effect on the Work as called for in the Contract Documents are included and accounted for in the Bid Proposal amounts submitted to the District.

I understand that a Bidder who fails to submit this Certification of Pre-Bid Site Visit, fully executed, with the Bidder's Bid Proposal form, will result in rejection of the Bid Proposal for non-responsiveness.

Name of Bidder

Authorized Signatory

Address

Phone Number

Date

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BID PROPOSAL

TO: **CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT**, a California Community College District, acting by and through its Board of Trustees (“the District”).

FROM:

(Name of Bidder)
(Address)
(City, State, Zip Code)
(Telephone/Fax)
(E-Mail Address of Bidder’s Representative(s))
(Name(s) of Bidder’s Authorized Representative(s))

1. Bid Proposal

1.	Base Bid	\$
2.	Owner’s Non-Specified Allowance	\$ 10,000
3.	Total Bid Amount (Sum of Line 1 + 2)	\$

1.1 Bid Proposal Amount. The undersigned Bidder proposes and agrees to perform the Contract including, without limitation, providing and furnishing any and all of the labor, materials, tools, equipment and services necessary to complete in a workmanlike manner all of the Work and other obligations required by the Contract Documents for the sum of _____ Dollars (\$ _____) (Line 4 of Table above). The Bidder confirms that it has checked all of the above figures and understands that neither the District nor any of its agents, employees or representatives shall be responsible for any errors or omissions on the part of the undersigned Bidder in preparing and submitting this Bid Proposal. The Bidder confirms that the bid proposal includes the Owner’s Non-Specified Allowance in the amount of Ten Thousand Dollars and No Cents (\$10,000.00).

1.2 Owner’s Non-Specified Allowance. Bidder shall include in Bid Proposal the stipulated sum of Ten Thousand Dollars and No Cents (\$10,000.00) for non-specified work to be performed ONLY at the determination and direction of the District. Work performed at the determination and direction of the District under this Allowance shall be documented by Contractor and submitted to Construction Manager per the requirements specified in Article 9 of the General Conditions. Contractor shall include a separate line item in

Contractor's Schedule of Values as "Allowance" with the value of Ten Thousand Dollars (\$10,000.00). At closeout of Contract, any funds remaining in the Allowance shall be credited to Owner through a Change Order.

1.3 Acknowledgment of Bid Addenda. The Bidder confirms that this Bid Proposal incorporates and is inclusive of, all items or other matters contained in Bid Addenda issued by or on behalf of the District.

_____ **Addenda Nos.** _____ received, acknowledged
(initial) and incorporated into this Bid Proposal.

2. **Documents Accompanying Bid.** The Bidder has submitted with this Bid Proposal the following: (a) Bid Security; (b) Subcontractors List; (c) Statement of Qualifications; (d) Certification of Pre-Bid Site Visit; (e) Non-Collusion Affidavit; and (f) Public Works Contractor Registration Certification Form. The Bidder acknowledges that if this Bid Proposal and the foregoing documents are not fully in compliance with applicable requirements set forth in the Call for Bids, the Instructions for Bidders and in each of the foregoing documents, the Bid Proposal may be rejected as non-responsive.

3. **Award of Contract.** If the Bidder submitting this Bid Proposal is awarded the Contract, the undersigned will execute and deliver to the District the Contract in the form attached hereto within ten (10) days after notification of award of the Contract. Concurrently with delivery of the executed Agreement to the District, the Bidder awarded the Contract shall deliver to the District: (a) Certificates of Insurance evidencing all insurance coverages required under the Contract Documents; (b) the Performance Bond; (c) the Labor and Material Payment Bond; (d) the Certificate of Workers' Compensation Insurance; and (e) the Drug-Free Workplace Certificate. Failure of the Bidder awarded the Contract to strictly comply with the preceding may result in the District's rescission of the award of the Contract and/or forfeiture of the Bidder's Bid Security. In such event, the District may, in its sole and exclusive discretion elect to award the Contract to the responsible Bidder submitting the next lowest Bid Proposal, or to reject all Bid Proposals.

4. **Contractor's License.** The undersigned Bidder is currently and duly licensed in accordance with the California Contractors License Law, California Business & Professions Code §§7000 et seq., under the following classification(s) _____ bearing License Number(s) _____, with expiration date(s) of _____. The Bidder certifies that: (a) it is duly licensed, in the necessary class(es), for performing the Work of the Contract Documents; (b) that such license shall be in full force and effect throughout the duration of the performance of the Work under the Contract Documents; and (c) that all Subcontractors providing or performing any portion of the Work shall be so properly licensed to perform or provide such portion of the Work.

5. **Acknowledgment and Confirmation.** The undersigned Bidder acknowledges its receipt, review and understanding of the Drawings, the Specifications and other Contract Documents pertaining to the proposed Work. The undersigned Bidder certifies that the Contract Documents are, in its opinion, adequate, feasible and complete for providing, performing and constructing the Work in a sound and suitable manner for the use specified and intended by the Contract Documents. The undersigned Bidder certifies that it has, or has available, all necessary equipment, personnel, materials, facilities and technical and financial ability to complete the Work for the amount bid herein within the Contract Time and in accordance with the Contract Documents.

(Corporate Seal)

By: _____

(Signature)

(Typed or Printed Name)

Title: _____

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AGREEMENT

THIS AGREEMENT is made this ____ day of _____, 2021, in the City of Dublin, County of Alameda, State of California, by and between **CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT**, a California Community College District hereinafter "District" and _____ ("Contractor") doing business at _____.

WITNESSETH, that the District and the Contractor in consideration of the mutual covenants contained herein agree as follows:

1. **The Work.** Within the Contract Time and for the Contract Price, subject to adjustments thereto pursuant to the Contract Documents, the Contractor shall perform and provide all necessary labor, materials, tools, equipment, utilities, services and transportation to complete in a workmanlike manner all of the Work required in connection with the work of improvement commonly referred to as **BID NO.: B20/21-07, Domestic Water Booster System Project**. Contractor shall complete all Work covered by the Contract Documents, including without limitation, the Drawings and Specifications prepared by Catalyst Consulting Group and other Contract Documents enumerated in Article 5 below, along with all modifications and addenda thereto issued in accordance with the Contract Documents.
2. **Contract Time.** The Work shall be commenced on the date stated in the District's Notice to Proceed; the Contractor shall achieve Substantial Completion of the Work within the Contract Time set forth in the Contract Documents.
3. **Contract Price.** The District shall pay the Contractor as full consideration for the Contractor's full, complete and faithful performance of the Contractor's obligations under the Contract Documents, subject to adjustments of the Contract Price in accordance with the Contract Documents, the Contract Price of _____ Dollars (**\$**_____), which includes the Owner's Non-Specified Allowance of \$10,000.00. The Contract Price is based upon the Contractor's Base Bid Proposal.

The District's payment of the Contract Price shall be in accordance with the Contract Documents.

4. **Liquidated Damages.** If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, including adjustments thereto authorized by the Contract Documents, the Contractor shall be subject to assessment of Liquidated Damages in accordance with the Contract Documents. Failure of the Contractor to complete Punchlist items noted upon Substantial Completion within the time established to complete the Punchlist items will result in the District's assessment of Liquidated Damages in accordance with the Contract Documents.
5. **The Contract Documents.** The documents forming a part of the Contract Documents consist of the following, all of which are component parts of the Contract Documents.

Notice to Contractors Calling For Bids	Bid Bond
Instructions For Bidders	Bid Addenda Nos. _____
Bid Proposal	Agreement
Subcontractors List	Performance Bond
Non-Collusion Affidavit	Labor and Materials Payment Bond
Statement of Bidder's Qualifications	Drug-Free Workplace Certification

Certificate of Workers Compensation
Insurance Certification
General Conditions
Special Conditions
Change Order Form
Asbestos and Other Hazardous Materials
Debris Recycling Statement

Certification of Pre-Bid Site Visit
Public Works Contractor Registration
Certification Form
Guarantee
Specifications
Drawings

6. **Authority to Execute.** The individual(s) executing this Agreement on behalf of the Contractor is/are duly and fully authorized to execute this Agreement on behalf of Contractor and to bind the Contractor to each and every term, condition and covenant of the Contract Documents.

CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED AND REGULATED BY THE CONTRACTORS' STATE LICENSE BOARD. ANY QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO THE REGISTRAR, CONTRACTORS' STATE LICENSE BOARD, P.O. BOX 2600, SACRAMENTO, CALIFORNIA 95826

IN WITNESS WHEREOF, this Agreement has been duly executed by the District and the Contractor as of the date set forth above.

**“DISTRICT”
CHABOT-LAS POSITAS COMMUNITY
COLLEGE DISTRICT**

**“CONTRACTOR”
(CONTRACTOR NAME)**

By: _____
Date

Mr. Jonah Nicholas
Vice Chancellor, Business Services

By: _____
Date

Date

Title:

(CORPORATE SEAL)

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that we, _____, as Principal, and _____ as Surety, are held and firmly bound unto **CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT** hereinafter "the Obligee", in the penal sum of _____ Dollars (\$_____) in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the Obligee, by resolution of its Board of Trustees has awarded to the Principal a Contract for the Work described as **BID NO.: B20/21-07, Domestic Water Booster System Project**.

WHEREAS, the Principal, has entered into an agreement with the Obligee for performance of the Work; the Agreement and all other Contract Documents set forth therein are incorporated herein and made a part hereof by this reference.

WHEREAS, by the terms of the Contract Documents, the Principal is required to furnish a bond ensuring the Principal's prompt, full and faithful performance of the Work of the Contract Documents.

NOW THEREFORE, if the Principal shall promptly, fully and faithfully perform each and all of the obligations and things to be done and performed by the Principal in strict accordance with the terms of the Contract Documents as they may be modified or amended from time to time; and if the Principal shall indemnify and save harmless the Obligee and all of its officers, agents and employees from any and all losses, liability and damages, claims, judgments, liens, costs, and fees of every description, which may be incurred by the Obligee by reason of the failure or default on the part of the Principal in the performance of any or all of the terms or the obligations of the Contract Documents, including all modifications, and amendments, thereto, and any warranties or guarantees required thereunder; then this obligation shall be void; otherwise, it shall be, and remain, in full force and effect.

The Surety, for value received, hereby stipulates and agrees that no change, adjustment of the Contract Time, adjustment of the Contract Price, alterations, deletions, additions, or any other modifications to the terms of the Contract Documents, the Work to be performed thereunder, or to the Specifications or the Drawings shall limit, restrict or otherwise impair Surety's obligations or Obligee's rights hereunder; Surety hereby waives notice from the Obligee of any such changes, adjustments of Contract Time, adjustments of Contract Price, alterations, deletions, additions or other modifications to the Contract Documents, the Work to be performed under the Contract Documents, or the Drawings or the Specifications.

In the event of the Obligee's termination of the Contract due to the Principal's breach or default of the Contract Documents, within thirty (30) days after written notice from the Obligee to the Surety of the Principal's breach or default of the Contract Documents and Obligee's termination of the Contract, the Surety shall notify Obligee in writing of Surety's assumption of obligations hereunder by its election to either remedy the default or breach of the Principal or to take charge of the Work of the Contract Documents and complete the Work at its own expense ("the Notice of Election"); provided, however, that the procedure by which the Surety undertakes to discharge its obligations under this Bond shall be subject to the advance written approval of the Obligee, which approval shall not be unreasonably withheld, limited or restricted. The insolvency of the Principal or the Principal's mere denial of a failure of performance or default under the Contract Documents shall not by itself, without the Surety's prompt,

diligent inquiry and investigation of such denial, be justification for Surety's failure to give the Notice of Election or for its failure to promptly remedy the failure of performance or default of the Principal or to complete the Work.

In the event the Surety shall fail to issue its Notice of Election to Obligee within the time provided for hereinabove, the Obligee may thereafter cause the cure or remedy of the Principal's failure of performance or default or to complete the Work. The Principal and the Surety shall be each jointly and severally liable to the Obligee for all damages and costs sustained by the Obligee as a result of the Principal's failure of performance under the Contract Documents or default in its performance of obligations thereunder, including without limitation the costs of cure or completion exceeding the then remaining balance of the Contract Price; provided that the Surety's liability hereunder for the costs of performance, damages and other costs sustained by the Obligee upon the Principal's failure of performance under or default under the Contract Documents shall be limited to the penal sum hereof, which shall be deemed to include the costs or value of any Changes to the Work which increases the Contract Price.

In the event suit or other proceeding is brought upon this Bond by the Obligee, the Surety shall pay to the Obligee all costs, expenses and fees incurred by the Obligee therewith, including without limitation, attorneys fees.

IN WITNESS WHEREOF, the Principal and Surety have executed this instrument this ____ day of _____, 2021 by their duly authorized agent or representative.

(Principal's Corporate Seal)

(Principal Name)

By: _____

(Typed or Printed Name)

Title: _____

(Surety's Corporate Seal)

(Surety Name)

By: _____
(Signature of Attorney-in-Fact for Surety)

(Attach Attorney-in-Fact Certificate)

(Typed or Printed Name)

() _____
(Area Code and Telephone Number of Attorney-in-Fact for Surety)

Contact name, address, telephone number and email address for notices to the Surety

(Contact Name)

(Address)

(Telephone)

(Email address)

LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that we, _____ as Principal, and _____ as Surety, are held and firmly bound unto **CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT** hereinafter "the Obligee", in the penal sum of _____ Dollars (\$_____) in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the Obligee, by resolution of its Board of Trustees has awarded to the Principal a Contract for the Work described as **BID NO.: B20/21-07, Domestic Water Booster System Project**.

WHEREAS, the Principal, has entered into an Agreement with the Obligee for performance of the Work, the Agreement and all other Contract Documents set forth therein are incorporated herein by this reference and made a part hereof.

WHEREAS, by the terms of the Contract Documents, the Principal is required to furnish a bond for the prompt, full and faithful payment to any Claimant, as hereinafter defined, for all labor materials or services used, or reasonably required for use, in the performance of the Work.

NOW THEREFORE, if the Principal shall promptly, fully and faithfully make payment to any Claimant for all labor, materials or services used or reasonably required for use in the performance of the Work then this obligation shall be void; otherwise, it shall be, and remain, in full force and effect.

The term "Claimant" shall refer to any person, corporation, partnership, proprietorship or other entity including without limitation, all persons and entities described in California Civil Code §3181, providing or furnishing labor, materials or services used or reasonably required for use in the performance of the Work under the Contract Documents, without regard for whether such labor, materials or services were sold, leased or rented. This Bond shall inure to the benefit of all Claimants so as to give them, or their assigns and successors, a right of action upon this Bond.

In the event suit is brought on this Bond by any Claimant for amounts due such Claimant for labor, materials or services provided or furnished by such Claimant, the Surety shall pay for the same and reasonable attorneys fees pursuant to California Civil Code §3250.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, deletion, addition, or any other modification to the terms of the Contract Documents, the Work to be performed thereunder, the Specifications or the Drawings, or any other portion of the Contract Documents, shall in any way limit, restrict or otherwise affect its obligations under this Bond; the Surety hereby waives notice from the Obligee of any such change, extension of time, alteration, deletion, addition or other modification to the Contract Documents, the Work to be performed under the Contract Documents, the Drawings or the Specifications of any other portion of the Contract Documents.

IN WITNESS WHEREOF, the Principal and Surety have executed this instrument this _____ day of _____, 2021 by their duly authorized agent or representative.

(Principal's Corporate Seal)

(Principal Name)

By: _____
(Signature)

(Type or Print Name)

Title: _____

(Surety's Corporate Seal)

(Surety Name)

By: _____
(Signature of Attorney-in-Fact for Surety)

(Type or Print Name of Attorney-in-Fact)

(Attach Attorney-in-Fact Certificate)

() _____
(Area Code and Telephone Number of Attorney-in-Fact for Surety)

Contact name, address, telephone number and email address for notices to the Surety

(Contact Name)

(Address)

(Telephone)

(Email address)

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CERTIFICATE OF WORKERS' COMPENSATION INSURANCE

PROJECT: BID NO.: 20/21-07, Domestic Water Booster System Project

I, _____ the _____ of
(Name) (Title)

_____, declare, state and certify that:
(Contractor Name)

1. I am aware that California Labor Code §3700(a) and (b) provides:

“Every employer except the state shall secure the payment of compensation in one or more of the following ways:

- (a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this state.
- (b) By securing from the Director of Industrial Relations a certificate of consent to self-insure either as an individual employer, or one employer in a group of employers, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his or her employees.”

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

(Contractor Name)

By: _____
(Signature)

(Typed or printed name)

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DRUG-FREE WORKPLACE CERTIFICATION

PROJECT: BID NO.: B20/21-07, Domestic Water Booster System Project

I, _____, am the _____ of
(Print Name) (Title)

_____. I declare, state and certify to all of the following:
(Contractor Name).

1. I am aware of the provisions and requirements of California Government Code §§8350 et seq., the Drug Free Workplace Act of 1990.
2. I am authorized to certify, and do certify, on behalf of Contractor that a drug free workplace will be provided by Contractor by doing all of the following:
 - A. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance is prohibited in Contractor's workplace and specifying actions which will be taken against employees for violation of the prohibition;
 - B. Establishing a drug-free awareness program to inform employees about all of the following:
 - i. The dangers of drug abuse in the workplace;
 - ii. Contractor's policy of maintaining a drug-free workplace;
 - iii. The availability of drug counseling, rehabilitation and employee-assistance programs; and
 - iv. The penalties that may be imposed upon employees for drug abuse violations;
 - C. Requiring that each employee engaged in the performance of the Contract be given a copy of the statement required by subdivision (A), above, and that as a condition of employment by Contractor in connection with the Work of the Contract, the employee agrees to abide by the terms of the statement.
 - D. Contractor agrees to fulfill and discharge all of Contractor's obligations under the terms and requirements of California Government Code §8355 by, inter alia, publishing a statement notifying employees concerning: (a) the prohibition of any controlled substance in the workplace, (b) establishing a drug-free awareness program, and (c) requiring that each employee engaged in the performance of the Work of the Contract be given a copy of the statement required by California Government Code §8355(a) and requiring that the employee agree to abide by the terms of that statement.
3. Contractor and I understand that if the District determines that Contractor has either: (a) made a false certification herein, or (b) violated this certification by failing to carry out and to implement the requirements of California Government Code §§8355, the Contract awarded herein is subject to termination, suspension of payments, or both. Contractor and I further understand that, should Contractor violate the terms of the Drug-Free Workplace Act of 1990, Contractor may be subject to debarment in accordance with the provisions of California Government Code §§8350, et seq.
4. Contractor and I acknowledge that Contractor and I are aware of the provisions of California Government Code §§8350, et seq. and hereby certify that Contractor and I will adhere to, fulfill, satisfy and discharge all provisions of and obligations under the Drug-Free Workplace Act of 1990.

I declare under penalty of perjury under the laws of the State of California that all of the foregoing is true and correct.

Executed at _____ this ____ day of _____, 2021
(City and State)

(Signature)

(Handwritten or Typed Name)

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GENERAL CONDITIONS

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- 1.2 Contractor.** The Contractor is the person or entity identified as such in the Agreement; references to “Contractor” include the Contractor's authorized representative.
- 1.3 Architect.** The Architect is the person or entity identified as such in the Agreement; references to the “Architect” include the Architect's authorized representative.
- 1.4 The Work.** The “Work” is the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment or services provided or to be provided by the Contractor to fulfill the Contractor's obligations under the Contract Documents. The Work may constitute the whole or a part of the Project.
- 1.5 The Project.** The Project is the total construction of which the Work performed by the Contractor under the Contract Documents which may be the whole or a part of the Project and which may include construction by the District or by separate contractors.
- 1.6 Surety.** The Surety is the person or entity that executes, as surety, the Contractor's Labor and Material Payment Bond and/or Performance Bond.
- 1.7 Subcontractors; Sub-Subcontractors.** A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work. “Subcontractor” does not include a separate contractor to the District or subcontractors of any separate contractor. A Sub-Subcontractor is a person or entity of any tier, who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site.
- 1.8 Material Supplier.** A Material Supplier is any person or entity who only furnishes materials, equipment or supplies for the Work without fabricating, installing or consuming them in the Work.
- 1.9 Drawings and Specifications.** The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing generally, the design, location and dimensions of the Work and may include without limitation, plans, elevations, sections, details, schedules or diagrams. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards, criteria and workmanship for the Work and related services. The Drawings and Specifications are intended to delineate and describe the Work and its component parts so as to permit skilled and competent contractors to bid upon the Work and prosecute the same to completion. Large scale Drawings shall take precedence over smaller scale Drawings as to shape and details of construction. Figured dimensions on Drawings shall govern, but Work which is not dimensioned shall be as directed or required by field conditions. Specifications shall govern as to materials, workmanship and installation procedures.

1.10 Special Conditions; Supplemental Conditions. If made a part of the Contract Documents, Special Conditions and Supplemental Conditions are special or supplemental provisions, not otherwise provided for in the Agreement or the General Conditions.

1.11 Contract Documents. The Contract Documents consist of the Agreement between the District and the Contractor, Conditions of the Contract (whether General, Special, Supplemental or otherwise), Drawings, Specifications, including addenda thereto issued prior to execution of the Agreement and any other documents listed in the Agreement. The Contract Documents shall include modifications issued after execution of the Agreement. The Contract Documents form the Contract for Construction.

1.12 Intent and Correlation of Contract Documents.

1.12.1 Work of the Contract Documents. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable therefrom as being necessary to produce the intended results. Organization of the Specifications into divisions, sections or articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Where any portion of the Contract Documents is silent and information appears elsewhere in the Contract Documents, such other portions of the Contract Documents shall control.

1.12.2 Technical Terms. Unless otherwise stated in the Contract Documents, words or terms which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

1.12.3 Conflict in Contract Documents. Conflicts, inconsistencies or ambiguities in the Contract Documents shall be resolved by the Architect in accordance with Article 3.1.9 of the General Conditions; where conflicts or inconsistencies arise between the Drawings and the Specifications, in resolving such conflicts or inconsistencies, the Architect will be governed generally by the following standards: the Drawings are intended to describe matters relating to placement, type, quantity and the like; the Specifications are intended to describe matters relating to quality, materials, compositions, manufacturers and the like. If conflicts exist between portions of the Contract Documents regarding the quality of any item, product, equipment or materials, unless otherwise directed or authorized by the District, the Contractor shall provide the item, product, equipment or material of the highest or more stringent quality.

1.13 Shop Drawings; Samples; Product Data (“Submittals”). Shop Drawings are diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-Subcontractor, manufacturer, Material Supplier, or distributor to illustrate some portion of the Work. Samples are physical examples of materials, equipment or workmanship forming a part of, or to be incorporated into the Work. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work. Shop Drawings, Samples and Product Data prepared or furnished by the

Contractor or any of its Subcontractors or Material Suppliers are collectively referred to as "Submittals".

- 1.14 Division of State Architect ("DSA").** The DSA is the California Division of the State Architect including without limitation the DSA's Office of Construction Services, Office of Design Services and the Office of Regulatory Services; references to the DSA in the Contract Documents shall mean the DSA, its offices and its authorized employees and agents. The authority of the DSA over the Work and the performance thereof shall be as set forth in the Contract Documents and Title 24 of the California Code of Regulations.
- 1.15 Project Inspector.** The Project Inspector is the individual designated and employed by the District in accordance with the requirements of Title 24 of the California Code of Regulations. The Project Inspector shall be authorized to act on behalf of the District as provided for in the Contract Documents and in Title 24 of the California Code of Regulations, as the same may be amended from time to time.
- 1.16 Contract Document Terms.** The term "provide" means "provide complete in place" or to "furnish and install" such item. Unless otherwise provided in the Contract Documents, the terms "approved;" "directed;" "satisfactory;" "accepted;" "acceptable;" "proper;" "required;" "necessary" and "equal" shall mean as approved, directed, satisfactory, accepted, acceptable, proper, required, necessary and equal, in the opinion of the Architect. The term "typical" as used in the Drawings shall require the installation or furnishing of such item(s) of the Work designated as "typical" in all other areas similarly marked as "typical"; Work in such other areas shall conform to that shown as "typical" or as reasonably inferable therefrom.
- 1.17 Contractor's Superintendent.** The Contractor's Superintendent is the individual employed by the Contractor whose principal responsibility shall be the supervision and coordination of the Work; the Contractor's Superintendent shall not perform routine construction labor.
- 1.18 Record Drawings.** The Record Drawings are a set of the Drawings marked by the Contractor during the performance of the Work to indicate completely and accurately the actual as-built condition of the Work. The Record Drawings shall be sufficient for a capable and qualified draftsman to modify the Drawings to reflect and indicate the Work actually in place at Final Completion of the Work.
- 1.19 Construction Manager.** The Construction Manager is an independent contractor retained by the District and is authorized and empowered to act on behalf of the District as set forth in the Contract Documents. The District reserves the right to remove or replace the Construction Manager prior to completion of the Work without adjustment of the Contract Price or the Contract Time or otherwise affect, limit or restrict Contractor's obligations hereunder.
- 1.20 Construction Equipment.** "Construction Equipment" is equipment utilized for the performance of any portion of the Work, but which is not incorporated into the Work.
- 1.21 Site.** The Site is the physical area designated in the Contract Documents for Contractor's performance, construction and installation of the Work.
- 1.22 Field Clarifications.** A written or graphic document consisting of supplementary details, instructions or information issued on behalf of the District which clarifies or supplements the Contract Documents and which becomes a part of the Contract Documents upon issuance. Field Clarifications do not constitute an adjustment of the Contract Time or the Contract Price,

unless a Change Order relating to a Field Clarification is authorized and issued under the Contract Documents.

- 1.23 Defective or Non-Conforming Work.** Defective or non-conforming Work is any Work which is unsatisfactory, faulty or deficient by: (a) not conforming to the requirements of the Contract Documents; (b) not conforming to the standards of workmanship of the applicable trade or industry; (c) not being in compliance with the requirements of any inspection, reference, standard, test, or approval required by the Contract Documents; or (d) damage occurring prior to Final Completion of all of the Work.
- 1.24 Delivery.** The term “delivery” used in conjunction with any equipment, materials or other items to be incorporated into the Work shall mean the unloading and storage in a protected condition pending incorporation into the Work.
- 1.25 Notice to Proceed.** The Notice to Proceed is the written notice issued by or on behalf of the District to the Contractor authorizing the Contractor to proceed with commencement of the Work and which establishes the date for commencement of the Contract Time.
- 1.26 Progress Reports; Verified Reports.** Progress Reports, if required, are written reports prepared by the Contractor and periodically submitted to the District in the form and content as required by the Contract Documents. Verified Reports are periodic written reports prepared by the Contractor and submitted to the DSA; Verified Reports shall be in such form and content as required by the applicable provisions of Title 24 of the California Code of Regulations. A material obligation of the Contractor is the preparation of complete and accurate Progress Reports, if required, and Verified Reports as well as the timely submission of the same.

ARTICLE 2: DISTRICT

2.1 Information Required of District.

- 2.1.1 Surveys; Site Information.** Information, if any, concerning physical characteristics of the Site, including without limitation, surveys, soils reports, and utility locations, to be provided by the District are set forth in the Contract Documents. Information not provided by the District or necessary information in addition to that provided by the District concerning physical characteristics of the Site which is required shall be obtained by Contractor without adjustment to the Contract Price or the Contract Time.
- 2.1.2 Permits; Fees.** Except as otherwise provided in the Contract Documents, the District shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities which relate to the Work of the Contractor under the Contract Documents. If permits and fees are designated as the responsibility of the Contractor under the Contract Documents, the Contractor shall be solely responsible for obtaining the same; the cost of such permits or fees and any costs incurred by the Contractor in obtaining such permits shall be included within the Contract Price.
- 2.1.3 Drawings and Specifications.** Except as otherwise provided for in the Contract Documents, the District shall furnish the Contractor, free of charge, the number of copies of the Drawings and the Specifications as set forth in the Special Conditions. All of the

Drawings and the Specifications provided by the District to the Contractor remain the property of the District; the Contractor shall not use the Drawings or the Specifications in connection with any other work of improvement other than the Work of the Project.

2.1.4 Furnishing of Information. Information or services to be provided by the District under the Contract Documents shall be furnished by the District with reasonable promptness to avoid delay in the orderly progress of the Work. Information about existing conditions furnished by the District under the Contract Documents is obtained from sources believed to be reliable, but the District neither guarantees nor warrants that such information is complete and accurate. The Contractor shall verify all information provided by the District. To the extent that the Contract Documents depict existing conditions on or about the Site, or the Work involves the renovation, removal or remodeling of existing improvements or the Work involves any tie-in or other connection with any existing improvements, the conditions and/or existing improvements depicted in the Contract Documents are as they are believed to exist. Contractor shall bear the risk of any variations between conditions or existing improvements depicted in the Contract Documents and those conditions or existing improvements actually encountered in the performance of the Work. Subject to the provisions of Article 4.2.3, the existence of any variations between conditions or existing improvements depicted in the Contract Documents and those actually encountered in the performance of the Work shall not result in any District liability therefor, nor shall any such variations result in an adjustment of the Contract Time or the Contract Price.

2.2 District's Right to Stop the Work. In addition to the District's right to suspend the Work or terminate the Contract pursuant to the Contract Documents, the District, may, by written order, direct the Contractor to stop the Work, or any portion thereof, until the cause for such stop work order has been eliminated if the Contractor. If the Contractor fails within seven (7) days to correct Work which is not in conformity and in accordance with the requirements of the Contract Documents, or (ii) otherwise fails to carry out the Work in conformity and accordance with the Contract Documents, the District reserves the right to remedy such action. The right of the District to stop the Work hereunder shall not be deemed a duty on the part of the District to exercise such right for the benefit of the Contractor or any other person or entity, nor shall the District's exercise of such right waive or limit the exercise of any other right or remedy of the District under the Contract Documents or at law.

2.3 Partial Occupancy or Use.

2.3.1 District's Right to Partial Occupancy. The District may occupy or use any completed or partially completed portion of the Work, provided that: (i) the District has obtained the consent of, or is otherwise authorized by, public authorities with jurisdiction thereof, to so occupy or use such portion of the Work and (ii) the District and the Contractor have accepted, in writing, the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, utilities, damage to the Work, insurance and the period for correction of the Work and commencement of warranties required by the Contract Documents for such portion of the Work partially used or occupied by the District. If the Contractor and the District are unable to agree upon the matters set forth in (ii) above, the District may nevertheless use or occupy any portion of the Work, with the responsibility for such matters subject to resolution in accordance with the Contract Documents. Immediately prior to such partial occupancy or use of the Work, or portions thereof, the District, the Project Inspector, the Contractor and the Architect shall jointly inspect the portions of the Work to be occupied or to be used to determine and record the condition of

the Work. Repairs, replacements or other corrective action noted in such inspection shall be promptly performed and completed by the Contractor so that the portion of the Work to be occupied or used by the District is in conformity with the requirements of the Contract Documents and the District's occupancy or use thereof is not impaired. The District's use or occupancy of the Work or portions thereof pursuant to the preceding shall not be deemed "completion" of the Work as that term is used in Public Contract Code §7107.

2.3.2 No Acceptance of Defective or Nonconforming Work. Unless otherwise expressly agreed upon by the District and the Contractor, the District's partial occupancy or use of the Work or any portion thereof, shall not constitute the District's acceptance of the Work not complying with the requirements of the Contract Documents or which is otherwise defective.

2.4 The Project Inspector. In addition to the authority and rights of the Project Inspector as provided for elsewhere in the Contract Documents, all of the Work shall be performed under the observation of the Project Inspector. The performance of the duties of the Project Inspector under the Contract Documents shall not relieve or limit the Contractor's performance of its obligations under the Contract Documents.

2.4.1 Access to Work. The Contractor shall provide the Project Inspector with access to all parts of the Work at any time, wherever located and whether partially or completely fabricated, manufactured, furnished or installed. The Project Inspector shall have the authority to stop Work if the Work is not in conformity with the Contract Documents.

2.4.2 Limitations on Project Inspector. The Project Inspector does not have authority to interpret the Contract Documents or to modify the Work depicted in the Contract Documents. No Work inconsistent with the Contract Documents shall be performed solely on the basis of the direction of the Project Inspector, and the Contractor shall be liable to the District for the consequences of all Work performed on such basis.

ARTICLE 3: ARCHITECT; CONSTRUCTION MANAGER

3.1 Administration of the Contract.

3.1.1 Role of the Architect and Construction Manager. The Architect and the Construction Manager will provide administration of the Contract as described in the Contract Documents, and will be the District's representatives during construction until the time that Final Payment is due the Contractor under the Contract Documents. The Architect and Construction Manager will advise and consult with the District and the Project Inspector with respect to the administration of the Contract and the Work. The Architect is authorized to act on behalf of the District to the extent provided for in the Contract Documents; and shall have the responsibilities and powers established by law, including Title 24 of the California Code of Regulations. The Architect and Construction Manager are authorized to stop the Work whenever deemed necessary in the sole discretion of the Architect or the Construction Manager to insure that the Work is completed in accordance with the Contract Documents.

3.1.2 Architect's Periodic Site Visits. The Architect will visit the Site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the completed Work and to determine, in general, if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract

Documents. The Architect will not be required to make exhaustive or continuous Site inspections to check quality or quantity of the Work. On the basis of Site observations as an architect, the Architect will keep the District informed of the progress of the Work, and will endeavor to guard the District against defects and deficiencies in the Work.

3.1.3 Contractor Responsibility for Construction Means, Methods and Sequences.

Neither the Architect or the Construction Manager will have control over or charge of and be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, these being solely the Contractor's responsibility. Neither the Architect nor Construction Manager will have control over or charge of and be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons performing portions of the Work.

3.1.4 Review of Applications for Payment. In accordance with Article 8 hereof, the Architect and Construction Manager will review the Contractor's Applications for Progress Payments and for Final Payment, evaluate the extent of Work performed and the amount properly due the Contractor on such Application for Payment.

3.1.5 Rejection of Work. The Architect is authorized to reject Work which is defective or does not conform to the requirements of the Contract Documents. Whenever the Architect considers it necessary or advisable, for implementation of the intent of the Contract Documents, the Architect will have authority to require additional inspections or testing of the Work, whether or not such Work is fabricated, installed or completed. Neither this authority of the Architect nor a decision made in good faith by the Architect to exercise or not to exercise such authority shall give rise to a duty or responsibility to the Contractor, Subcontractors, Material Suppliers, their agents or employees, or other persons performing portions of the Work.

3.1.6 Submittals.

3.1.6.1 Processing of Submittals Through Construction Manager. Submittals required by the Contract Documents shall be prepared by or on behalf of the Contractor in accordance with the requirements of the Contract Documents. Submittals shall be transmitted by the Contractor to the Construction Manager for distribution by the Construction Manager to the Architect and the District. Upon completion of the Architect's review of a Submittal, the Construction Manager shall transmit the reviewed Submittal to the Contractor for the Contractor's distribution to its Subcontractor(s) and other affected parties.

3.1.6.2 Architect's Review. The Architect will review and approve or take other appropriate action upon the Contractor's Submittals, but only for the limited purpose of checking for general conformance with information given and the design concept expressed in the Contract Documents. Review of Submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's Submittals shall not relieve the Contractor of its obligations under the Contract Documents. The Architect's review of Submittals shall not constitute approval of safety measures, programs or precautions or, unless otherwise

specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item in a Submittal shall not indicate approval of an assembly of which the item is a component with the Submittal(s) required and relating to such assembly have been reviewed by the Architect.

3.1.6.3 Time for Architect's Review. The Architect's review of Submittals will be conducted promptly so as not to delay or hinder the progress of the Work or the activities of the Contractor, the District or the District's separate contractors while allowing sufficient time, in the Architect's reasonable professional judgment, to permit adequate review of Submittals. The foregoing notwithstanding, the Architect's review and return of Submittals will conform with the time limits and other conditions, if any, set forth in the Specifications or the Submittal Schedule if the Submittal Schedule is required by other provisions of the Contract Documents.

3.1.7 Changes to the Work; Change Orders. The Architect and Construction Manager will prepare Change Orders, and with the written approval of the District, may authorize minor Changes in the Work which do not result in adjustment of the Contract Time or the Contract Price.

3.1.8 Completion. The Architect will conduct observations to determine the date(s) of Substantial Completion and the date(s) of Final Completion, will receive and forward to the District, for the District's review and records, written warranties and related documents required by the Contract Documents and assembled by the Contractor, and will verify that the Contractor has complied with all requirements of the Contract Documents and is entitled to receipt of Final Payment.

3.1.9 Interpretation of Contract Documents; Architect as Initial Arbiter of Disputes. The Architect will interpret and decide matters concerning the requirements of the Contract Documents on written request of either the District or the Contractor. The Architect's response to such requests will be made with reasonable promptness and within the time limits agreed upon, if any. If no agreement is reached establishing the time for the Architect's review and response to requests under this Article 3.1.9, the Architect shall be afforded a fifteen (15) day period after receipt of such request to review and respond thereto. Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both the District and the Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith. The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents. If there is any disagreement, dispute or other matter in controversy between the District and the Contractor, in addition to other requirements established by the Contract Documents or by law, the submission of the same to the Architect for its decision shall be a condition precedent to initiation of dispute resolution procedures.

3.1.10 Request for Information. If the Contractor encounters any condition which the Contractor believes, in good faith and with reasonable basis, is the result of an ambiguity, conflict, error or omission in the Contract Documents (collectively "the Conditions"), it shall be affirmative obligation of the Contractor to timely notify the Architect, in writing, of the Conditions encountered and to request information from the Architect necessary to

address and resolve any such Conditions before proceeding with any portion of the Work affected or which may be affected by such Conditions. If the Contractor fails to timely notify the Architect in writing of any Conditions encountered and the Contractor proceeds to perform any portion of the Work containing or affected by such Conditions the Contractor shall bear all costs associated with or required to correct, remove, or otherwise remedy any portion of the Work affected thereby without adjustment of the Contract Time or the Contract Price. In requesting information of the Architect to address and resolve any Conditions the Contractor shall act with promptness in submitting any such written request so as to allow the Architect a reasonable period of time to review, evaluate and respond to any such request, taking into account the then current status of the progress and completion of the Work and the actual or potential impact of any such Conditions upon the completion of the Work within the Contract Time. The Contract Time shall not be subject to adjustment in the event that the Contractor shall fail to timely request information from the Architect. The Architect's responses to any such Contractor request for information shall conform to the standards and time frame set forth in Article 3.1.9 of these General Conditions. The foregoing provisions notwithstanding, in the event that the Architect reasonably determines that any of Contractor's request(s) for information: (i) does not reflect adequate or competent supervision or coordination by the Contractor or any Subcontractor; or (ii) does not reflect the Contractor's adequate or competent knowledge of the requirements of the Work or the Contract Documents; or (iii) is not justified for any other reason, Contractor shall be liable to the District for all costs incurred by the District associated with the processing, reviewing, evaluating and responding to any such request for information, including without limitation, fees of the Architect and any other design consultant to the Architect or the District. In responding to any of Contractor's request(s) for information, the Architect shall, in the response, indicate if the Architect has made the determination pursuant to the preceding sentence and, if so, the amount of costs to be borne by the Contractor for the processing, review, evaluation and response to the request for information. Thereafter, the District is authorized to deduct such amount from any portion of the Contract Price then or thereafter due the Contractor.

3.1.11 Detail Drawings and Instructions.

3.1.11.1 Architect's Additional Details. In case of ambiguity, conflict, or lack of information, Architect shall furnish additional instructions by means of drawings or otherwise, necessary for proper execution of the Work. All such drawings and instructions shall be consistent with Contract Documents, true developments thereof, and reasonably inferable therefrom. Such additional instructions shall be furnished with reasonable promptness, but not more than fourteen (14) days, provided that Contractor informs Architect and District in writing of the relationship of the requested critical path of the Construction Schedule. Architect will furnish necessary additional details to more fully explain the Work, which details shall be deemed part of the Contract Documents.

3.1.11.2 Contractor Notice of Impacts. If the Contractor believes that detail drawings issued by the Architect reflects a change to the scope of work or additional work beyond that reflected in the Contract Documents or reasonably referable therefrom, the Contractor shall give written notice thereof to Architect and District within five (5) days of the receipt of same. If the Contractor does not give the Architect and District such written notice within five (5) days, the details shall be deemed to be reasonable development of the Work depicted in the Contract Documents without adjustment of the Contract Time or the Contract Price. If notice is given by the Contractor, the

Contractor shall set forth in detail the extent of Contract Price or Contract Time adjustments resulting from such details along with the basis upon which the requested Contract Time/Contract Price adjustment is computed. The Architect will review any such notice and request for adjustment of the Contract Time/Contract Price and render the Architect's decision in accordance with the Contract Documents.

- 3.2 Communications; Role of Construction Manager and Architect.** All communications regarding the Work, the performance thereof or the Contract Documents shall be in writing; verbal communications shall be reduced to writing. Communications between the Contractor and the District or the Architect shall be through the Construction Manager. Communications between separate contractors, if any, shall be through the Construction Manager. All written communications between the Contractor and any Subcontractor, Material Supplier or others directly or indirectly engaged by the Contractor to perform or provide any portion of the Work shall be available to the District, the Construction Manager and the Architect for review, inspection and reproduction as may be requested from time to time. Failure or refusal of the Contractor to permit the District, the Construction Manager or Architect to review, inspect or reproduce such written communications may be deemed a default of Contractor hereunder.
- 3.3 Termination of Architect or Construction Manager; Substitute Architect or Construction Manager.** In case of termination of employment of the Architect or the Construction Manager, the District shall appoint a substitute architect or substitute construction manager whose status under the Contract Documents shall be that of the Architect or the Construction Manager, as applicable.

ARTICLE 4: THE CONTRACTOR

4.1 Contractor Review of Contract Documents.

- 4.1.1 Examination of Contract Documents.** The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the District pursuant to the Contract Documents and shall at once report to the Architect any errors, inconsistencies or omissions discovered. If the Contractor performs any Work knowing, or with reasonable diligence should have known that, it involves an error, inconsistency or omission in the Contract Documents without prior notice to the Architect of the same, the Contractor shall assume full responsibility for such performance and shall bear all attributable costs for correction of the same.
- 4.1.2 Field Measurements.** Prior to commencement of the Work, or portions thereof, the Contractor shall take field measurements and verify field conditions at the Site and shall carefully compare such field measurements and conditions and other information known to the Contractor with information provided in the Contract Documents. Errors, inconsistencies or omissions discovered shall be reported to the Architect at once.
- 4.1.3 Dimensions; Layouts and Field Engineering.** Unless otherwise expressly provided, dimensions indicated in the Drawings are intended for reference only. The Drawings are intended to be diagrammatic and schematic in nature; the Contractor shall be solely responsible for coordinating the Work of the Contract Documents. All field engineering required for laying out the Work and establishing grades for earthwork operations shall be by the Contractor at its expense. Any field engineering or other engineering to be provided

or performed by the Contractor under the Contract Documents and required or necessary for the proper execution or installation of the Work shall be provided and performed by the an engineer duly registered under the laws of the State of California in the engineering discipline for such portion of the Work. Upon commencement of any item of the Work, the Contractor is responsible for dimensions of such item of Work and related Work; without adjustment of the Contract Time or Contract Price, the Contractor is responsible for making component parts of the Work fit together properly.

4.1.4 Work in Accordance With Contract Documents. The Contractor shall perform all of the Work in strict conformity with the Contract Documents and approved Submittals.

4.2 Site Investigation; Subsurface Conditions.

4.2.1 Contractor Investigation. The Contractor shall be responsible for, and by executing the Agreement acknowledges, that it has carefully examined the Site and has taken all steps it deems reasonably necessary to ascertain all conditions which may effect the Work, or the cost thereof, including, without limitation, conditions bearing upon transportation, disposal, handling or storage of materials; availability of labor and materials; access to the Site; and the physical conditions and the character of equipment, materials, labor and services necessary to perform the Work. Any failure of the Contractor to do so will not relieve it from the responsibility for fully and completely performing all Work without adjustment to the Contract Price or the Contract Time. The District assumes no responsibility to the Contractor for any understandings or representations concerning conditions or characteristics of the Site, or the Work, made by any of its officers, employees or agents prior to the execution of the Agreement, unless such understandings or representations are expressly set forth in the Agreement.

4.2.2 Subsurface Data. By executing the Agreement, the Contractor acknowledges that it has examined the boring data and other subsurface data available and satisfied itself as to the character, quality and quantity of surface and subsurface materials, including without limitation, obstacles which may be encountered in performance of the Work, insofar as this information is reasonably ascertainable from an inspection of the Site, review of available subsurface data and analysis of information furnished by the District under the Contract Documents. Subsurface data or other soils investigation report provided by the District hereunder are not a part of the Contract Documents. Information contained in such data or report regarding subsurface conditions, elevations of existing grades, or below grade elevations are approximate only and is neither guaranteed or warranted by the District to be complete and accurate. The Contractor shall examine all boring and other subsurface data to make its own independent interpretation of the subsurface conditions and acknowledges that its bid is based upon its own opinion of the conditions which may be encountered.

4.2.3 Subsurface Conditions. If the Work under the Contract Documents involves digging trenches or other excavations that extend deeper than four feet below the surface, the Contractor shall promptly and before the following conditions are disturbed, notify the Project Inspector, in writing, of any: (i) material that the Contractor believes may be material that is hazardous waste, as defined in California Health and Safety Code §25117, that is required to be removed to a Class I or Class II or Class III disposal site in accordance with provisions of existing law; (ii) subsurface or latent physical conditions at the site differing from those indicated; or (iii) unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent

in the Work or the character provided for in the Contract Documents. If upon notice to the District of the conditions described above and upon the District's investigation thereof, the District determines that the conditions so materially differ or involve such hazardous materials which require an adjustment to the Contract Price or the Contract Time, the District shall issue a Change Order in accordance with Article 9 hereof. In accordance with California Public Contract Code §7104, any dispute arising between the Contractor and the District as to any of the conditions listed in (i), (ii) or (iii) above, shall not excuse the Contractor from the completion of the Work within the Contract Time and the Contractor shall proceed with all Work to be performed under the Contract Documents. The District reserves the right to terminate the Contract pursuant to Article 15.2 hereof should the District determine not to proceed because of any condition described in (i), (ii) or (iii) above.

4.3 Supervision and Construction Procedures.

4.3.1 Supervision of the Work. The Contractor shall supervise and direct performance of the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract Documents, unless Contract Documents give other specific instructions concerning these matters. The Contractor shall be responsible for inspection of completed or partially completed portions of Work to determine that such portions are in proper condition to receive subsequent Work.

4.3.2 Responsibility for the Work. The Contractor shall be responsible to the District for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and all other persons performing any portion of the Work under a contract with the Contractor. The Contractor shall not be relieved of the obligation to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager, Project Inspector or the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

4.3.3 Layouts. The Contractor is solely responsible for laying-out the Work so that construction of the Work conforms to the requirements of the Contract Documents and so that all component parts of the Work are coordinated. The Contractor shall be responsible for maintenance and preservation of benchmarks, reference points and stakes for the Work. The cost of maintenance and preservation of benchmarks, reference points and stakes shall be included within the Contract Price. The Contractor shall be solely responsible for all loss or costs resulting from the loss, destruction, disturbance or damage of benchmarks, reference points or stakes.

4.3.4 Construction Utilities. The District will furnish and pay the costs of utility services for the Work as set forth in the Special Conditions; all other utilities necessary to complete the Work and to completely perform all of the Contractors' obligations shall be obtained by the Contractor without adjustment of the Contract Price. The Contractor shall furnish and install necessary or appropriate temporary distributions of utilities, including utilities furnished by the District. Any such temporary distributions shall be removed by the Contractor upon completion of the Work. The costs of all such utility services, including the installation and removal of temporary distributions thereof, shall be borne by the Contractor and included in the Contract Price.

4.3.5 Existing Utilities; Removal, Relocation and Protection. In accordance with California Government Code §4215, the District shall assume the responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the Site which are not identified in the Drawings, Specifications or other Contract Documents. Contractor shall be compensated for the costs of locating, repairing damage not due to the Contractor's failure to exercise reasonable care, and removing or relocating such utility facilities not indicated in the Drawings, Specifications and other Contract Documents with reasonable accuracy and for equipment on the Site necessarily idled during such work. Contractor shall not be assessed Liquidated Damages for delay in completion of the Work when such delay is caused by the failure of the District or the District of the utility to provide for removal or relocation of such utility facilities. Nothing in this Article 4.3.5 shall be deemed to require the District to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Site can be inferred from the presence of other visible facilities, such as buildings, meters and junction boxes, on or adjacent to the Site. If the Contractor encounters utility facilities not identified by the District in the Drawings, Specifications, or other Contract Documents, the Contractor shall immediately notify, in writing, the District, the Project Inspector, the Architect, the Construction Manager and the utility owner. In the event that such utility facilities are owned by a public utility, the public utility shall have the sole discretion to perform repairs or relocation work or permit the Contractor to do such repairs or relocation work at a reasonable price.

4.3.6 Conferences and Meetings. A material obligation of the Contractor under the Contract Documents is the attendance at required meetings by the Contractor's supervisory personnel for the Work and the Contractor's management personnel as required by the Contract Documents or as requested by the District. The Contractor's personnel participating in conferences and meetings relating to the Work shall be authorized to act on behalf of the Contractor and to bind the Contractor. The Contractor is solely responsible for arranging for the attendance by Subcontractors, Material Suppliers at meetings and conferences relating to the Work as necessary, appropriate or as requested by the District.

4.3.6.1 Pre-Construction Conference. The Contractor's representatives (and representatives of Subcontractors as requested by the District) shall attend a Pre-Construction Conference at such time and place as designated by the District. The Pre-Construction Conference will generally address the requirements of the Work and Contract Documents, and to establish construction procedures. Subject matters of the Pre-Construction Conference will include as appropriate: (a) administrative matters, including an overview of the respective responsibilities of the District, Architect, Construction Manager, Contractor, Subcontractor, Project Inspector and others performing any part of the Work or services relating to the Work; (b) Submittals; (c) Changes and Change Order processing; (d) employment practices, including Certified Payroll preparation and submission and prevailing wage rate responsibilities of the Contractor and Subcontractors; (e) Progress Schedule development and maintenance; (f) development of Schedule of Values and payment procedures; (g) communication procedures, including the handling of Requests for Information; (h) emergency and safety procedures; (i) Site visitor policies; (j) conduct of Contractor/Subcontractor personnel at the Site; and (k) punchlist/close-out procedures.

4.3.6.2 Progress Meetings. Progress meetings will be conducted on regular intervals

(weekly unless otherwise expressly indicated elsewhere in the Contract Documents). The Contractor's representatives and representatives of Subcontractors (as requested by the District) shall attend Progress Meetings. Progress Meetings will be chaired by the Construction Manager and will generally include as agenda items: Site safety, field issues, coordination of Work, construction progress and impacts to timely completion, if any. The purposes of the Progress Meetings include: a formal and regular forum for discussion of the status and progress of the Work by all Project participants, a review of progress or resolution of previously raised issues and action items assigned to the Project participants, and reviews of the Progress Schedule and Submittals.

4.3.6.3 Special Meetings. As deemed necessary or appropriate by the District, Special Meetings will be conducted with the participation of the Contractor, Subcontractors and other Project participants as requested by the District.

4.3.6.4 Minutes of Meetings. Following conclusion of the Pre-Construction Conference, Progress Meetings and Special Meetings, the Construction Manager or Architect will prepare and distribute minutes reflecting the items addressed and actions taken at a meeting or conference. Unless the Contractor notifies the Architect and the Construction Manager in writing of objections or corrections to minutes prepared hereunder within five (5) dates of the date of distribution of the minutes, the minutes as distributed shall constitute the official record of the meeting or conference. No objections or corrections of any Subcontractor or Material Supplier shall be submitted directly to the Architect or the Construction Manager; such objections or corrections shall be submitted to the Architect and the Construction Manager through the Contractor. If the Contractor timely interposes objections or notes corrections, the resolution of such matters shall be addressed at the next scheduled Progress Meeting.

4.3.7 Temporary Sanitary Facilities. At all times during Work at the Site, the Contractor shall obtain and maintain temporary sanitary facilities in conformity with applicable law, rule or regulation. The Contractor shall maintain temporary sanitary facilities in a neat and clean manner with sufficient toilet room supplies. Personnel engaged in the Work are not permitted to use toilet facilities at the Site.

4.3.8 Noise and Dust Control.

4.3.8.1 Noise Control. The Contractor shall install noise reducing devices on construction equipment. Contractor shall comply with the requirements of the city and county having jurisdiction with regard to noise ordinances governing construction sites and activities. Construction Equipment noise at the Site shall be limited and only as permitted by applicable law, rule or regulation. If classes are in session at any point during the progress of the Work, and, in the District's reasonable discretion, the noise from any Work disrupts or disturbs the students or faculty or the normal operation of the college, at the District's request, the Contractor shall schedule the performance of all such Work around normal college hours or make other arrangements so that the Work does not cause such disruption or disturbance. In no event shall such arrangements result in adjustment of the Contract Price or the Contract Time.

4.3.8.2 Dust Control. The Contractor shall be fully and solely responsible for

maintaining and upkeeping all areas of the Site and adjoining areas, outdoors and indoors, free from flying debris, grinding powder, sawdust, dirt and dust as well as any other product, product waste or work waste, that by becoming airborne may cause respiratory inconveniences to persons, particularly to students and District personnel. Additionally, the Contractor shall take specific care to avoid deposits of airborne dust or airborne elements. Such protection devices, systems or methods shall be in accordance with the regulations set forth by the EPA and OSHA, and other applicable law, rule or regulation. Additionally, the Contractor shall be the sole party responsible to regularly and routinely clean up and remove any and all deposits of dust and other elements. Damage and/or any liability derived from the Contractor's failure to comply with these requirements shall be exclusively at the cost of the Contractor, including, without limitation, any and all penalties that may be incurred for violations of applicable law, rule or regulation, and any amounts expended by the District to pay such damages shall be due and payable to the District on demand. Contractor shall replace any damages property or part thereof and professionally clean any and all items that become covered or partially covered to any degree by dust or other airborne elements. If classes are in session at any point during the progress of Work, and, in the District's reasonable discretion, flying debris, grinding powder, sawdust, dirt or dust from any Work disrupts or disturbs the students or faculty or the normal operation of the college, at the District's request, the Contractor shall schedule the performance of all such Work around normal college hours and make other arrangements so that the Work does not cause such disruption or disturbance. In no event shall such arrangements result in adjustment of the Contract Price or the Contract Time.

4.3.8.3 Contractor Failure to Comply. If the Contractor fails to comply with the requirements for dust control, noise control, or any other maintenance or clean up requirement of the Contract Documents, upon notice from the District, Architect, Project Inspector or Construction Manager to the Contractor, the Contractor shall take immediate action. Should the Contractor fail to respond with immediate and responsive action and not later than twenty-four (24) hours from such notification, the District shall have the absolute right to proceed as it may deem necessary to remedy such matter. Any and all costs incurred by the District in connection with such actions shall be the sole responsibility of, and be borne by, the Contractor; the District may deduct such amounts from the Contract Price then or thereafter due the Contractor.

4.3.9 Debris Recycling; Contractor Submittal of Debris Recycling Statement. The Contractor and all Subcontractors shall maintain current, complete and accurate records of debris and other waste (collectively "Waste Materials") resulting from performance of the Work. The Contractor shall compile the records of the Contractor and all Subcontractors on a monthly basis. Based on such compilation, the Contractor shall, each month during performance of the Work, complete the form of Debris Recycling Statement (Attachment C to the Special Conditions) for itself and all Subcontractors performing Work at the Site. The Debris Recycling Statement must be executed by the Contractor's Superintendent, Construction Manager or other authorized employee; the completed/executed form of Debris Recycling Statement shall be submitted by the Contractor to the District each month during the Work concurrently with the Contractor's submission of its Applications for Progress Payment. During the Contract term, monthly records for each calendar year shall be compiled by the Contractor's Superintendent and submitted to the College's Project Manager, no later than January 15th of the following year.

4.4 Labor and Materials.

4.4.1 Payment for Labor, Materials and Services. Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, Construction Equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated in the Work.

4.4.2 Employee Discipline. The Contractor shall enforce strict discipline and good order among the Contractor's employees, the employees of any Subcontractor or Sub-subcontractor, and all other persons performing any part of the Work at the Site. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. The Contractor shall dismiss from its employ and direct any Subcontractor or Sub-subcontractor to dismiss from their employment any person deemed by the District to be unfit or incompetent to perform Work and thereafter, the Contractor shall not employ nor permit the employment of such person for performance of any part of the Work without the prior written consent of the District, which consent may be withheld in the reasonable discretion of the District.

4.4.3 Contractor's Superintendent. Contractor shall employ a competent Superintendent who is fluent in spoken and written English along with necessary assistants who shall be in attendance at the Site at all times during the performance of Work at the Site. Before commencing the Work, Contractor shall designate in writing the name, qualifications, experience and references from owners and architects on previous projects for Contractor's proposed Superintendent who, on approval of District, shall have full authority to represent and act for Contractor. All directions given to the Superintendent shall be as binding as if given to Contractor. A facsimile of the signatures of the authorized representatives of Contractor shall be submitted to Architect and District. The Contractor's communications relating to the Work or the Contract Documents shall be through the Contractor's Superintendent. The Superintendent shall represent the Contractor and communications given to the Superintendent shall be binding as if given to the Contractor. The Contractor shall dismiss the Superintendent or any of his/her assistants if they are deemed, in the sole reasonable judgment of the District, to be unfit, incompetent or incapable of performing the functions assigned to them. In such event, the District shall have the right to approve of the replacement superintendent or assistant. Unless expressly excused by the District, the Contractor's Superintendent shall attend all Project meetings as the Contractor's representative.

4.4.4 Prohibition on Harassment.

4.4.4.1 District's Policy Prohibiting Harassment. The District is committed to providing a campus and workplace free of sexual harassment and harassment based on factors such as race, color religion, national origin, ancestry, age, medical condition, marital status, disability or veteran status. Harassment includes without limitation, verbal, physical or visual conduct which creates an intimidating, offensive or hostile environment such as racial slurs; ethnic jokes; posting of offensive statements, posters or cartoons or similar conduct. Sexual harassment includes without limitation the solicitation of sexual favors, unwelcome sexual advances, or other verbal, visual or physical conduct of a sexual nature.

4.4.4.2 Contractor's Adoption of Anti-Harassment Policy. Contractor shall adopt

and implement all appropriate and necessary policies prohibiting any form of discrimination in the workplace, including without limitation harassment on the basis of any classification protected under local, state or federal law, regulation or policy. Contractor shall take all reasonable steps to prevent harassment from occurring, including without limitation affirmatively raising the subject of harassment among its employees, expressing strong disapproval of any form of harassment, developing appropriate sanctions, informing employees of their right to raise and how to raise the issue of harassment and informing complainants of the outcome of an investigation into a harassment claim. Contractor shall require that any Subcontractor or Sub-subcontractor performing any portion of the Work to adopt and implement policies in conformity with this Article 4.4.4.

4.4.4.3 Prohibition on Harassment at the Site. Contractor shall not permit any person, whether employed by Contractor, a Subcontractor, Sub-subcontractor, or any other person or entity, performing any Work at or about the Site to engage in any prohibited form of harassment. Any such person engaging in a prohibited form of harassment directed to any individual performing or providing any portion of the Work at or about the Site shall be subject to appropriate sanctions in accordance with the anti-harassment policy adopted and implemented pursuant to Article 4.4.4.2 above. Any person, performing or providing Work on or about the Site engaging in a prohibited form of harassment directed to any student, faculty member or staff of the District or directed to any other person on or about the Site shall be subject to immediate removal and shall be prohibited thereafter from providing or performing any portion of the Work. Upon the District's receipt of any notice or complaint that any person employed directly or indirectly by Contractor in performing or providing the Work has engaged in a prohibited form of harassment, the District will promptly undertake an investigation of such notice or complaint. In the event that the District, after such investigation, reasonably determines that a prohibited form of harassment has occurred, the District shall promptly notify the Contractor of the same and direct that the person engaging in such conduct be immediately removed from the Site. Unless the District's determination that a prohibited form of harassment has occurred is grossly negligent or without reasonable cause, District shall have no liability for directing the removal of any person determined to have engaged in a prohibited form of harassment nor shall the Contract Price or the Contract Time be adjusted on account thereof. Contractor and the Surety shall defend, indemnify and hold harmless the District and its employees, officers, board of trustees, agents, and representatives from any and all claims, liabilities, judgments, awards, actions or causes of actions, including without limitation, attorneys' fees, which arise out of, or pertain in any manner to: (i) the assertion by any person dismissed from performing or providing work at the direction of the District pursuant to this Article 4.4.4.3; or (ii) the assertion by any person that any person directly or indirectly under the employment or direction of the Contractor has engaged in a prohibited form of harassment directed to or affecting such person. The obligations of the Contractor and the Surety under the preceding sentence are in addition to, and not in lieu of, any other obligation of defense, indemnity and hold harmless whether arising under the Contract Documents, at law or otherwise; these obligations survive completion of the Work or the termination of the Contract.

4.5 Taxes. The Contractor shall pay, without adjustment of the Contract Price, all sales, consumer, use and other taxes for the Work or portions thereof provided by the Contractor under the Contract Documents.

4.6 Permits, Fees and Notices; Compliance With Laws.

4.6.1 Payment of Permits, Fees. The District shall secure and pay for the building permits, other permits, governmental fees, licenses and inspections necessary or required for the proper execution and completion of the Work, except as otherwise provided in the Special Conditions. If permits/approvals are designated in the Special Conditions as the Contractor's responsibility, the Contractor shall obtain such permits/approvals at its sole cost and expense without adjustment of the Contract Price. Fees, costs or other expenses associated with or arising in connection with Deferred Approval Items shall be the responsibility of the Contractor without adjustment of the Contract Price.

4.6.2 Compliance With Laws. The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and other orders of public authorities bearing on performance of the Work.

4.6.3 Notice of Variation From Laws. If the Contractor knows, or has reason to believe, that any portion of the Contract Documents are at variance with applicable laws, statutes, ordinances, building codes, regulations or rules, the Contractor shall promptly notify the Architect, Construction Manager and the Project Inspector, in writing, of the same. If the Contractor performs Work knowing, or with reasonable diligence should have known, it to be contrary to laws, statutes, ordinances, building codes, rules or regulations applicable to the Work without such notice to the Architect and the Project Inspector, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs arising or associated therefrom, including without limitation, the removal, replacement or correction of the same.

4.7 Submittals.

4.7.1 Purpose of Submittals. Shop Drawings, Product Data, Samples and similar submittals (collectively "Submittals") are not Contract Documents. The purpose for submission of Submittals is to demonstrate, for those portions of the Work for which Submittals are required, the manner in which the Contractor proposes to provide or incorporate such item of the Work in conformity with the information given and the design concept expressed in the Contract Documents.

4.7.2 Contractor's Submittals.

4.7.2.1 Prompt Submittals. The Contractor shall review, approve and submit to the Architect or such other person or entity designated by the District, the number of copies of Submittals required by the Contract Documents. All Submittals required by the Contract Documents shall be prepared, assembled and submitted by the Contractor to the Architect within the time frames set forth in the Submittal Schedule incorporated and made a part of the Approved Construction Schedule prepared and submitted by the Contractor pursuant to Article 7 of these General Conditions. Contractor's submission of Submittals in conformity with the Submittal Schedule is a material obligation of the Contractor. In the event of Contractor's failure or refusal to deliver Submittals to the Architect in accordance with the Submittal Schedule, the Contractor shall be subject to per diem assessments in the amount set forth in the Special Conditions for each day of delayed submission for any Submittal beyond the date set forth in the Submittal Schedule for Contractor's submission of such Submittal. Contractor and District acknowledge and agree that if Contractor shall fail to deliver

Submittals in accordance with the Submittal Schedule, the District will incur costs and expenses not contemplated by the Contract Documents, the exact amount of which are difficult to ascertain and fix. Contractor and the District acknowledge and agree that the per diem assessment for delayed submission of Submittals set forth in the Special Conditions represents a reasonable estimate of costs and expenses the District will incur as a result of delayed submission of Submittals and that the same is not a penalty. Notwithstanding Contractor's submission of all required Submittals in accordance with the Submittal Schedule, in the event that the District or the Architect reasonably determines that all or any portion of such Submittals fail to comply with the requirements of Articles 4.7.2.2, 4.7.2.3 and 4.7.2.4 of these General Conditions and/or such Submittals are not otherwise complete and accurate so as to require re-submission, Contractor shall bear all costs associated with the review and approval of the second resubmitted Submittals, including without limitation Architect's fees incurred in connection therewith; provided that such costs are in addition to, and not in lieu of, any per diem assessments imposed under this Article 4.7.2.1 for Contractor's delayed submission of Submittals. In the event of the District's imposition of the per diem assessments due to the Contractor's delayed submission of Submittals or in the event of the District's assessment of costs and expenses incurred to review incomplete or inaccurate Submittals, the District may deduct the same from any portion the Contract Price then or thereafter due the Contractor. Submittals not required by the Contract Documents or which do not otherwise conform to the requirements of the Contract Documents may be returned without action. No adjustment to the Contract Time or the Contract Price shall be granted to the Contractor on account of its failure to make timely submission of any Submittal.

4.7.2.2 Approval of Subcontractor Submittals. All Submittals prepared by Subcontractors, of any tier, Material Suppliers, manufacturers or distributors shall bear the written approval of the Contractor thereto prior to submission to the Architect for review. Any Submittal not bearing the Contractor's written approval shall be subject to return to the Contractor for re-submittal in conformity herewith, with the same being deemed to not have been submitted. Any delay, impact or cost associated therewith shall be the sole and exclusive responsibility of the Contractor without adjustment to the Contract Time or the Contract Price.

4.7.2.3 Verification of Submittal Information. By approving and submission of Submittals, the Contractor represents to the District and Architect that the Contractor has determined and verified materials, field measurements, field construction criteria, catalog numbers and similar data related thereto and has checked and coordinated the information contained within such Submittals with the requirements of the Work and of the Contract Documents. Each Submittal shall include the following certification duly executed by the Contractor's Superintendent or Construction Manager for the Work:

"The Contractor has reviewed and approved the field dimensions and construction criteria of the attached Submittal. The Contractor has verified that the Submittal includes notations of any portion of the Work depicted in the Submittal which is not in strict conformity with the Contract Documents. The information in the attached Submittal has been reviewed and coordinated by the Contractor with information included in other Submittals."

4.7.2.4 Contractor Responsibility for Deviations. The Contractor shall not be

relieved of responsibility for correcting deviations from the requirements of the Contract Documents by the Architect's review of Submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submission of the Submittal and the Architect has given written approval to the specific deviation. A material obligation of the Contractor is its specific/detailed identification and notation on the transmittal cover-sheet of each submission of Submittals any deviation between the Work as indicated in the Contract Documents and as indicated in the Submittal. The Contractor shall not be relieved of responsibility for errors or omissions in Submittals by the Architect's review thereof.

4.7.2.5 No Performance of Work Without Architect Review. The Contractor shall perform no portion of the Work requiring the Architect's review of Submittals until the Architect has completed its review and returned the Submittal to the Contractor indicating "No Exception Taken" to such Submittal. The Contractor shall not perform any portion of the Work forming a part of a Submittal or which is affected by a related Submittal until the entirety of the Submittal or other related Submittal has been fully processed. Such Work shall be in accordance with the final action taken by the Architect in review of Submittals and other applicable portions of the Contract Documents.

4.7.3 Architect Review of Submittals. The purpose of the Architect's review of Submittals and the time for the Architect's return of Submittals to the Contractor shall be as set forth elsewhere in the Contract Documents. If the Architect returns a Submittal as rejected or requiring correction(s) with re-submission, the Contractor, so as not to delay the progress of the Work, shall promptly thereafter resubmit a Submittal conforming to the requirements of the Contract Documents; the resubmitted Submittal shall indicate the portions thereof modified in accordance with the Architect's direction. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications accompanying Submittals. The Architect's review of the Submittals is for the limited purposes described in the Contract Documents.

4.7.4 Deferred Approval Items. In the event that any portion of the Work is designated in the Contract Documents as a "Deferred Approval" item, Contractor shall be solely and exclusively responsible for the preparation of Submittals for such item(s) in a timely manner so as not to delay or hinder the completion of the Work within the Contract Time.

4.8 Materials and Equipment.

4.8.1 Specified Materials, Equipment. References in the Contract Documents to any specific article, device, equipment, product, material, fixture, patented process, form, method or type of construction, by name, make, trade name, or catalog number, with or without the words "or equal" shall be deemed to establish a minimum standard of quality or performance, and shall not be construed as limiting competition.

4.8.2 Approval of Substitutions or Alternatives. The Contractor may propose to furnish alternatives or substitutes for a particular item specified in the Contract Documents, provided that such proposed substitution or alternative complies with the requirements of the Specifications relating to substitutions of specified items and the Contractor certifies to the Architect that the quality, performance capability and functionality (including visual and/or aesthetic effect) of the proposed alternative or substitute will meet or exceed the

quality, performance capability and functionality of the item or process specified, and must demonstrate to the Architect that the use of the substitution or alternative is appropriate and will not delay completion of the Work or result in an increase to the Contract Price. The Contractor shall submit engineering, construction, dimension, visual, aesthetic and performance data to the Architect to permit its proper evaluation of the proposed substitution or alternative. If requested by the Architect, Contractor shall promptly furnish any additional information or data regarding a proposed substitution or alternative which the Architect deems reasonably necessary for the evaluation of the proposed substitution or alternative. The Contractor shall not provide, furnish or install any substitution or alternative without the Architect's review and final action on the proposed substitution or alternative; any alternative or substitution installed or incorporated into the Work without first obtaining the Architect's review and final action of the same shall be subject to removal pursuant to Article 12 hereof. The Architect's decision evaluating the Contractor's proposed substitutions or alternatives shall be final. Neither the Contract Time nor the Contract Price shall be increased on account of any substitution or alternative proposed by the Contractor and which is accepted by the Architect; provided, however, that in the event a substitution or alternative accepted by the Architect and purchase, fabrication and/or installation or such accepted substitution or alternative shall be less expensive than the originally specified item, the Contract Price shall be reduced by the actual cost savings realized by the Contractor's furnishing and/or installation of such approved substitution or alternative. The Contractor shall be solely responsible for all costs and fees incurred by the District to review a proposed substitution or alternative, including without limitation fees of the Architect, of the Architect's consultant(s) and/or governmental agencies to review and/or approve any proposed substitution or alternative. The Contractor shall be solely responsible for any increase in the cost of any accepted substitution or alternative or any Work affected by such alternative or substitution. The foregoing notwithstanding, all requests for the Architect's review and approval of any proposed substitution or alternative and all engineering, construction, dimension and performance data substantiating the equivalency of the proposed substitution or alternative shall be submitted by Contractor not later than thirty-five (35) days following the date of the District's award of the Contract to Contractor by action of the District's Board of Trustees; any request for approval of proposed alternatives or substitutions submitted thereafter may be rejected summarily. The foregoing process and time limits shall apply to any proposed substitution or alternative regardless of whether the substitute or alternate item is to be provided, furnished or installed by Contractor, any Subcontractor, any Sub-Subcontractor, Material Supplier or Manufacturer.

4.8.3 "Sole Source" Products. If any material, equipment, product or other item is designated in the Contract Documents as a "District Standard" or similar words/terms, the District shall be deemed to have made a finding that such material, equipment, product or other item is designated and specified to match other materials, equipment, products, or other item in use in a completed or to be completed work of improvement and not subject to substitution. If any material, equipment, or other item is identified in the Contract Documents as being the only source of the material, equipment or other item necessary to accomplish the intended result(s), such material, equipment or other item shall not be subject to substitution.

4.8.4 Placement of Material and Equipment Orders. Contractor shall, after award of the Contract, promptly and timely place all orders for materials and/or equipment necessary for completion of the Work so that delivery of the same shall be made without delay or interruption to the timely completion of the Work. Contractor shall require that any

Subcontractor or Sub-Subcontractor performing any portion of the Work similarly place orders for all materials and/or equipment to be furnished by any such Subcontractor or Sub-Subcontractor in a prompt and timely manner so that delivery of the same shall be made without delay or interruption to the timely completion of the Work. Upon request of the District, Construction Manager or the Architect, the Contractor shall furnish reasonably satisfactory written evidence of the placement of orders for materials and/or equipment necessary for completion of the Work, including without limitation, orders for materials and/or equipment to be provided, furnished or installed by any Subcontractor or Sub-Subcontractor.

4.8.5 District's Right to Place Orders for Materials and/or Equipment. Notwithstanding any other provision of the Contract Documents, in the event that the Contractor shall, upon request of the District or the Architect, fail or refuse, for any reason, to provide reasonably satisfactory written evidence of the placement of orders for materials and/or equipment necessary for completion of the Work, or should the District determine, in its sole and reasonable discretion, that any orders for materials and/or equipment have not been placed in a manner so that such materials and/or equipment will be delivered to the Site so the Work can be completed without delay or interruption, the District shall have the right, but not the obligation, to place such orders on behalf of the Contractor. If the District exercises the right to place orders for materials and/or equipment pursuant to the foregoing, the District's conduct shall not be deemed to be an exercise, by the District, of any control over the means, methods, techniques, sequences or procedures for completion of the Work, all of which remain the responsibility and obligation of the Contractor. Notwithstanding the right of the District to place orders for materials and/or equipment pursuant to the foregoing, the election of the District to exercise, or not to exercise, such right shall not relieve the Contractor from any of Contractor's obligations under the Contract Documents, including without limitation, completion of the Work within the Contract Time and for the Contract Price. If the District exercises the right hereunder to place orders for materials and/or equipment on behalf of Contractor pursuant to the foregoing, Contractor shall reimburse the District for all costs and fees incurred by the District in placing such orders; such costs and fees may be deducted by the District from the Contract Price then or thereafter due the Contractor.

4.9 Safety.

4.9.1 Safety Programs. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety programs required by applicable law, ordinance, regulation or governmental orders in connection with the performance of the Contract, or otherwise required by the type or nature of the Work. The Contractor's safety program shall include all actions and programs necessary for compliance with California or federally statutorily mandated workplace safety programs, including without limitation, compliance with the California Drug Free Workplace Act of 1990 (California Government Code §§8350 et seq.). Without limiting or relieving the Contractor of its obligations hereunder, the Contractor shall require that its Subcontractors similarly initiate and maintain all appropriate or required safety programs. Prior to commencement of Work at the Site, the Contractor shall provide the Architect, Project Inspector, the Construction Manager and District with the Contractor's proposed safety program for the Work for the Construction Manager's review. The Architect, the Construction Manager and the Project Inspector are authorized to enforce the Contractor's obligation to implement the safety program accepted by the Construction Manager.

- 4.9.2 Safety Precautions.** The Contractor shall be solely responsible for initiating and maintaining reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to: (i) employees on the Work and other persons who may be affected thereby; (ii) the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and (iii) other property or items at the site of the Work, or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction. The Contractor shall take adequate precautions and measures to protect existing roads, sidewalks, curbs, pavement, utilities, adjoining property and improvements thereon (including without limitation, protection from settlement or loss of lateral support) and to avoid damage thereto. Without adjustment of the Contract Price or the Contract Time, the Contractor shall repair, replace or restore any damage or destruction of the foregoing items as a result of performance or installation of the Work. Contractor's personnel who do not abide by Contractor's accepted Safety Plan shall be removed from the site.
- 4.9.3 Safety Signs, Barricades.** The Contractor shall erect and maintain, as required by existing conditions and conditions resulting from performance of the Contract, reasonable safeguards for safety and protection of property and persons, including, without limitation, posting danger signs and other warnings against hazards, promulgating safety regulations and notifying Districts and users of adjacent sites and utilities. Contractor shall provide directional and informational signage as required to direct pedestrian traffic around the work area. Contractor will be required to fence in the Construction Site and all gates shall be closed while students are on campus. Contractor shall provide spotters, both front and rear, for any vehicles moving throughout occupied student or faculty areas.
- 4.9.4 Safety Notices.** The Contractor shall give or post all notices required by applicable law and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.
- 4.9.5 Safety Coordinator.** The Contractor shall designate a responsible member of the Contractor's organization at the Site whose duty shall be the prevention of accidents and the implementation and maintenance safety precautions and programs. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Project Inspector and the Architect.
- 4.9.6 Emergencies; First Aid.** In an emergency affecting safety of persons or property, the Contractor shall act, to prevent threatened damage, injury or loss. The Contractor shall maintain stocked emergency first aid kits at the Site which comply with applicable law, rule or regulation.
- 4.9.7 Hazardous Materials.**
- 4.9.7.1 General.** In the event that the Contractor, any Subcontractor or anyone employed directly or indirectly by them shall use, at the Site, or incorporate into the Work, any material or substance deemed to be hazardous or toxic under any law, rule, ordinance, regulation or interpretation thereof (collectively "Hazardous Materials"), the Contractor shall comply with all laws, rules, ordinances or regulations applicable thereto and shall exercise all necessary safety precautions relating to the

use, storage or disposal thereof.

4.9.7.2 Prohibition on Use of Asbestos Construction Building Materials (“ACBMs”). Notwithstanding any provision of the Drawings or the Specifications to the contrary, it is the intent of the District that ACBMs not be used or incorporated into any portion of the Work. In the event that any portion of the Work depicted in the Drawings or the Specifications shall require materials or products which the Contractor knows, or should have known with reasonably diligent investigation, to contain ACBMs, Contractor shall promptly notify the Architect and the Project Inspector of the same so that an appropriate alternative can be made in a timely manner so as not to delay the progress of the Work. Contractor warrants to the District that there are no materials or products used or incorporated into the Work which contain ACBMs. Whether before or after completion of the Work, if it is discovered that any product or material forming a part of the Work or incorporated into the Work contains ACBMs, the Contractor shall at its sole cost and expense remove such product or material in accordance with any laws, rules, procedures and regulations applicable to the handling, removal and disposal of ACBMs and to replace such product or material with non-ACBM products or materials and to return the affected portion(s) of the Work to the finish condition depicted in the Drawings and Specifications relating to such portion(s) of the Work. Contractor's obligations under the preceding sentence shall survive the termination of the Contract, the warranty period provided under the Contract Documents, the Contractor's completion of the Work or the District's acceptance of the Work. In the event that the Contractor shall fail or refuse, for any reason, to commence the removal and replacement of any material or product containing ACBMs forming a part of, or incorporated into the Work, within ten (10) days of the date of the District's written notice to the Contractor of the existence of ACBM materials or products in the Work, the District may thereafter proceed to cause the removal and replacement of such materials or products in any manner which the District determines to be reasonably necessary and appropriate; all costs, expenses and fees, including without limitation fees and costs of consultants and attorneys, incurred by the District in connection with such removal and replacement shall be the responsibility of the Contractor and the Contractor's Performance Bond Surety.

4.9.7.3 Disposal of Hazardous Materials. Contractor shall be solely and exclusively responsible for the disposal of any Hazardous Materials on or about Site resulting from the Contractor's performance of Work and other activities. The Contractor's obligations hereunder shall include without limitation, the transportation and disposal of any Hazardous Materials in strict conformity with any and all applicable laws, regulations, orders, procedures or ordinances.

4.10 Maintenance of Documents.

4.10.1 Documents at Site. The Contractor shall maintain at the Site: (i) one record copy of the Drawings, Specifications and all addenda thereto; (ii) Change Orders approved by the District and all other modifications to the Contract Documents; (iii) Submittals reviewed by the Architect; (iv) Record Drawings; (v) Material Safety Data Sheets (“MSDS”) accompanying any materials, equipment or products delivered or stored at the Site or incorporated into the Work; and (vi) all building and other codes or regulations applicable to the Work, including without limitation, Title 24, Part 2 of the California Code of Regulations. During performance of the Work, all documents maintained by Contractor at

the Site shall be available to the District, the Construction Manager, the Architect, the Project Inspector and DSA for review, inspection or reproduction. Upon completion of the Work, all documents maintained at the Site by the Contractor pursuant to the foregoing shall be assembled and transmitted to the Architect for delivery to the District.

4.10.2 Maintenance of Record Drawings. During its performance of the Work, the Contractor shall maintain Record Drawings consisting of a set of the Drawings which are marked to indicate all field changes made to adapt the Work depicted in the Drawings to field conditions, changes resulting from Change Orders and all concealed or buried installations, including without limitation, piping, conduit and utility services. All buried or concealed items of Work shall be completely and accurately marked and located on the Record Drawings. The Record Drawings shall be clean and all changes, corrections and dimensions shall be marked in a neat and legible manner in a contrasting color. Record Drawings relating to the Structural, Mechanical, Electrical and Plumbing portions of the Work shall indicate without limitation, circuiting, wiring sizes, equipment/member sizing and shall depict the entirety of the as built conditions of such portions of the Work. The Record Drawings shall be continuously maintained by the Contractor during the performance of the Work. At any time during the Contractor's performance of the Work, upon the request of the District, the Project Inspector or the Architect, the Contractor shall make the Record Drawings maintained here under available for the District's review and inspection. The District's review and inspection of the Record Drawings during the Contractor's performance of the Work shall be only for the purpose of generally verifying that Contractor is continuously maintaining the Record Drawings in a complete and accurate manner; any such inspection or review shall not be deemed to be the District's approval or verification of the completeness or accuracy thereof. The failure or refusal of the Contractor to continuously maintain complete and accurate Record Drawings or to make available the Record Drawings for inspection and review by the District may be deemed by the District to be Contractor's default of a material obligation hereunder. Without waiving, restricting or limiting any other right or remedy of the District for the Contractor's failure or refusal to continuously maintain the Record Drawings, the District may, upon reasonably determining that the Contractor has not, or is not, continuously maintaining the Record Drawings in a complete and accurate manner, take appropriate action to cause the continuous maintenance of complete and accurate Record Drawings, in which event all fees and costs incurred or associated with such action shall be charged to the Contractor and the District may deduct the amount of such fees and costs from any portion of the Contract Price then or thereafter due the Contractor. In accordance with Article 8.4.2 of these General Conditions, prior to receipt of the Final Payment, Contractor shall deliver the Record Drawings to the Construction Manager for transmittal of the District.

4.11 Use of Site. The Contractor shall confine operations at the Site to areas permitted by law, ordinances or permits, subject to any restrictions or limitations set forth in the Contract Documents. The Contractor's construction site and lay down area shall be limited to the agreed upon construction site. The entire construction site shall be fenced in with temporary construction fencing until project or current phase of project is substantially complete. The fencing will be privacy screened. The Contractor shall not unreasonably encumber the Site or adjoining areas with materials or equipment. The Contractor shall be solely responsible for providing security at the Site with all such costs included in the Contract Price. The District shall at all times have access to the Site.

4.12 Clean-Up. The Contractor shall at all times keep the Site and all adjoining areas free from

the accumulation of any waste material or rubbish caused or generated by performance of the Work. Without limiting the generality of the foregoing, Contractor shall maintain the Site in a "broom-clean" standard on a daily basis. In the event that the Work of the Contract Documents includes painting and/or the installation of floor covering, prior to commencement of any painting operations or the installation of any flooring covering, the area and adjoining areas of the Site where paint is to be applied or floor covering is to be installed shall be in a "broom-clean" condition. Prior to completion of the Work, Contractor shall remove from the Site all rubbish, waste material, excess excavated material, tools, Construction Equipment, machinery, surplus material and any other items which are not the property of the District under the Contract Documents. At completion of the Work, the Contractor shall clean the building interior and exterior, including fixtures, equipment, walls, floors, ceilings, roofs, window sills and ledges, horizontal surfaces, areas where debris, dust and similar items have collected, clean and polish all glass, plumbing fixtures, finish hardware, metal/wood/stone finishes. As directed by the Construction Manager, District or Architect, the Contractor shall remove temporary fencing, barricades, planking, temporary sanitary facilities, temporary utility distributions and other temporary facilities. Upon completion of the Work, the Site and all adjoining areas shall be left in a neat and broom clean condition satisfactory to District. The Project Inspector or Construction Manager shall be authorized to direct the Contractor's clean-up obligations hereunder. If the Contractor fails to clean up as provided for in the Contract Documents, the District may do so, and all costs incurred in connection therewith shall be charged to the Contractor; the District may deduct such costs from any portion of the Contract Price then or thereafter due the Contractor.

- 4.13 Access to the Work.** The Contractor shall provide the DSA, the District, the Construction Manager, the Project Inspector, the Architect and the Architect's consultant(s) with access to the Work, whether in place, preparation and progress and wherever located.
- 4.14 Information and Facilities/Services for the Project Inspector.** The Contractor shall furnish the Project Inspector access to the Work for obtaining such information as may be necessary to keep the Project Inspector fully informed respecting the progress, quality and character of the Work and materials, equipment or other items incorporated therein. The Contractor shall provide, without adjustment of the Contract Price, for use by the Project Inspector, the District and Construction Manager the facilities, equipment, furnishings and services set forth in the Special Conditions. If the Contractor does not provide the facilities, furnishings, equipment and services set forth in the Special Conditions, or fails to pay timely any charges or fees arising out of the use of the same, the District may, as applicable, procure facilities, furnishings, equipment and services required by the Contract Documents or pay outstanding charges. Contractor shall reimburse the District for all costs, including the District's administrative costs, incurred by the District pursuant to the preceding sentence; in lieu of the Contractor's reimbursement and at the sole and exclusive discretion of the District, such costs may be deducted by the District from any portion of the Contract Price or thereafter due the Contractor.
- 4.15 Patents and Royalties.** The Contractor and the Surety shall defend, indemnify and hold harmless the District and its agents, employees and officers from any claim, demand or legal proceeding arising out of or pertaining, in any manner, to any actual or claimed infringement of patent rights in connection with performance of the Work under the Contract Documents.
- 4.16 Cutting and Patching.** The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make the component parts thereof fit together properly. The Contractor shall not damage or endanger any portion of the Work, or the fully or partially

completed construction of the District or separate contractors by cutting, patching, excavation or other alteration. When modifying new Work or when installing Work adjacent to an existing structure/facility, the Contractor shall match, as closely as conditions of the Site and materials will allow the finishes, textures and colors of the existing structure/facility and refinish elements of the existing structure/facility. The Contractor shall not cut, patch or otherwise alter the construction by the District or separate contractor without the prior written consent of the District or separate contractor thereto, which consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold consent to the request of the District or separate contractor to cut, patch or otherwise alter the Work.

4.17 Encountering of Hazardous Materials. In the event the Contractor encounters Hazardous Materials at the Site which have not been rendered harmless or for which there is no provision in the Contract Documents for containment, removal, abatement or handling of such Hazardous Materials, the Contractor shall immediately stop the Work in the affected area, but shall diligently proceed with the Work in all other unaffected areas. Upon encountering such Hazardous Materials, the Contractor shall immediately notify the Project Inspector and the Architect, in writing, of such condition. The Contractor shall proceed with the Work in such affected area only after such Hazardous Materials have been rendered harmless, contained, removed or abated. In the event such Hazardous Materials are encountered, the Contractor shall be entitled to an adjustment of the Contract Time to the extent that the Work is stopped and Substantial Completion of the Work is affected thereby. In no event shall there be an adjustment to the Contract Price solely on account of the Contractor encountering such Hazardous Materials.

4.18 Wage Rates; Employment of Labor.

4.18.1 Determination of Prevailing Rates. Pursuant to the provisions of Division 2, Part 7, Chapter 1, Article 2 of the California Labor Code at §§1770 et seq., the District has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the prevailing rate for holiday and overtime work in the locality in which the Work is to be performed. Holidays shall be as defined in the collective bargaining agreement applicable to each particular craft, classification or type of worker employed under the Contract. Per diem wages include employer payments for health and welfare, pensions, vacation, travel time and subsistence pay as provided in California Labor Code §1773.8, apprenticeship or other training programs authorized by California Labor Code §3093, and similar purposes when the term "per diem wages" is used herein. Holiday and overtime work, when permitted by law, shall be paid for at the rate of at least one and one-half (1½) times the above specified rate of per diem wages, unless otherwise specified. The Contractor shall post, at appropriate and conspicuous locations on the Site, a schedule showing all determined general prevailing wage rates.

4.18.2 Payment of Prevailing Rates. There shall be paid each worker of the Contractor, or any Subcontractor, of any tier, engaged in the Work, not less than the general prevailing wage rate, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor, of any tier, and such worker.

4.18.3 Prevailing Rate Penalty. The Contractor shall, as a penalty, forfeit not more than Fifty Dollars (\$50.00) to the District for each calendar day or portion thereof, for each worker paid less than the prevailing rates for such work or craft in which such worker is employed for the Work by the Contractor or by any Subcontractor, of any tier, in connection with the Work. The amount of the penalty for failure to pay applicable prevailing wage rates shall

be determined and assessed in accordance with the standards established pursuant to Labor Code §1775(a)(2). The amount of the penalty shall be determined based on consideration of both of the following: (i) whether the failure of the Contractor or Subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected when brought to the attention of the Contractor or Subcontractor; and (ii) whether the Contractor or Subcontractor has a prior record of failing to meet its prevailing wage obligations. The penalty may not be less than ten dollars (\$10) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, unless the failure of the Contractor or Subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected when brought to the attention of the contractor or subcontractor. The penalty may not be less than twenty dollars (\$20) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, if the Contractor or Subcontractor has been assessed penalties within the previous three years for failing to meet its prevailing wage obligations on a separate contract, unless those penalties were subsequently withdrawn or overturned. The penalty may not be less than thirty dollars (\$30) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, if the Labor Commissioner determines that the violation was willful, as defined in subdivision (c) of Section 1777.1. When the penalty amount due hereunder is collected from the Contractor or Subcontractor, any outstanding wage claim under Chapter 1 (commencing with Section 1720) of Part 7 of Division 2 against that Contractor or Subcontractor shall be satisfied before applying that amount to the penalty imposed on that Contractor or Subcontractor hereunder. The difference between prevailing wage rates and the amount paid to each worker each calendar day, or portion thereof, for which each worker paid less than the prevailing wage rate, shall be paid to each worker by the Contractor.

4.18.4 Payroll Records. Pursuant to California Labor Code §1776, the Contractor and each Subcontractor, of any tier, shall keep an accurate payroll record, 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 person employed for the Work. The payroll records shall be certified and available for inspection at all reasonable hours at the principal office of the Contractor on the following basis: (i) a certified copy of an employee's payroll record shall be made available for inspection or furnished to such employee or his/her authorized representative on request; (ii) a certified copy of all payroll records shall be made available for inspection or furnished upon request to the District, the Division of Labor Standards Enforcement and the Division of Apprenticeship Standards of the Department of Industrial Relations; (iii) a certified copy of payroll records shall be made available upon request to the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the District, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided, the requesting party shall, prior to being provided the records, reimburse the cost of preparation by the Contractor, Subcontractors and the entity through which the request was made; the public shall not be given access to such records at the principal office of the Contractor; (iv) the Contractor shall file a certified copy of the payroll records with the entity that requested such records within ten (10) days after receipt of a written request; (v) any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the District, the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address and social security number. The name

and address of the Contractor or any Subcontractor, of any tier, performing a part of the Work shall not be marked or obliterated. The Contractor shall inform the District of the location of payroll records, including the street address, city and county and shall, within five (5) working days, provide a notice of a change or location and address. In the event of noncompliance with the requirements of this Article 4.18.4, the Contractor shall have ten (10) days in which to comply, subsequent to receipt of written notice specifying in what respects the Contractor must comply herewith. Should noncompliance still be evident after such 10-day period, the Contractor shall, as a penalty to the District, forfeit Twenty-Five Dollars (\$25.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from any portion of the Contract Price then or thereafter due the Contractor. The Contractor is solely responsible for compliance with the foregoing provisions.

4.18.5 Hours of Work.

4.18.5.1 Limits on Hours of Work. Pursuant to California Labor Code §1810, eight (8) hours of labor shall constitute a legal day's work. Pursuant to California Labor Code §1811, the time of service of any worker employed at any time by the Contractor or by a Subcontractor, of any tier, upon the Work or upon any part of the Work, is limited and restricted to eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except as hereafter provided. Notwithstanding the foregoing provisions, Work performed by employees of Contractor or any Subcontractor, of any tier, in excess of eight (8) hours per day and forty (40) hours during any one week, shall be permitted upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1½) times the basic rate of pay.

4.18.5.2 Penalty for Excess Hours. The Contractor shall pay to the District a penalty of Twenty-five Dollars (\$25.00) for each worker employed on the Work by the Contractor or any Subcontractor, of any tier, for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any calendar day and forty (40) hours in any one calendar week, in violation of the provisions of the California Labor Code, unless compensation to the worker so employed by the Contractor is not less than one and one-half (1½) times the basic rate of pay for all hours worked in excess of eight (8) hours per day.

4.18.5.3 Contractor Responsibility. Any Work performed by workers necessary to be performed after regular working hours or on Sundays or other holidays shall be performed without adjustment to the Contract Price or any other additional expense to the District. The Contractor shall be responsible for costs incurred by the District which arise out of Work performed by the Contractor at times other than regular working hours and regular working days. Upon determination of such costs, the District may deduct such costs from the Contract Price then or thereafter due the Contractor.

4.18.6 Apprentices.

4.18.6.1 Employment of Apprentices. Any apprentices employed to perform any of the Work shall be paid the standard wage paid to apprentices under the regulations of the craft or trade for which such apprentice is employed, and such individual shall

be employed only for the work of the craft or trade to which such individual is registered. Only apprentices, as defined in California Labor Code §3077 who are in training under apprenticeship standards and written apprenticeship agreements under California Labor Code §§3070 et seq. are eligible to be employed for the Work. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which such apprentice is training.

4.18.6.2 Apprenticeship Certificate. When the Contractor or any Subcontractor, of any tier, in performing any of the Work employs workers in any Apprenticeable Craft or Trade, the Contractor and such Subcontractor shall apply to the Joint Apprenticeship Committee administering the apprenticeship standards of the craft or trade in the area of the site of the Work for a certificate approving the Contractor or such Subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected, provided, however, that the approval as established by the Joint Apprenticeship Committee or Committees shall be subject to the approval of the Administrator of Apprenticeship. The Joint Apprenticeship Committee or Committees, subsequent to approving the Contractor or Subcontractor, shall arrange for the dispatch of apprentices to the Contractor or such Subcontractor in order to comply with California Labor Code §1777.5. The Contractor and Subcontractors shall submit contract award information to the applicable Joint Apprenticeship Committee which shall include an estimate of journeyman hours to be performed under the Contract, the number of apprentices to be employed, and the approximate dates the apprentices will be employed. There shall be an affirmative duty upon the Joint Apprenticeship Committee or Committees, administering the apprenticeship standards of the crafts or trades in the area of the site of the Work, to ensure equal employment and affirmative action and apprenticeship for women and minorities. Contractors or Subcontractors shall not be required to submit individual applications for approval to local Joint Apprenticeship Committees provided they are already covered by the local apprenticeship standards.

4.18.6.3 Ratio of Apprentices to Journeymen. The ratio of Work performed by apprentices to journeymen, who shall be employed in the Work, may be the ratio stipulated in the apprenticeship standards under which the Joint Apprenticeship Committee operates, but in no case shall the ratio be less than one hour of apprentice work for each five hours of labor performed by a journeyman, except as otherwise provided in California Labor Code §1777.5. The minimum ratio for the land surveyor classification shall not be less than one apprentice for each five journeymen. Any ratio shall apply during any day or portion of a day when any journeyman, or the higher standard stipulated by the Joint Apprenticeship Committee, is employed at the site of the Work and shall be computed on the basis of the hours worked during the day by journeymen so employed, except for the land surveyor classification. The Contractor shall employ apprentices for the number of hours computed as above before the completion of the Work. The Contractor shall, however, endeavor, to the greatest extent possible, to employ apprentices during the same time period that the journeymen in the same craft or trade are employed at the site of the Work. Where an hourly apprenticeship ratio is not feasible for a particular craft or trade, the Division of Apprenticeship Standards, upon application of a Joint Apprenticeship Committee, may order a minimum ratio of not less than one apprentice for each five journeymen in a craft or trade classification. The Contractor or any Subcontractor covered by this Article and California Labor Code §1777.5, upon the issuance of the approval

certificate, or if it has been previously approved in such craft or trade, shall employ the number of apprentices or the ratio of apprentices to journeymen stipulated in the apprenticeship standards. Upon proper showing by the Contractor that it employs apprentices in such craft or trade in the State of California on all of its contracts on an annual average of not less than one apprentice to each five journeymen, the Division of Apprenticeship Standards may grant a certificate exempting the Contractor from the 1-to-5 ratio as set forth in this Article and California Labor Code §1777.5. This Article shall not apply to contracts of general contractors, or to contracts of specialty contractors not bidding for work through a general or prime contractor, involving less than Thirty Thousand Dollars (\$30,000.00) or twenty (20) working days. The term "Apprenticeable Craft or Trade," as used herein shall mean a craft or trade determined as an Apprenticeable occupation in accordance with rules and regulations prescribed by the Apprenticeship Council.

4.18.6.4 Exemption from Ratios. The Joint Apprenticeship Committee shall have the discretion to grant a certificate, which shall be subject to the approval of the Administrator of Apprenticeship, exempting the Contractor from the 1-to-5 ratio set forth in this Article when it finds that any one of the following conditions are met: (i) unemployment for the previous three-month period in such area exceeds an average of fifteen percent (15%) or; (ii) the number of apprentices in training in such area exceeds a ratio of 1-to-5 in relation to journeymen, or; (iii) the Apprenticeable Craft or Trade is replacing at least one-thirtieth (1/30) of its journeymen annually through apprenticeship training, either on a statewide basis or on a local basis, or; (iv) if assignment of an apprentice to any Work performed under the Contract Documents would create a condition which would jeopardize such apprentice's life or the life, safety or property of fellow employees or the public at large, or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyman. When such exemptions from the 1-to-5 ratio between apprentices and journeymen are granted to an organization which represents contractors in a specific trade on a local or statewide basis, the member contractors will not be required to submit individual applications for approval to local Joint Apprenticeship Committees, provided they are already covered by the local apprenticeship standards.

4.18.6.5 Contributions to Trust Funds. The Contractor or any Subcontractor, of any tier, who, performs any of the Work by employment of journeymen or apprentices in any Apprenticeable Craft or Trade and who is not contributing to a fund or funds to administer and conduct the apprenticeship program in any such craft or trade in the area of the site of the Work, to which fund or funds other contractors in the area of the site of the Work are contributing, shall contribute to the fund or funds in each craft or trade in which it employs journeymen or apprentices in the same amount or upon the same basis and in the same manner as the other contractors do, but where the trust fund administrators are unable to accept such funds, contractors not signatory to the trust agreement shall pay a like amount to the California Apprenticeship Council. The Division of Labor Standards Enforcement is authorized to enforce the payment of such contributions to such fund(s) as set forth in California Labor Code §227. Such contributions shall not result in an increase in the Contract Price.

4.18.6.6 Contractor's Compliance. The responsibility of compliance with this Article for all Apprenticeable Trades or Crafts is solely and exclusively that of the Contractor. All decisions of the Joint Apprenticeship Committee(s) under this Article are subject

to the provisions of California Labor Code §3081. In the event the Contractor willfully fails to comply with the provisions of this Article and California Labor Code §1777.5, pursuant to California Labor Code §1777.7, the Contractor shall: (i) be denied the right to bid on any public works contract for a period of one (1) year from the date the determination of non-compliance is made by the Administrator of Apprenticeship; and (ii) forfeit, as a civil penalty, Fifty Dollars (\$50.00) for each calendar day of noncompliance. Notwithstanding the provisions of California Labor Code §1727, upon receipt of such determination, the District shall withhold such amount from the Contract Price then due or to become due. Any such determination shall be issued after a full investigation, a fair and impartial hearing, and reasonable notice thereof in accordance with reasonable rules and procedures prescribed by the California Apprenticeship Council. Any funds withheld by the District pursuant to this Article shall be deposited in the General Fund or other similar fund of the District. The interpretation and enforcement of California Labor Code §§1777.5 and 1777.7 shall be in accordance with the rules and procedures of the California Apprenticeship Council.

4.18.7 Employment of Independent Contractors. Pursuant to California Labor Code §1021.5, Contractor shall not willingly and knowingly enter into any agreement with any person, as an independent contractor, to provide any services in connection with the Work where the services provided or to be provided requires that such person hold a valid contractors license issued pursuant to California Business and Professions Code §§7000 et seq. and such person does not meet the burden of proof of his/her independent contractor status pursuant to California Labor Code §2750.5. In the event that Contractor shall employ any person in violation of the foregoing, Contractor shall be subject to the civil penalties under California Labor Code §1021.5 and any other penalty provided by law. In addition to the penalties provided under California Labor Code §1021.5, Contractor's violation of this Article 4.18.7 or the provisions of California Labor Code §1021.5 shall be deemed an event of Contractor's default under Article 15.1 of these General Conditions. The Contractor shall require any Subcontractor or Sub-Subcontractor performing or providing any portion of the Work to adhere to and comply with the foregoing provisions.

4.19 Assignment of Antitrust Claims. Pursuant to California Government Code §4551, the Contractor and its Subcontractor(s), of any tier, hereby offers and agrees to assign to the District all rights, title and interest in and to all causes of action they may have under Section 4 of the Clayton Act, (15 U.S.C. §15) or under the Cartwright Act (California Business and Professions Code §§16700 et seq.), arising from purchases of goods, services or materials hereunder or any Subcontract. This assignment shall be made and become effective at the time the District tenders Final Payment to the Contractor, without further acknowledgment by the parties. If the District receives, either through judgment or settlement, a monetary recovery in connection with a cause of action assigned under California Government Code §§4550 et seq., the assignor thereof shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the District any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the District as part of the Contract Price, less the expenses incurred by the District in obtaining that portion of the recovery. Upon demand in writing by the assignor, the District shall, within one year from such demand, reassign the cause of action assigned pursuant to this Article if the assignor has been or may have been injured by the violation of law for which the cause of action arose: and (i) the District has not been injured thereby; or (ii) the District declines to file a court action for the cause of action.

4.20 Limitations Upon Site Activities. Except in the circumstances of an emergency, no construction activities shall be permitted at or about the Site except during the District's hours and days set forth in the Special Conditions. Work performed outside of the hours and days noted in the Special Conditions will not result in adjustment of the Contract Time or the Contract Price; unless Work outside of the hours and days noted in the Special Conditions is expressly authorized by the District.

4.21 Labor Compliance Program ("LCP"). Pursuant to Labor Code §1771.7, the District has established a Labor Compliance Program. Unless otherwise expressly provided in the Contract Documents, the LCP is applicable to the entirety of the Work. A material obligation of the Contractor awarded the Contract is its strict compliance with all applicable provisions and requirements of the LCP and its strict enforcement of such provisions and requirements on its Subcontractors and others under the direction or control of the Contractor relating to the Work or the Project. A copy of the LCP is available for review and reproduction in the District's administrative office.

4.21.1 Pre-Construction Conference. In addition to the matters included in the scope of the Pre-Conference, as set forth in Article 4.3.6.1 of the General Conditions, the Pre-Construction conference will include a discussion of the subject matters indicated in the Pre-Construction Conference portion of the LCP, including general requirements of the LCP, measures for compliance with, and enforcement of, LCP requirements, and penalties for failure to comply. The Contractor awarded the Contract and each Subcontractor identified by such Contractor in its Subcontractors List submitted with its Bid Proposal. The foregoing notwithstanding, if the District reasonably determines that individuals or entities in addition to the Contractor and its listed Subcontractor are necessary attendees at the Pre-Construction conference, the Contractor is responsible for measures necessary to secure the attendance of such other persons or entities at the Pre-Construction conference.

4.21.2 Maintenance and Weekly Submission of Certified Payroll Records. The Contractor and each of its Subcontractors shall maintain accurate, complete and current payroll records as required by the LCP. During the progress of the Work, until Final Payment is due, the Contractor and its Subcontractors shall maintain and submit Certified Payroll Records on a weekly basis. No later than the 5:00 P.M. on each Monday during the Work, the Contractor shall submit to the Construction Manager Certified Payroll Records for the Contractor and its Subcontractors for all persons providing or performing any Work in the immediately preceding week. The Certified Payroll Records maintained and submitted hereunder shall be in strict conformity with requirements established in the LCP. A material obligation of the Contractor under the Contract Documents is the Contractor's and its Subcontractor's strict compliance with requirements of the LCP relating to maintenance and submission of Certified Payroll Records. The Contractor's submittal of weekly Certified Payroll Records in strict conformity with requirements of the LCP is an express condition precedent to the District's obligation to disburse any Progress Payment to the Contractor and the Contractor's entitlement to receipt of any Progress Payment.

4.21.3 District Audit of Certified Payroll Records. Pursuant to the LCP, the District shall, as appropriate or necessary conduct audits of Certified Payroll Records. If upon conducting such audits, the District determines that the Contractor or its Subcontractors have committed violations of the LCP, the Contractor and/or its Subcontractors shall be subject to all penalties, assessments and other remedies set forth in the LCP or by

operation of law for such violations.

4.21.4 Contractor's Rights Upon Determination of Violation. If upon audit of Certified Payroll Records, the District determines that the Contractor has violated, or failed to comply with, applicable provisions of the LCP, the Contractor shall be subject to the penalties, assessments and other remedies set forth in the LCP for the Contractor's violation of, or failure to comply with, the LCP. To the extent applicable, the Contractor shall be entitled to contest or appeal such determination, as set forth in the LCP, provided that the Contractor strictly complies with all applicable provisions of applicable law and the LCP relating to the initiation and completion of proceeding to contest or appeal a determination that the Contractor has committed a violation of, or failed to comply with, the LCP.

4.21.5 LCP Not Exclusive. The LCP is not the exclusive source of Contractor's obligations relating to the payment of prevailing wages and compliance with apprenticeship standards. A material obligation of the Contractor under the Contract Documents is the Contractor's compliance with all applicable laws, codes, regulations, rules and orders relating to the employment of labor, working conditions, and payments to laborers for Work performed or provided by laborers.

4.22 State Audit. Pursuant to and in accordance with the provisions of Government Code §8546.7, or any amendments thereto, all books, records and files of the District, the Contractor, or any Subcontractor relating to the Work or the performance of work involving the expenditure of public funds in excess of Ten Thousand Dollars (\$10,000), including, but not limited to, the administration thereof, shall be subject to the examination and audit by the State Auditor of the State of California, at the request of District or as part of any audit of District, for a period of three (3) years after Final Payment is made under this Contract. Contractor shall preserve and cause to be preserved such books, records and files for the audit period. Upon request of the District, the Contractor shall make all such books, records or files available for review, inspection and/or reproduction.

ARTICLE 5: SUBCONTRACTORS

5.1 Subcontracts. Any Work performed for the Contractor by a Subcontractor shall be pursuant to a written agreement between the Contractor and such Subcontractor which specifically incorporates by reference the Contract Documents and which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents, including without limitation, the policies of insurance required under Article 6 of these General Conditions and the termination provisions of Article 15, and obligates the Subcontractor to assume toward the Contractor all the obligations and responsibilities of the Contractor which by the Contract Documents the Contractor assumes toward the District, the Project Inspector, DSA, the Construction Manager and the Architect. The foregoing notwithstanding, no contractual relationship shall exist, or be deemed to exist, between any Subcontractor and the District, unless the Contract is terminated and District, in writing, elects to assume the Subcontract. Each Subcontract for a portion of the Work shall provide that such Subcontract may be assigned to the District if the Contract is terminated by the District pursuant to Article 15.1 hereof, subject to the prior rights of the Surety obligated under a bond relating to the Contract. The Contractor shall provide to the District copies of all executed Subcontracts and Purchase Orders to which Contractor is a party within thirty (30) days after Contractor's execution of the Agreement. During performance of the Work, the Contractor shall, from time to time, as and when requested by the District, the Architect or the Construction Manager provide the District with copies of any and all Subcontracts or Purchase Orders relating to

the Work and all modifications thereto. The Contractor's failure or refusal, for any reason, to provide copies of such Subcontracts or Purchase Orders in accordance with the two preceding sentences is Contractor's default of a material term of the Contract Documents.

5.2 Substitution of Listed Subcontractor.

5.2.1 Substitution Process. Any request of the Contractor to substitute a listed Subcontractor will be considered only if such request is in strict conformity with this Article 5.2 and California Public Contract Code §4107. All costs incurred by the District, including without limitation, costs of the Project Inspector, the Architect, the Construction Manager or attorneys fees in the review and evaluation of a request to substitute a listed Subcontractor shall be borne by the Contractor; such costs may be deducted by the District from the Contract Price then or thereafter due the Contractor.

5.2.2 Responsibilities of Contractor Upon Substitution of Subcontractor. The District's consent to Contractor's substitution of a listed Subcontractor shall not relieve Contractor from its obligation to complete the Work within the Contract Time and for the Contract Price. The substitution of a listed Subcontractor shall not, under any circumstance, result in, or give rise to any to any increase of the Contract Price or the Contract Time on account of such substitution. In the event of the District's consent to the substitution of a listed Subcontractor, the Architect shall determine the extent to which, if any, revised or additional Submittals will be required of the newly substituted Subcontractor. In the event that the Architect determines that revised or additional Submittals are required of the newly substituted Subcontractor, the Architect shall promptly notify the Contractor, in writing, of such requirement. In such event, revised or additional Submittals shall be submitted to Architect not later than thirty (30) days following the date of the Architect's written notice to the Contractor pursuant to the foregoing sentence; provided that if in the reasonable and good faith judgment of the Architect, the progress of the Work or completion of the Work requires submission of additional or revised Submittals by the newly substituted Subcontractor in less than thirty (30) days, the Architect shall so state in its written notice to the Contractor. In the event that the revised or additional Submittals are not submitted by Contractor within thirty (30) days, or such earlier time as determined by the Architect pursuant to the preceding sentence, following the Architect's written notice of the requirement for revised or additional Submittals, Contractor shall be subject to the per diem assessments for late Submittals as set forth in Article 4.7.2.1 of these General Conditions. Any revised or additional Submittals required pursuant to this Article 5.2.2 shall conform to the requirements of Article 4.7 of these General Conditions. Contractor shall reimburse the District for all fees and costs, including without limitation fees of the Construction Manager, Architect and/or any design consultant to the Architect or the District and DSA fees, incurred or associated with the processing, review and evaluation of any revised or additional Submittals required pursuant to this Article 5.2.2; the District may deduct such fees and costs from any portion of the Contract Price then or thereafter due the Contractor. In the event that additional or revised Submittals are required pursuant to this Article 5.2.2, such requirement shall not result in an increase to the Contract Time or the Contract Price.

5.3 Subcontractors' Work. Whenever the Work of a Subcontractor is dependent upon the Work of the Contractor or another Subcontractor, the Contractor shall require the Subcontractor to: (a) coordinate its Work with the dependent Work; (b) provide necessary dependent data and requirements; (c) supply and/or install items to built into the dependent Work of others; (d) make appropriate provisions for dependent Work of others; (e) carefully examine and understand the portions of the Contract Documents (including Drawings, Specifications and

Field Clarifications) and Submittals relating to the dependent Work; and (f) examine the existing dependent Work and verify that the dependent Work is in proper condition for the Subcontractor's Work. If the dependent Work is not in a proper condition, the Subcontractor shall notify the Contractor in writing and not proceed with the Subcontractor's Work until the dependent Work has been corrected or replaced and is in a proper condition for the Subcontractor's Work.

- 5.4 Subcontractors' Compliance With LCP.** As applicable, each Subcontractor performing Work shall comply with the LCP. A material obligation of the Contractor is its enforcement of Subcontractor obligations relating to the LCP; failure of the Contractor to strictly enforce such Subcontractor obligations is a material obligation of the Contractor under the Contract Documents.

ARTICLE 6: INSURANCE; INDEMNITY; BONDS

- 6.1 Workers' Compensation Insurance; Employer's Liability Insurance.** The Contractor shall purchase and maintain Workers' Compensation Insurance as will protect the Contractor from claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Contractor shall purchase and maintain Employer's Liability Insurance covering bodily injury (including death) by accident or disease to any employee which arises out of the employee's employment by Contractor. The Employer's Liability Insurance required of Contractor hereunder may be obtained by Contractor as a separate policy of insurance or as an additional coverage under the Workers' Compensation Insurance required to be obtained and maintained by Contractor hereunder. The limits of liability for the Employer's Liability Insurance required hereunder shall be as set forth in the Special Conditions.
- 6.2 Commercial General Liability and Property Insurance.** The Contractor shall purchase and maintain Commercial General Liability and Property Insurance covering the types of claims set forth below which may arise out of or result from Contractor's operations under the Contract Documents and for which the Contractor may be legally responsible: (i) claims for damages because of bodily injury, sickness or disease or death of any person other than the Contractor's employees; (ii) claims for damages insured by usual personal injury liability coverage which are sustained (a) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (b) by another person; (iii) claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; (iv) claims for damages because of bodily injury, death of a person or property damages arising out of ownership, maintenance or use of a motor vehicle; (v) contractual liability insurance applicable to the Contractor's obligations under the Contract Documents; and (vi) Completed Operations.
- 6.3 Builder's Risk "All-Risk" Insurance.** The Contractor shall obtain Builders Risk insurance covering the full insurable value of the Work from risks of loss, damage or destruction of Work in progress or in place at the Site prior to Final Acceptance including without limitation coverage for losses resulting from the perils of fire, malicious mischief, vandalism, and collapse. The Builder's Risk Insurance Policy shall include coverage for seismic risks if so indicated in the Special Conditions.
- 6.4 Insurance Policy Requirements.** Each policy of insurance required by the Contract

Documents shall confirm the following requirements.

6.4.1 Minimum Coverage Amounts. The insurance required of the Contractor hereunder shall be written for not less than any limits of liability specified in the Contract Documents, or required by law, whichever is greater. In the event of any loss or damage covered by a policy of insurance required to be obtained and maintained by the Contractor hereunder, the Contractor shall be solely and exclusively responsible for the payment of the deductible, if any, under such policy of insurance, without adjustment to the Contract Price on account thereof.

6.4.2 Required Qualifications of Insurers. The Contractor and Subcontractors' policies of Commercial General Liability and Property/Casualty insurance and the Contractor's Builders Risk insurance will be accepted by the District only if the insurer(s) are: (a) A.M. Best rated A- or better; (b) A.M. Best Financial Size Category VII or higher; and (c) authorized under California law to transact business in the State of California and authorized to issue insurance policies in the State of California. If at any time during performance of the Work, the insurer(s) issuing a policy of insurance covering Commercial General Liability, Property/Casualty or Builder Risk is/are not A.M. Best rated A- or better and is/are not A.M. Best Financial Size Category VII or higher, the Contractor or Subcontractor, as applicable shall within thirty (30) days of the District's written notice of the insufficiency of an insurer to the Contractor, obtain insurance coverage(s) from alternative insurer(s) who is/are then A.M. Best rated A- or better and who is/are A.M. Best Financial Size Category VII or higher. If the Contractor fails to deliver Certificate(s) of Insurance from an alternative insurer(s) meeting or exceeding the A.M. Best rating and A.M. Best Financial Size Category set forth above, within thirty (30) days of the date of the District's issuance of a written notice pursuant to the preceding sentence, in addition to any other right or remedy of the District under the Contract Documents or arising by operation of law, the District may withhold disbursement of any Progress Payment otherwise due hereunder until the Contractor has delivered such Certificate(s) of Insurance from an alternative insurer(s).

6.5 Evidence of Insurance; Subcontractor's Insurance.

6.5.1 Certificates of Insurance. Prior to commencing the Work, Contractor shall deliver to the District Certificates of Insurance evidencing the insurance coverages required by the Contract Documents. Failure or refusal of the Contractor to so deliver Certificates of Insurance may be deemed by the District to be a default of a material obligation of the Contractor under the Contract Documents, and thereupon the District may proceed to exercise any right or remedy provided for under the Contract Documents or at law. The Certificates of Insurance and the insurance policies required by the Contract Documents shall contain a provision that coverages afforded under such policies will not be canceled or allowed to expire until at least thirty (30) days prior written notice has been given to the District. The insurance policies required of Contractor hereunder shall also name the District, the Architect and the Construction Manager as additional insureds as their interests may appear. Should any policy of insurance be canceled before Final Acceptance of the Work by the District and the Contractor fails to immediately procure replacement insurance as required, the District reserves the right to procure such insurance and to deduct the premium cost thereof and other costs incurred by the District in connection therewith from any sum then or thereafter due the Contractor under the Contract Documents. The Contractor shall, from time to time, furnish the District, when requested, with satisfactory proof of coverage of each type of insurance required by the Contract

Documents; failure of the Contractor to comply with the District's request may be deemed by the District to be a default of a material obligation of the Contractor under the Contract Documents.

- 6.5.2 Subcontractors' Insurance.** Contractor shall require that every Subcontractor, of any tier, performing or providing any portion of the Work obtain and maintain the policies of insurance set forth in Articles 6.1 and 6.2 of these General Conditions; the coverages and limits of liability of such policies of insurance to be obtained and maintained by Subcontractors shall be as set forth in the Special Conditions. The policies of insurance to be obtained and maintained by Subcontractors hereunder are in addition to, and not in lieu of, Contractor obtaining and maintaining such policies of insurance. Each of the policies of insurance obtained and maintained by a Subcontractor hereunder shall conform with the requirements of this Article 6. Upon request of the District, Contractor shall promptly deliver to the District Certificates of Insurance evidencing that the Subcontractors have obtained and maintained policies of insurance in conformity with the requirements of this Article 6. Failure or refusal of the Contractor to provide the District with Subcontractors' Certificates of Insurance evidencing the insurance coverages required hereunder is a material default of Contractor hereunder.
- 6.6 Maintenance of Insurance.** Any insurance bearing on the adequacy of performance of Work shall be maintained after the District's Final Acceptance of all of the Work for the full one year correction of Work period and any longer specific guarantee or warranty periods set forth in the Contract Documents. Should such insurance be canceled before the end of any such periods and the Contractor fails to immediately procure replacement insurance as specified, the District reserves the right to procure such insurance and to charge the cost thereof to the Contractor. Nothing contained in these insurance requirements is to be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from its operations or performance of the Work under the Contract Documents, including without limitation the Contractor's obligation to pay Liquidated Damages. In no instance will the District's exercise of its option to occupy and use completed portions of the Work relieve the Contractor of its obligation to maintain insurance required under this Article until the date of Final Acceptance of the Work by the District, or such time thereafter as required by the Contract Documents. The insurer providing any insurance coverage required hereunder shall be to the reasonable satisfaction of the District.
- 6.7 Contractor's Insurance Primary.** All insurance and the coverages thereunder required to be obtained and maintained by Contractor hereunder, if overlapping with any policy of insurance maintained by the District, shall be deemed to be primary and non-contributing with any policy maintained by the District and any policy or coverage thereunder maintained by District shall be deemed excess insurance. To the extent that the District maintains a policy of insurance covering property damage arising out of the perils of fire or other casualty covered by the Contractor's Builder's Risk Insurance or the Comprehensive General Liability Insurance of the Contractor or any Subcontractor, the District, Contractor and all Subcontractors waive rights of subrogation against the others. The costs for obtaining and maintaining the insurance coverages required herein shall be included in the Contract Price.
- 6.8 Indemnity.** Unless arising solely out of the active negligence, gross negligence or willful misconduct the District or the Architect, the Contractor shall indemnify, defend and hold harmless the Indemnified Parties who are: (i) the District and its Board of Trustees, officers, employees, agents and representatives (including the Project Inspector); (ii) the Architect and its consultants for the Work and their respective agents and employees; and (iii) the

Construction Manager and its agents and employees. The Contractor's obligations hereunder includes indemnity, defense and hold harmless of the Indemnified Parties from and against any and all damages, losses, claims, demands or liabilities whether for damages, losses or other relief, including, without limitation attorneys fees and costs which arise, in whole or in part, from the Work, the Contract Documents or the acts, omissions or other conduct of the Contractor, any Subcontractor or any person or entity engaged by them for the Work. The Contractor's obligations under the foregoing include without limitation: (i) injuries to or death of persons; (ii) damage to property; or (iii) theft or loss of property; (iv) Stop Notice claims asserted by any person or entity in connection with the Work; and (v) other losses, liabilities, damages or costs resulting from, in whole or part, any acts, omissions or other conduct of Contractor, any of Contractor's Subcontractors, of any tier, or any other person or entity employed directly or indirectly by Contractor in connection with the Work and their respective agents, officers or employees. The obligations of the Contractor, as set forth in (v) above shall include, without limitation losses, costs, expenses, damages and other claims asserted by any other Contractor to the District in connection with the Work or in connection with a work of improvement related to or affected by the Work. If any action or proceeding, whether judicial, administrative, arbitration or otherwise, shall be commenced on account of any claim, demand or liability subject to Contractor's obligations hereunder, and such action or proceeding names any of the Indemnified Parties as a party thereto, the Contractor shall, at its sole cost and expense, defend the named Indemnified Parties in such action or proceeding with counsel reasonably satisfactory to the named Indemnified Parties. In the event that there shall be any judgment, award, ruling, settlement, or other relief arising out of any such action or proceeding to which any of the Indemnified Parties are subject to, or bound by, Contractor shall pay, satisfy or otherwise discharge any such judgment, award, ruling, settlement or relief; Contractor shall indemnify and hold harmless the Indemnified Parties from any and all liability or responsibility arising out of any such judgment, award, ruling, settlement or relief. The Contractor's obligations hereunder are binding upon Contractor's Performance Bond Surety and these obligations shall survive notwithstanding Contractor's completion of the Work or the termination of the Contract.

- 6.9 Payment Bond; Performance Bond.** Prior to commencement of the Work, the Contractor shall furnish a Performance Bond as security for Contractor's faithful performance of the Contract and a Labor and Material Payment Bond as security for payment of persons or entities performing work, labor or furnishing materials in connection with Contractor's performance of the Work under the Contract Documents. Unless otherwise stated in the Special Conditions, the amounts of the Performance Bond and the Payment Bond required hereunder shall be one hundred percent (100%) of the Contract Price. Said Labor and Material Payment Bond and Performance Bond shall be in the form and content set forth in the Contract Documents. The failure or refusal of the Contractor to furnish either the Performance Bond or the Labor and Material Payment Bond in strict conformity with this Article 6.9 may be deemed by the District as a default by the Contractor of a material obligation hereunder. Upon request of the Contractor, the District may consider and accept, but is not obligated to do so, multiple sureties on such bonds. The Surety on any bond required under the Contract Documents shall be: (i) an Admitted Surety Insurer as that term is defined in California Code of Civil Procedure §995.120; (ii) A.M. Best rated A- or better; and (iii) A.M. Best Financial Size Category VII or better. The Contractor's delivery of Bonds issued by a Surety who does not meet or exceed each of the criteria set forth above will be rejected.

ARTICLE 7: CONTRACT TIME

7.1 Substantial Completion of the Work Within Contract Time. Unless otherwise expressly provided in the Contract Documents, the Contract Time is the period of time, including authorized adjustments thereto, allotted in the Contract Documents for achieving Substantial Completion of the Work. The date for commencement of the Work is the date established by the Notice to Proceed issued by the District pursuant to the Agreement, which shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible. The date of Substantial Completion is the date certified by the Architect and the Project Inspector as such in accordance with the Contract Documents.

7.2 Progress and Completion of the Work.

7.2.1 Time of Essence. Time limits stated in the Contract Documents are of the essence. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing and achieving Substantial Completion of the Work. The Contractor shall employ and supply a sufficient force of workers, material and equipment, and prosecute the Work with diligence so as to maintain progress, to prevent Work stoppage and to achieve Substantial Completion of the Work within the Contract Time.

7.2.2 Substantial Completion. Substantial Completion is that stage in the progress of the Work when the Work is complete in accordance with the Contract Documents so the District can occupy or use the Work for its intended purpose. Substantial Completion shall be determined by the Architect, the Construction Manager and the Project Inspector upon request by the Contractor in accordance with the Contract Documents. The good faith and reasonable determination of Substantial Completion by the Project Inspector, the Construction Manager and the Architect shall be controlling and final.

7.2.3 Correction or Completion of the Work After Substantial Completion.

7.2.3.1 Punchlist. Upon achieving Substantial Completion of the Work, the District, The Project Inspector, the Construction Manager, the Architect and the Contractor shall jointly review the Work and prepare a comprehensive list of items of the Work to be corrected or completed by the Contractor (“the Punchlist”). The exclusion of, or failure to include, any item on the Punchlist shall not alter or limit the obligation of the Contractor to complete or correct any portion of the Work in accordance with the Contract Documents.

7.2.3.2 Time for Completing Punchlist Items. In addition to setting forth items for correction or completion pursuant to Article 7.2.3.1, the Construction Manager, if any, Contractor and Architect shall, after the jointly review, establish a reasonable time for Contractors’ completion of all Punchlist items. If mutual agreement is not reached for the Contractor’s completion of Punchlist items, the Architect shall determine such time, and in such event, the time determined by the Architect shall be final and binding upon the District and Contractor so long as the Architect’s determination is made in good faith. The Contractor shall promptly and diligently proceed to complete all Punchlist items within the time established. In the event that the Contractor shall fail or refuse, for any reason, to complete all Punchlist items within the time established, Contractor shall be subject to assessment of Liquidated Damages in accordance with Article 7.4 hereof. The foregoing notwithstanding, if the Contractor fails or refuses to complete all Punchlist items, the District may in its sole and exclusive discretion and without further notice to Contractor, elect to cause the completion of all remaining Punchlist items provided, however that such election by the District is in addition to

and not in lieu of any other right or remedy of the District under the Contract Documents or at law. If the District elects to complete Punchlist items of the Work, pursuant to the foregoing, Contractor shall be responsible for all costs incurred by the District in connection herewith and the District may deduct such costs from the Contract Price then or thereafter due the Contractor, if these costs exceed the remaining Contract Price due to the Contractor, the Contractor and the Performance Bond Surety are liable to District for any such excess costs

7.2.4 Final Completion. Final Completion is that stage of the Work when all Work has been completed in accordance with the Contract Documents, including without limitation, the performance of all correction or completion items noted upon Substantial Completion, and the Contract has been otherwise fully performed by the Contractor. Final Completion shall be determined by the Architect and the Project Inspector upon request of the Contractor. The good faith and reasonable determination of Final Completion by the Project Inspector and the Architect shall be controlling and final.

7.2.5 Contractor Responsibility for Multiple Inspections. In the event the Contractor shall request determination of Substantial Completion or Final Completion by the Project Inspector and the Architect and it is determined by the Project Inspector and the Architect that the Work does not then justify certification of Substantial Completion or Final Completion and re-inspection is required at a subsequent time to make such determination, the Contractor shall be responsible for all costs of such re-inspection, including without limitation, the fees of the Architect and the salary of the Project Inspector. The District may deduct such costs from the Contract Price then due or thereafter due to the Contractor.

7.2.6 Final Acceptance. Final Acceptance of the Work shall occur upon approval of the Work by the District's Board of Trustees; such approval shall be submitted for adoption at the next regularly scheduled meeting of the District's Board of Trustees after the determination of Final Completion. The commencement of any warranty or guarantee period under the Contract Documents shall be deemed to be the date upon which the District's Board of Trustees approves of the Final Acceptance of the Work.

7.3 Construction Schedule.

7.3.1 General Construction Schedule Requirements. Unless otherwise provided in the Special Conditions, the Construction Schedules required under this Article 7 shall; (i) indicate the date(s) for commencement and completion of various portions of the Work including without limitation, procurement, fabrication and delivery of major items, materials or equipment; (ii) indicate manpower and other resources required for completion of each Construction Schedule activity; (iii) indicate costs for completion of each Construction Schedule activity; (iv) identify each Submittal required by the Contract Documents, the date for the Contractor's submission of each Submittal and the date for the return of the reviewed Submittal to the Contractor; (v) no Site activity shall reflect a duration of less than one (1) or more than fifteen (15) working days; (vi) no more than twenty five percent (25%) of the total number of activities shown on any Construction Schedule shall be critical path activities or near critical path activities; "near critical path" is defined as float less than ten (10) working days; (viii) indicate major milestones, including without limitation, development of Punchlists and completion of Punchlists, equipment start-up and testing, close-out activities; and (ix) shall incorporate an activity code structure sufficient to allow future sorting/grouping by responsibility, Site area/location, CSI divisions and Milestones.

Failure by the Contractor to include any element of the Work required by the Contract Documents or completion of the Work shall not excuse the Contractor from completing all work required within the Contract Time, notwithstanding District's, Construction Manager's and Architect's acceptance of any Construction Schedule prepared by the Contractor.

7.3.2 Submittal of Preliminary Construction Schedule. Within ten (10) days following execution of the Agreement, the Contractor shall prepare and submit one (1) electronic and two (2) hard copies to the District, the Construction Manager and the Architect a Preliminary Construction Schedule indicating, in graphic form, the estimated rate of progress and sequence of all Work required under the Contract Documents. Failure of the Contractor to submit the Preliminary Construction Schedule within said ten (10) days will result in assessment of Liquidated Damages as set forth in the Special Conditions for each calendar beyond such ten (10) day period, until the Preliminary Construction Schedule is submitted by the Contractor. The purpose of the Preliminary Construction Schedule is to ensure adequate planning and execution of the Work so that it is completed within the Contract Time and to permit evaluation of the progress of the Work. The Contractor may submit a Preliminary Construction Schedule depicting completion of the Work in a duration shorter than the Contract Time; provided that such Preliminary Construction Schedule shall not be a basis for adjustment to the Contract Price in the event that completion of the Work shall occur after the time depicted therein, nor shall such Preliminary Construction Schedule be the basis for any extension of the Contract Time, the Contractor's entitlement to any extension of the Contract Time shall be based upon the Contract Time and not on any shorter duration which may be depicted in the Contractor's Preliminary Construction Schedule. If the Construction Schedules required under this Article 7.3 incorporate therein any "float" time, such float shall be deemed to jointly belong to and owned by the District and the Contractor. As used herein, "float time" shall be deemed to refer to the time between earliest finish date and the latest finish date of each activity shown on the Construction Schedule.

7.3.3 Review of Preliminary Construction Schedule. The District, the Construction Manager and the Architect shall review the Preliminary Construction Schedule submitted by the Contractor pursuant to Article 7.3.1 above for conformity with the requirements of the Contract Documents. Within fifteen (15) days of the date of receipt of the Preliminary Construction Schedule, the Preliminary Construction Schedule will be returned to the Contractor with comments to the form or content thereof. Review of the Preliminary Progress Schedule and any comments thereto by the District, the Construction Manager and/or the Architect shall not be deemed to be the assumption of construction means, methods or sequences by the District, the Construction Manager or the Architect, all of which remain the Contractor's obligations under the Contract Documents.

7.3.4 Preparation and Submittal of Contract Construction Schedule. Within ten (10) days of the District's return of the Preliminary Construction Schedule to the Contractor pursuant to Article 7.3.2 above, the Contractor shall prepare and submit to the District, Architect and the Construction Manager the Construction Schedule which incorporates therein the comments to the Preliminary Construction Schedule. Upon the Contractor's submittal of such Construction Schedule, the District, the Construction Manager and the Architect shall review the same for purposes of determining conformity with the requirements of the Contract Documents. Within fifteen (15) days of the receipt of the Construction Schedule, the District will accept such Construction Schedule or will return the same to the Contractor with comments to the form or content. In the event there are comments to the form or content thereof, the Contractor, shall within seven (7) days of

receipt of such comments, revise and resubmit the Construction Schedule incorporating therein such comments. Upon the District's acceptance of the form and content of a Construction Schedule, the same shall be deemed the "Accepted Construction Schedule." The District's acceptance of a Construction Schedule shall be for the sole and limited purpose of determining conformity with the requirements of the Contract Documents. By the Accepted Construction Schedule, the District shall not be deemed to have exercised control over, or approval of, construction means, methods or sequences, all of which remain the responsibility and obligation of the Contractor in accordance with the terms of the Contract Documents. Further, the Accepted Construction Schedule shall not operate to limit or restrict any of Contractor's obligations under the Contract Documents nor relieve the Contractor from the full, faithful and timely performance of such obligations in accordance with the terms of the Contract Documents. The activities, commencement and completion dates of activities, and the sequencing of activities depicted on the Accepted Construction Schedule shall not be modified or revised by the Contractor without the prior consent, or direction, of the District, Construction Manager and the Architect. Updates to the Accepted Construction Schedule pursuant to Article 7.3.5 below shall not be deemed revisions to the Accepted Construction Schedule. In the event that the Accepted Construction Schedule shall depict completion of the Work in a duration shorter than the Contract Time, the same shall not be a basis for an adjustment of the Contract Time or the Contract Price in the event that actual completion of the Work shall occur after such the time depicted in such Accepted Construction Schedule. In such event, the Contract Price shall not be subject to adjustment on account of any additional costs incurred by the Contractor to complete the Work prior to the Contract Time, as adjusted in accordance with the terms of the Contract Documents. Any adjustment of the Contract Time or the Contract Price shall be based upon the Contract Time set forth in the Contract Documents and not any shorter duration which may depicted in the Accepted Construction Schedule.

7.3.5 Revisions to Accepted Construction Schedule. In the event that the progress of the Work or the sequencing of the activities of the Work shall materially differ from that indicated in the Accepted Construction Schedule, as determined by the District in its reasonable discretion and judgment, the District may direct the Contractor to revise the Accepted Construction Schedule; within fifteen (15) days of the District's direction, the Contractor shall prepare and submit to the District, Architect and the Construction Manager a revised Accepted Construction Schedule, for review and approval by the District. The Contractor may request consent of the District to revise the Accepted Construction Schedule. Any such request shall be considered by the District only if in writing setting forth the Contractor's proposed revision(s) to the Accepted Construction Schedule and the reason(s) therefor. The District may consent to, or deny, any such request of the Contractor to revise the Accepted Construction Schedule in its reasonable discretion.

7.3.6 Updates to Accepted Construction Schedule.

7.3.6.1 Updated Construction Schedule Requirements. The Contractor shall monitor and update the Accepted Construction Schedule on a monthly basis, or more frequently as required by the conditions or progress of the Work, or as may be requested by the District. The Contractor shall provide the District, the Construction Manager and the Architect with Updated Accepted Construction Schedules indicating progress achieved and activities commenced or completed within the prior Updated Accepted Construction Schedule. Updates to the Accepted Construction Schedule shall not include any revisions to the activities, commencement and completion dates of activities or the sequencing of activities depicted on the Accepted Construction

Schedule. Any such revisions to the Accepted Construction Schedule shall result in the District's rejection of such update and Contractor shall, within seven (7) days of the District's rejection of such update, submit to the Architect and the Construction Manager an Updated Accepted Construction Schedule which does not incorporate any such revisions. The Contractor shall also submit, with its updates to the Accepted Construction Schedule a narrative statement including a description of current and anticipated problem areas of the Work, delaying factors and their impact, and an explanation of corrective action taken or proposed by the Contractor. If the progress of the Work is behind the Accepted Construction Schedule, the Contractor shall indicate what measures will be taken to place the Work back on schedule. The District may, from time to time, and in the District's sole and exclusive discretion, transmit to the Contractor's Performance Bond Surety the Accepted Construction Schedule, any updates thereof and the narrative statement described hereinabove. The District's election to transmit, or not to transmit such information, to the Contractor's Performance Bond Surety shall not limit the Contractor's obligations under the Contract Documents.

7.3.6.2 Monthly Submission of Updated Construction Schedules. Concurrently with its submission of its Applications for Progress Payments, the Contractor shall submit the Updated Construction Schedule for the immediately preceding month. Each submission of a monthly Updated Construction Schedule shall consist of: (i) one (1) reproducible copy; (ii) three (3) color copies; and (iii) electronic file stored on CD or DVD. If a narrative report accompanies any monthly Updated Construction Schedule, the Contractor shall submit four (4) copies of such narratives.

7.3.7 Contractor Responsibility for Construction Schedule. The Contractor shall be responsible for the preparation, submittal and maintenance of the Construction Schedules required by the Contract Documents, and any failure of the Contractor to do so may be deemed by the District as the Contractor's default in the performance of a material obligation of the Contractor under Contract Documents. Any and all costs or expenses required or incurred to prepare, submit, revise, maintain or update the Construction Schedules shall be solely that of the Contractor and no such cost or expense shall be charged to the District. The Contract Price shall not be subject to adjustment on account of costs, fees or expenses incurred or associated with the Contractor's preparation, submittal, and maintenance or updating of the Construction Schedules.

7.3.8 Three (3) Week Look-Ahead Schedule; One (1) Week As Built Schedule. A combined three (3) week Look-Ahead Schedule for the three (3) week period immediately following each weekly Progress Meeting with a one (1) week As-Built Schedule for the previous week shall be prepared by the Contractor and submitted by the Contractor to the Construction Manager for review and approval at each weekly Progress Meeting. The Contractor's preparation and submittal of the Three (3) Week Look-Ahead Schedule; One (1) Week As Built Schedule described above are material obligations of the Contractor; failure or refusal of the Contractor to strictly comply with the foregoing shall be a basis for the District's exercise of the default termination procedures set forth in the Contract Documents.

7.3.9 Unanticipated Unusually Severe Weather Conditions. The Baseline Construction Schedule and all subsequent Construction Schedule Updates shall incorporate a critical path activity entitled "Remaining Inclement Weather Days" which shall be the last activity in each Construction Schedule prior to the activity entitled "Final Completion". The sole

successor to "Remaining Inclement Weather Days" (with zero lag) shall be "Final Completion" and the sole predecessor (with zero lag) shall be "Punchlist".

The Contractor shall apply in writing to the District to use an Inclement Weather Day only when a critical path activity on the then current Updated Construction Schedule has been delayed because of inclement weather conditions. The duration of the "Remaining Inclement Weather Days" activity shall be reduced by the number of approved work days of actual weather caused delay, and be included in the monthly schedule updates.

The "Remaining Inclement Weather Days" activity shall have an initial duration as set forth in the Special Conditions, Paragraph 4.3. If, at Final Completion, there are inclement weather days remaining, the unused days shall be considered "float" as defined by Paragraph 7.3.1 of the General Conditions. If, additional inclement weather days are required, the District shall adjust the Substantial Completion date accordingly.

7.3.10 Construction Schedules; Conditions Precedent To Progress Payment Disbursements. In addition to, and not in lieu of conditions precedent set forth elsewhere in the Contract Documents relating to the District's disbursement of Progress Payments, the Contractor's preparation and submission of the Preliminary Construction Schedule, Construction Schedule Updates and the Three (3) Week Look-Ahead Schedule; One (1) Week As Built Schedule in accordance with the Contract Documents requirements are conditions precedent to the District's obligation to disburse any Progress Payment to the Contractor.

7.3.11 Contractor Schedule Compliance Obligations. If in the sole reasonable judgment of the District: (i) the Contractor's progress of Work is materially behind that indicated in the then current Construction Schedule or (ii) the Contractor's progress of Work will not result in the Contractor's achievement of Substantial Completion within the Contract Time or the Contractor's completion of Milestones/Phases of the Work as required by the Contract Documents, the Contractor shall take the action(s) described herein, as directed or authorized by the District. Unless the actions of the District, Construction Manager, Architect or Project Inspector are the sole causative factors resulting in delayed progress of the Work or the inability to achieve Substantial Completion within the Contract Time, the Contractor's actions hereunder shall not result in adjustment of the Contract Time or the Contract Price. Actions to be directed or authorized by the District include, without limitation, the Contractor's (i) increase of labor resources (whether on-Site or off-Site); (ii) increase the number of working hours per shift, increase the number of shifts per working day, increase the number of working days and/or increase Construction Equipment at the Site; and/or (iii) re-sequence Work activities to achieve maximum concurrent performance and completion of multiple Work activities.

7.4 Adjustment of Contract Time. If Substantial Completion is delayed, adjustment, if any, to the Contract Time on account of such delay shall be in accordance with this Article 7.4.

7.4.1 Excusable Delays. If Substantial Completion of the Work is delayed by Excusable Delays, the Contract Time shall be subject to adjustment for such reasonable period of time as determined by the Architect; Excusable Delays shall not result in any increase in the Contract Price. Excusable Delays refer to unforeseeable and unavoidable casualties or other unforeseen causes beyond the control, and without fault or neglect, of the Contractor, any Subcontractor, Material Supplier or other person directly or indirectly engaged by the Contractor in performance of any portion of the Work. Excusable Delays

include unanticipated and unavoidable labor disputes, unusual and unanticipated delays in transportation of equipment, materials or Construction Equipment reasonably necessary for completion and proper execution of the Work, unanticipated unusually severe weather conditions or DSA directive to stop the Work. Neither the financial resources of the Contractor or any person or entity directly or indirectly engaged by the Contractor in performance of any portion of the Work shall be deemed conditions beyond the control of the Contractor. If an event of Excusable Delay occurs, the Contract Time shall be subject to adjustment hereunder only if the Contractor establishes: (i) full compliance with all applicable provisions of the Contract Documents relative to the method, manner and time for Contractor's notice and request for adjustment of the Contract Time; (ii) that the event(s) forming the basis for Contractor's request to adjust the Contract Time are outside the reasonable control and without any fault or neglect of the Contractor or any person or entity directly or indirectly engaged by Contractor in performance of any portion of the Work; and (iii) that the event(s) forming the basis for Contractor's request to adjust the Contract Time directly and adversely impacted the critical path of the Work as indicated in the Approved Construction Schedule or the most recent updated Approved Construction Schedule relative to the date(s) of the claimed event(s) of Excusable Delay. The foregoing provisions notwithstanding, if the Special Conditions set forth a number of "Rain Days" to be anticipated during performance of the Work, the Contract Time shall not be adjusted for rain related unusually severe weather conditions until and unless the actual number of Rain Days during performance of the Work shall exceed those noted in the Special Conditions and such additional Rain Days shall have directly and adversely impacted the critical path of the Work as depicted in the Approved Construction Schedule or the most recent updated Approved Construction Schedule relative to the date(s) of such additional Rain Days.

7.4.2 Compensable Delays. If Substantial Completion of the Work is delayed and such delay is caused by the acts or omissions of the District, the Architect, the Inspector of Record, or separate contractor employed by the District (collectively "Compensable Delays"), upon Contractor's request and notice, in strict conformity with Articles 7 and 9 of these General Conditions, the Contract Time will be adjusted by Change Order for such reasonable period of time as determined by the Architect and the District. In accordance with California Public Contract Code §7102, if the Contractor's progress is delayed by any of the events described in the preceding sentence, Contractor shall not be precluded from the recovery of damages directly and proximately resulting therefrom, provided that the District is liable for the delay, the delay is unreasonable under the circumstances involved and the delay was not within the reasonable contemplation of the District and the Contractor at the time of execution of the Agreement. In such event, Contractor's damages, if any, shall be limited to direct, actual and unavoidable additional costs of labor, materials or Construction Equipment directly resulting from such delay, and shall exclude indirect or other consequential damages. Except as expressly provided for herein, Contractor shall not have any other claim, demand or right to adjustment of the Contract Price arising out of delay, interruption, hindrance or disruption to the progress of the Work. Adjustments to the Contract Price and the Contract Time, if any, on account of Changes to the Work or Suspension of the Work shall be governed by the applicable provisions of the Contract Documents, including without limitation, Articles 9 and 14 of these General Conditions.

7.4.3 Unexcusable Delays. Unexcusable Delays refer to any delay to the progress of the Work caused by events or factors other than those specifically identified in Articles 7.4.1 and 7.4.2 above. Neither the Contract Price nor the Contract Time shall be adjusted on account of Unexcusable Delays.

7.4.4 Adjustment of Contract Time.

7.4.4.1 Procedure for Adjustment of Contract Time. The Contract Time shall be subject to adjustment only in strict conformity with applicable provisions of the Contract Documents. Failure of Contractor to request adjustment(s) of the Contract Time in strict conformity with applicable provisions of the Contract Documents shall be deemed Contractor's waiver of the same.

7.4.4.1.1 Contractor Notice of Adjustment of Contract Time. The Contract Time shall be subject to adjustment only if the Contractor provides notice of an adjustment of the Contract Time and all supporting substantiation and documentation of the basis and extent of the requested Contract Time adjustment in strict conformity to Article 9.6 of these General Conditions.

7.4.4.1.2 Time Impact Evaluation. The supporting substantiation and documentation of the basis and extent of Contract Time adjustments required by the provisions of Article 9.6 shall include, without limitation, a complete Time Impact Evaluation ("TIE") of the factors justifying an adjustment of the Contract Time and the extent of such adjustment of the Contract Time.

7.4.4.2 Limitations Upon Adjustment of Contract Time on Account of Delays. Any adjustment of the Contract Time on account of an Excusable Delay or a Compensable Delay shall be limited as set forth herein. If an Excusable Delay and a Compensable Delay occur concurrently, the maximum extension of the Contract Time shall be the number of days from the commencement of the first delay to the cessation of the delay which ends last. If an Unexcusable Delay occurs concurrently with either an Excusable Delay or a Compensable Delay, the maximum extension of the Contract Time shall be the number of days, if any, which the Excusable Delay or the Compensable Delay exceeds the period of time of the Unexcusable Delay. In addition to the foregoing limitations upon extension of the Contract Time, no adjustment of the Contract Time shall be made on account of any Excusable Delays or Compensable Delays unless such delay(s) actually and directly impact Work or Work activities on the critical path of the then current and updated Approved Construction Schedule as of the date on which such delay first occurs. The District shall not be deemed in breach of, or otherwise in default of any obligation hereunder, if the District shall deny any request by the Contractor for an adjustment of the Contract Time for any delay which does not actually and directly impact Work or Work activities on the critical path of the then current and updated Approved Construction Schedule.

7.5 Liquidated Damages. Should the Contractor neglect, fail or refuse to: (i) submit the Preliminary Construction Schedule within the time set forth in the Contract Documents; (ii) submit Submittals in accordance with Submittal Schedule incorporated into the Accepted Construction Schedule; (iii) achieve Substantial Completion of the Work within the Contract Time, (subject to adjustments authorized under the Contract Documents); or (iv) to complete Punchlist items within the time established pursuant to the Contract Documents, the Contractor agrees to pay to the District the amount of per diem Liquidated Damages set forth in the Special Conditions, not as a penalty but as Liquidated Damages. The Liquidated Damages amounts set forth in the Special Conditions are agreed upon by and between the Contractor and the District because of the difficulty of fixing the District's actual damages in the event of the Contractor's delayed submission of the Preliminary Construction Schedule, delayed submission of Submittals, delayed Substantial Completion or delayed completion of

Punchlist items. The Contractor and the District specifically agree that said amounts are reasonable estimates of the District's damages in such event, and that such amounts do not constitute a penalty. Liquidated Damages may be deducted by the District from the Contract Price then or thereafter due the Contractor. The Contractor and the Surety shall be liable to the District for any Liquidated Damages exceeding any amount of the Contract Price then held or retained by the District. In the event that the Contractor shall fail or refuse to complete Punchlist items and the District elects to exercise its right to cause completion or correction of such items pursuant to Article 7.2.3.2 hereof, the District's assessment of Liquidated Damages pursuant to the foregoing shall be in addition, and not in lieu of, the District's right to charge Contractor with the cost of completing or correcting such items of the Work, as provided for under Article 7.2.3.2. The Contractor and the District acknowledge and agree that the provisions of this Article 7.5 are reasonable under the circumstances existing at the time of the Contractor's execution of the Agreement.

- 7.6 District Right to Take-Over Work.** Unless caused by the District, Architect, Construction Manager or the Project Inspector, if the Contractor fails or refuses, for any reason and at any time, to furnish adequate materials, labor, equipment or services to maintain progress of the Work in accordance with the then current Construction Schedule after twenty-four (24) hours advance written notice from the Construction Manager to the Contractor of its failure or refusal, the District may thereafter furnish or cause to be furnished such materials, labor, equipment or services necessary to maintain progress of the Work in accordance with the then current Construction Schedule. All costs, expenses or other charges (whether direct, indirect and administrative) incurred by the District in furnishing such materials, labor, equipment or services shall be at the sole cost of the Contractor and the District may deduct the same from the Contract Price then or thereafter due the Contractor. The District's exercise of rights pursuant to the foregoing shall not be deemed a waiver or limitation of any other right or remedy of the District under the Contract Documents.

ARTICLE 8: CONTRACT PRICE

- 8.1 Contract Price.** The Contract Price is the amount stated in the Agreement as such, and subject to any authorized adjustments thereto in accordance with the Contract Documents, is the total amount payable by the District to the Contractor for performance of the Work under the Contract Documents. The District's payment of the Contract Price to the Contractor shall be in accordance with the Contract Documents.
- 8.2 Cost Breakdown.** Within fifteen (15) days of the execution of the Agreement by Contractor, Contractor shall furnish, on forms approved by the District, a detailed estimate and complete Cost Breakdown of the Contract Price. The Cost Breakdown shall be subject to review and approval by the Construction Manager, Architect and District of the form and content thereof. In the event that the District shall reasonably object to any portion of the Cost Breakdown, within ten (10) days of the District's receipt of the Cost Breakdown, the District shall notify the Contractor, in writing of the District's objection(s) to the Cost Breakdown. Within five (5) days of the date of the District's written objection(s), Contractor shall submit a revised Cost Breakdown to the District, Architect and the Construction Manager for review and acceptance. The foregoing procedure for the preparation, review and approval of the Cost Breakdown shall continue until the District, Architect and the Construction Manager have approved of the entirety of the Cost Breakdown. Once the Cost Breakdown is accepted by the District, Architect and the Construction Manager, the Cost Breakdown shall not be thereafter modified or amended by the Contractor without the prior consent and approval of the District, Architect and the Construction Manager, which may be granted or withheld in

their sole reasonable discretion.

8.3 Progress Payments.

8.3.1 Applications for Progress Payments. During the Contractor's performance of the Work, the Contractor shall submit monthly, on the first working day of each month, to the Project Inspector, Construction Manager and the Architect, Applications for Progress Payments, on forms approved by the District, setting forth an itemized estimate of Work completed in the preceding month for the purpose of the District's making of Progress Payments thereon. Values utilized in the Applications for Progress Payments shall be based upon the District accepted Cost Breakdown pursuant to Article 8.2 above and such values shall be only for determining the basis of Progress Payments to Contractor, and shall not be considered as fixing a basis for adjustments, whether additive or deductive, to the Contract Price, or for determining the extent of Work actually completed.

8.3.2 Initial Progress Payment Meeting. Prior to submitting any Application for Progress Payment and for the purpose of expediting review of Application for Progress Payments and disbursement of Progress Payments, Contractor agrees to meet with the Project Inspector, Construction Manager and Architect to review and discuss each of the Contractor's Proposed Applications for Progress Payment. If any item submitted for payment is disputed during this review, Contractor agrees to use its best efforts to resolve the disputed items with Project Inspector, Construction Manager and Architect before formally submitting the Application for Progress Payment. The Architect, the Construction Manager and District specifically reserve the right to dispute any item included in Contractor's Application for Progress Payment, regardless of whether such item was identified as disputed in the initial review process provided for herein.

8.3.3 District's Review of Applications for Progress Payments. In accordance with Public Contract Code §20104.50, upon receipt of an Application for Progress Payment, the District shall cause the same to be reviewed by the Project Inspector, the Construction Manager, if one is designated by the District, and the Architect, as soon as is practicable after receipt of such Application for Progress Payment. Such review shall be for the purpose of determining that the Application for Progress Payment is a proper Progress Payment request. For purposes of this Article 8.3.2, an Application for Progress Payment shall be deemed "proper" only if it is submitted on the form approved by the District, with all of the requested information of such form of Application for Progress Payment completely and accurately provided by the Contractor and such completed Application for Progress Payment is accompanied by: (i) a Certification, executed under penalty of perjury by the Contractor's Superintendent and/or Construction Manager, that all weekly Certified Payroll Records for the Contractor and all Subcontractors required to submit weekly Certified Payroll Records under the LCP for the period of time covered by the Application for Progress Payment have been completed and submitted in strict conformity with the LCP; (ii) Certified Payrolls of the any Subcontractors, of any tier, (who are not required under the LCP to submit Certified Payroll Records on weekly basis) for laborers performing any portion of the Work for which a Progress Payment is requested; (iii) duly completed and executed forms of Conditional Waiver and Release of Rights Upon Progress Payment in accordance with California Civil Code §3262 of the Contractor, all Subcontractors of any tier, and Material Suppliers covering the Progress Payment requested; (iv) duly completed and executed forms of Unconditional Waiver and Release of Rights upon Progress Payment in accordance with California Civil Code §3262 of the Contractor, all Subcontractors of any tier, and Material Suppliers covering the Progress Payment received

by the Contractor under the prior Application for Progress Payment; (v) an updated Construction Schedule in accordance with Article 7.3.5 of the General Conditions and applicable provisions of the Specifications relating to the Contractor's updates to the Construction Schedule; (vi) for the first (1st) Application for Progress Payment, a certification that the Preliminary Construction Schedule conforming to requirements of the Contract Documents has been prepared and submitted by the Contractor; for subsequent Applications for Progress Payment a certification by the Contractor that it has continuously maintained, or caused to be maintained, the Record Drawings reflecting the actual as-built conditions of the Work performed for which the Progress Payment is requested, it being understood that such certification is subject to verification by the District, Architect, Project Inspector or the Construction Manager prior to disbursement of the Progress Payment; and (vii) completed/executed form of Debris Recycling Statement. In accordance with Public Contract Code §20104.50, an Application for Progress Payment determined by the District not to be a proper Application for Progress Payment shall be returned by the District to the Contractor as soon as is practicable after receipt of the same from the Contractor, but in no event not more than seven (7) days after the District's receipt thereof. The District's return of any Application for Progress Payment pursuant to the preceding sentence shall be accompanied by a written document setting forth the reason(s) why the Application for Progress Payment is not proper.

8.3.4 Review of Applications for Progress Payments. Upon receipt of an Application for Progress Payment, the Architect, Construction Manager and the Project Inspector shall inspect and verify the Work to determine whether it has been performed in accordance with the terms of the Contract Documents and to determine the portion of the Application for Progress Payment which is properly due to the Contractor under the terms of the Contract Documents.

8.3.5 District's Disbursement of Progress Payments

8.3.5.1 Timely Disbursement of Progress Payments. In accordance with Public Contract Code §20104.50, within thirty (30) days after the District's receipt of a proper Application for Progress Payment, there shall be paid, by District, to Contractor a sum equal to ninety-five percent (95%) of the value of the Work indicated in the Application for Progress Payment which is actually in place as of the date of the Application for Progress Payment and as verified and approved by the Project Inspector and the Architect and the pro rata portion of the Contractor's overhead, supervision and general conditions costs and profit for that month; provided, however, that the District's obligation to disburse any Progress Payment shall be subject to the District's receipt of all documents set forth in Article 8.3.3 above, each and all of which are conditions precedent to the District's obligation to disburse Progress Payments. If an Application for Progress Payment is determined not to be proper due to the failure or refusal of the Contractor to submit documents with the Application for Progress Payment, as required by Article 8.3.2, or incompleteness or inaccuracies in any such documents submitted or if it is reasonably determined that the Record Drawings have not been continuously maintained to reflect the actual as built conditions of the Work completed in the period for which the Progress Payment is requested, the thirty (30) day period hereunder for the District's timely disbursement of a Progress Payment shall be deemed to commence on the date that the District is actually in receipt of documents not submitted with the Application for Progress Payment, or corrections to documents with the Application for Progress Payment so as to render them complete and accurate, or the date upon which the Contractor accurately and fully

completes preparation of the Record Drawings relating to the Work for which the Progress Payment is requested.

8.3.5.2 Untimely Disbursement of Progress Payments. In accordance with Public Contract Code §20104.50, in the event that the District shall fail to make any Progress Payment within thirty (30) days after receipt of an undisputed and properly submitted Application for Progress Payment, the District shall pay the Contractor interest on the undisputed amount of such Application for Progress Payment equal to the legal rate of interest set forth in California Code of Civil Procedure §685.010(a). The foregoing notwithstanding, in the event that the District shall determine that any Application for Progress Payment is not proper, pursuant to Article 8.3.3 above, and the District does not return such Application for Progress Payment within the seven (7) day period provided for in Article 8.3.3, the period of time for the District's disbursement of the Progress Payment on such Application for Progress Payment without incurring the interest liability shall be reduced by the number of days exceeding the seven (7) day return period.

8.3.5.3 District's Right to Disburse Progress Payments by Joint Checks. Provided that the District is in receipt of the applicable Subcontract or Purchase Order, the District, may in its sole discretion, issue joint checks to the Contractor and such Subcontractor or Material Supplier in satisfaction of its obligation to make Progress Payments or the Final Payment due hereunder.

8.3.5.4 No Waiver of Defective or Non-Conforming Work. The approval of any Application for Progress Payment or the disbursement of any Progress Payment to the Contractor shall not be deemed nor constitute acceptance of defective Work or Work not in conformity with the Contract Documents.

8.3.6 Progress Payments for Changed Work. The Contractor's Applications for Progress Payment may include requests for payment on account of Changes in the Work which have been properly authorized and approved by the Project Inspector, the Architect and all other governmental agencies with jurisdiction over such Change in accordance with the terms of the Contract Documents and for which a Change Order has been issued. Except as provided for herein, no other payment shall be made by the District for Changes in the Work.

8.3.7 Materials or Equipment Not Incorporated Into the Work.

8.3.7.1 Limitations Upon Payment. Except as expressly provided for herein, no payments shall be made by the District on account of any item of the Work, including without limitation, materials or equipment which, at the time of the Contractor's submittal of an Application for Progress Payment, has/have not been incorporated into and made a part of the Work.

8.3.7.2 Materials or Equipment Delivered and Stored at the Site. The District may, in its sole and exclusive discretion, make payment for materials or equipment not yet incorporated into the Work if, at or prior to the time of the Contractor's submittal of a an Application for Progress Payment incorporating therein a request for payment of such materials or equipment if all of the following are complied with: (i) the materials or equipment have been delivered to the Site; (ii) adequate arrangements, reasonably satisfactory to the District, have been made by the Contractor to store and protect

such materials or equipment at the Site including without limitation, insurance reasonably satisfactory to the District, covering and protecting against the risk of loss, destruction, theft or other damage to such materials or equipment while in storage if such coverage is not afforded under the policy of Builder's Risk insurance obtained by the District pursuant to the Contract Documents; and (iii) the establishment of procedures reasonably satisfactory to the District by which title to such materials or equipment will be vested in the District upon the District's payment therefor. The Contractor acknowledges that the discretion to make, or not to make, payment for materials or equipment delivered or stored at the site of the Work pursuant to the preceding sentence shall be exercised exclusively by the District; the District's exercise of discretion not to make payment for materials or equipment delivered or stored at the Site, but not yet incorporated into the Work shall not be deemed the District's default hereunder. In the event that the District shall elect to make payment for materials or equipment delivered and stored at the Site, the costs and expenses incurred to comply with the requirements of (ii) and (iii) of this Article 8.3.6.2 shall be borne solely and exclusively by the Contractor and no payment shall be made by the District on account of such costs and expenses.

8.3.7.3 Materials or Equipment Not Delivered or Stored at the Site. No payments shall be made by the District for materials or equipment to be incorporated into the Work where such materials or equipment have not been delivered or stored at the Site. The foregoing notwithstanding, the District may, in its sole and exclusive discretion, elect to make payment for materials or equipment not incorporated into the Work and which are not delivered or stored at the Site at or prior to the time of the Contractor's submittal of an Application for Progress Payment incorporating therein a request for payment of such materials or equipment provided that each and all of the following have been complied with: (i) adequate arrangements, reasonably satisfactory to the District, have been made by the Contractor to store and protect such materials or equipment which include without limitation, insurance reasonably satisfactory to the District, covering and protecting against the risk of loss, destruction, theft or other damage to such materials or equipment while in storage if coverage for the same is not afforded under the policy of Builder's Risk insurance obtained by the District pursuant to the Contract Documents; and (ii) the establishment of procedures reasonably satisfactory to the District by which title to such materials or equipment will be vested in the District upon the District's payment therefor. The Contractor acknowledges that the discretion to make, or not to make, payment for such materials or equipment pursuant to the preceding sentence shall be exercised exclusively by the District; the District's exercise of discretion not to make payment for such materials or equipment shall not be deemed the District's default hereunder. In the event that the District shall elect to make payment for materials or equipment not at the Site, the costs and expenses incurred to comply with the requirements of (i) and (ii) of this Article 8.3.7.3 shall be borne solely and exclusively by the Contractor and no payment shall be made by the District on account of such costs and expenses.

8.3.7.4 Materials or Equipment in Fabrication or Transit. The provisions of this Article 8.3.7 notwithstanding, the District shall not make any payment on account of any materials or equipment which is in the process of being fabricated or which are in transit to the Site of or other storage location.

8.3.8 Exclusions From Progress Payments. In addition to the District's right to withhold disbursement of any Progress Payment provided for in the Contract Documents, neither

the Contractor's Application for Progress Payment shall include, nor shall the District be obligated to disburse any portion of the Contract Price for amounts which the Contractor does not intend to pay any Subcontractor, of any tier, or Material Supplier because of a dispute or any other reason.

8.3.9 Title to Work. The Contractor warrants that title to all Work covered by an Application for Progress Payment will pass to the District no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Progress Payment, all Work for which a Progress Payment has been previously issued and the Contractor has received payment from the District therefor shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, stop notices, security interests or encumbrances in favor of the Contractor, Subcontractors, Material Suppliers or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

8.3.10 Substitute Security for Retention. In accordance with the provisions of California Public Contract Code §22300, eligible and equivalent securities may be substituted for any monies withheld by the District to ensure the Contractor's performance under the Contract Documents at the request and expense of the Contractor and in conformity with the provisions of California Public Contract Code §22300. The foregoing and the provisions of California Public Contract Code §22300 notwithstanding, failure of the Contractor to request the substitution of eligible and equivalent securities for monies to be withheld by the District prior to the Contractor's submission of its first Application for Progress Payment shall be deemed a waiver of such right.

8.4 Final Payment.

8.4.1 Application for Final Payment. When the Contractor has achieved Final Completion of the Work and has otherwise fully performed its obligations under the Contract Documents, the Contractor shall submit an Application for Final Payment on such form as approved by the District. Thereupon, the Architect and the Project Inspector will promptly make a final inspection of the Work and when the Architect and the Project Inspector find the Work acceptable under the Contract Documents and that the Contract has been fully performed by the Contractor, the Architect and the Project Inspector will thereupon promptly approve the Application for Final Payment, stating that to the best their knowledge, information and belief, the Work has been completed in accordance with the terms of the Contract Documents. The Final Payment shall include the remaining balance of the Contract Price and any retention from Progress Payments previously withheld by the District.

8.4.2 Conditions Precedent to Disbursement of Final Payment. Neither Final Payment nor any remaining Contract Price shall become due until the Contractor submits to the District each and all of the following, the submittal of which are conditions precedent to the District's obligation to disburse the Final Payment: (i) an affidavit or certification by the Contractor that payrolls, bills for materials and other indebtedness incurred in connection with the Work for which the District or the District's property may or might be responsible or encumbered have been paid or otherwise satisfied; (ii) a certificate evidencing that insurance required by the Contract Documents to remain in force after the Contractor's receipt of Final Payment is currently in effect; (iii) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover any period following Final Payment as required by the Contract Documents; (iv) consent of the Surety

on the Labor and Material Payment Bond and Performance Bond, to Final Payment if required; (v) duly completed and executed forms of Conditional or Unconditional Waivers and Releases of rights upon Final Payment of the Contractor, Subcontractors of any tier and Material Suppliers in accordance with California Civil Code §3262, with each of the same stating that there are, or will be, no claims for additional compensation after disbursement of the Final Payment; (vi) Operations and Maintenance manuals and separate warranties provided by any manufacturer or distributor of any materials or equipment incorporated into the Work; (vii) the Record Drawings; (viii) the form of Guarantee included in the Contract Documents duly executed by an authorized representative of the Contractor; (ix) any and all other items or documents required by the Contract Documents to be delivered to the District upon completion of the Work; (x) the completion and submittal of all reports required by the Contract Documents, including without limitation, verified reports required by applicable provisions of the California Code of Regulations; and (xi) if required by the District, such other data establishing payment or satisfaction of obligations such as receipts, releases and waivers of liens, stop notices, claims, security interest or encumbrances arising out of the Contract to the extent and in such form as may be required by the District.

8.4.3 Disbursement of Final Payment. Provided that the District is then in receipt of all documents and other items in Article 8.4.2 above as conditions precedent to the District's obligation to disburse Final Payment, not later than sixty (60) days following Final Acceptance the District shall disburse the Final Payment to the Contractor. Pursuant to California Public Contract Code §7107, if there is any dispute between the District and the Contractor at the time that disbursement of the Final Payment is due, the District may withhold from disbursement of the Final Payment an amount not to exceed one hundred fifty percent (150%) of the amount in dispute.

8.4.4 Waiver of Claims. The Contractor's acceptance of the Final Payment is a waiver and release by the Contractor of any and all claims against the District for compensation or otherwise in connection with the Contractor's performance of the Contract.

8.4.5 Claims Asserted After Final Payment. Any lien, stop notice or other claim filed or asserted after the Contractor's acceptance of the Final Payment by any Subcontractor, of any tier, laborer, Material Supplier or others in connection with or for Work performed under the Contract Documents shall be the sole and exclusive responsibility of the Contractor who further agrees to indemnify, defend and hold harmless the District and its officers, agents, representatives and employees from and against any claims, demands or judgments arising or associated therewith, including without limitation attorneys fees incurred by the District in connection therewith. In the event any lien, stop notice or other claim of any Subcontractor, Laborer, Material Supplier or others performing Work under the Contract Documents remain unsatisfied after Final Payment is made, Contractor shall refund to District all monies that the District may pay or be compelled to pay in discharging any lien, stop notice or other claim, including, without limitation all costs and reasonable attorneys fees incurred by District in connection therewith.

8.5 Withholding of Payments. The District may withhold any Progress Payment or the Final Payment, in whole or in part, or backcharge the Contractor to the extent it may deem advisable to protect the District on account of: (i) defective Work or Work not in conformity with the requirements of the Contract Documents which is not remedied; (ii) failure of the Contractor to make payments when due Subcontractors or Material Suppliers for materials or labor; (iii) claims filed or reasonable evidence of the probable filing of claims by

Subcontractors, laborers, Material Suppliers, or others performing any portion of the Work under the Contract Documents for which the District may be liable or responsible including, without limitation, Stop Notice Claims filed with the District pursuant to California Civil Code §3179 et seq.; (iv) a reasonable doubt that the Contract can be completed for the then unpaid balance of the Contract Price; (v) tax demands filed in accordance with California Government Code §12419.4; (vi) other claims, penalties and/or forfeitures for which the District is required or authorized to retain funds otherwise due the Contractor; (vii) any amounts due from the Contractor to the District under the terms of the Contract Documents; (viii) violations of the LCP or other obligations of the Contractor or any Subcontractor relating to the employment of labor in connection with the Work (including without limitation, delinquent submission of weekly Certified Payroll Records or the submission of inadequate weekly Certified Payroll Records; or (ix) the Contractor's failure to perform any of its obligations under the Contract Documents or its default under the Contract Documents or its failure to maintain adequate progress of the Work. In addition to the foregoing, the District shall not be obligated to process any Application for Progress Payment or Final Payment, nor shall Contractor be entitled to any Progress Payment or Final Payment so long as any lawful or proper direction concerning the Work or the performance thereof or any portion thereof, given by the District, the Project Inspector, the Architect or any public authority having jurisdiction over the Work, or any portion thereof, shall not be fully and completely complied with by the Contractor. When the District is reasonably satisfied that the Contractor has remedied any such deficiency, payment shall be made of the amount withheld. In lieu of making payment of withheld amounts to the Contractor, the District may, in its sole exclusive discretion, apply withheld amounts to the payment and satisfactions of debts and obligations of the Contractor relating to the Work. In doing, the District shall be an agent of the Contractor for the sole and limited purpose of making payment(s) to others for the Work on behalf of the Contractor; payments made by the District pursuant to the foregoing shall be deemed payments to the Contractor and the Contract Price shall be adjusted to reflect such payment(s). The District shall not be liable to the Contractor or others for its good faith decision to make or not make payment(s) of amounts withheld from the Contractor pursuant to the foregoing. If the District elects to make payments to other of amounts withheld from the Contractor, the District may do so without prior judicial determination; the District will render the Contractor a complete and accurate accounting of amounts withheld and paid to others on behalf of the Contractor.

8.6 Payments to Subcontractors. The Contractor shall pay all Subcontractors for and on account of Work of the Contract performed by such Subcontractors in accordance with the terms of their respective subcontracts and as provided for pursuant to California Public Contract Code §10262, the provisions of which are deemed incorporated herein by this reference. In the event of the Contractor's failure to make payment to Subcontractors in conformity with California Public Contract Code §10262, the provisions of California Public Contract Code §10253 shall apply; by this reference, the provisions of California Public Contract Code §10253 are incorporated herein in its entirety, except that the references in said Section 10253 to "the director" shall be deemed to refer to the District. The Contractor shall timely make payment of retention due Subcontractors in accordance with Public Contract Code §7107.

8.7 Computerized Job Cost Reporting System.

8.7.1 Job Cost Reporting. The Contractor and each Subcontractor with a Subcontract valued at Five Hundred Thousand Dollars (\$500,000) or greater shall maintain a computerized job cost reporting system conforming to the requirements set forth herein.

The computer program(s) utilized by the Contractor and applicable Subcontractors shall be subject to the review and acceptance by the District. The job cost reporting systems for the Work shall be updated in regular intervals of not less than one (1) calendar month.

8.7.2 Job Cost Reporting System Requirements. The computerized job cost programs utilized by the Contractor and applicable Subcontractors shall conform and comply with generally accepted accounting principles applied in a consistent manner and with recognized and generally accepted construction industry accounting standards, guidelines and procedures. The job cost reporting system format and configuration shall follow the general format of the District approved Cost Breakdown and budgets established for each line item shall be traceable to a bid estimate of costs. The job cost reporting systems utilized by the Contractor and applicable Subcontractors shall be capable of: (a) providing overall cost status on a monthly and cumulative basis; (b) providing comparative analysis of the original budgeted costs, actual costs, remaining budget, and projected cost of completion; the job cost reporting system shall be capable of providing comparative analysis for individual line items and the totality of the Work reflected in the job cost report and; (c) tracking adjustments to original budget amounts for Changes to the Work (including, without limitation, issued, pending and potential Change Orders).

8.7.3 Job Cost System Information. Upon request of the District or the Construction Manager, the Contractor and applicable Subcontractors shall make available written job cost reports and provide the District and the Construction Manager with the electronic files of the then current or requested job cost report. The Contractor's obligations hereunder are material.

ARTICLE 9: CHANGES

9.1 Changes in the Work. The District, at any time, by written order, may make Changes within the general scope of the Work under the Contract Documents or issue additional instructions, require additional Work or direct deletion of Work. The Contractor shall not proceed with any Change involving an increase or decrease in the Contract Price or the Contract Time without prior written authorization from the District. The foregoing notwithstanding, the Contractor shall promptly commence and diligently complete any Change to the Work subject to the District's written authorized issued pursuant to the preceding sentence; the Contractor shall not be relieved or excused from its prompt commencement and diligent completion of any Change subject to the District's written authorization by virtue of the absence or inability of the Contractor and the District to agree upon the extent of any adjustment to the Contract Time or the Contract Price on account of such Change. The issuance of a Change Order pursuant to this Article 9 in connection with any Change authorized by the District under this Article 9.1 shall not be deemed a condition precedent to Contractor's obligation to promptly commence and diligently complete any such Change authorized by the District hereunder. The District's right to make Changes shall not invalidate the Contract nor relieve the Contractor of any liability or other obligations under the Contract Documents. Any requirement of notice of Changes in the scope of Work to the Surety shall be the responsibility of the Contractor. Changes to the Work depicted or described in the Drawings or the Specifications shall be subject to approval by the DSA. The District may make Changes to bring the Work or the Project into compliance with environmental requirements or standards established by state or federal statutes and regulations enacted after award of the Contract.

9.2 Oral Order of Change in the Work. Any oral order, direction, instruction, interpretation, or determination from the District, the Project Inspector or the Architect which in the opinion of

the Contractor causes any change to the scope of the Work, or otherwise requires an adjustment to the Contract Price or the Contract Time, shall be treated as a Change only if the Contractor gives the Architect and the Project Inspector written notice within ten (10) days of the order, directions, instructions, interpretation or determination and prior to acting in accordance therewith. Time is of the essence in Contractor's written notice pursuant to the preceding sentence so that the District can promptly investigate and consider alternative measures to address the order, direction, instruction, interpretation or determination giving rise to Contractor's notice. Accordingly, Contractor acknowledges that its failure, for any reason, to give written notice within ten (10) days of such order, direction, instruction, interpretation or determination shall be deemed Contractor's waiver of any right to assert or claim any entitlement to an adjustment of the Contract Time or the Contract Price on account of such order, direction, instruction, interpretation or determination. The written notice shall state the date, circumstances, extent of adjustment to the Contract Price or the Contract Time, if any, requested, and the source of the order, directions, instructions, interpretation or determination that the Contractor regards as a Change. Unless the Contractor acts in strict accordance with this procedure, any such order, direction, instruction, interpretation or determination shall not be treated as a Change and the Contractor hereby waives any claim for any adjustment to the Contract Price or the Contract Time on account thereof.

9.3 Contractor Submittal of Data. Within ten (10) days after receipt of a written order directing a Change in the Work or furnishing the written notice regarding any oral order directing a Change in the Work, the Contractor shall submit to the Architect, the Project Inspector, the Construction Manager and the District a detailed written statement setting forth the general nature of the Change, the amount of any adjustment to the Contract Price on account thereof, properly itemized and supported by sufficient substantiating data to permit evaluation of the same, and the extent of adjustment of the Contract Time, if any, required by such Change. No claim or adjustment to the Contract Price or the Contract Time shall be allowed if not asserted by the Contractor in strict conformity herewith or if asserted after Final Payment is made under the Contract Documents.

9.4 Adjustment to Contract Price and Contract Time on Account of Changes to the Work.

9.4.1 Adjustment to Contract Price. Adjustments to the Contract Price due to Changes in the Work shall be determined by application of one of the following methods, in the following order of priority:

9.4.1.1 Mutual Agreement. By negotiation and mutual agreement, on a lump sum basis, between the District and the Contractor on the basis of the estimate of the actual and direct increase or decrease in costs on account of the Change. Upon request of the District or the Architect, the Contractor shall provide a detailed estimate of increase or decrease in costs directly associated with performance of the Change along with cost breakdowns of the components of the Change and supporting data and documentation. The Contractor's estimate of increase or decrease in costs pursuant to the foregoing, if requested, shall be in sufficient detail and in such form as to allow the District, the Project Inspector and the Architect to review and assess the completeness and accuracy thereof. The Contractor shall be solely responsible for any additional costs or additional time arising out of, or related in any manner to, its failure to provide the estimate of costs within the time specified in the request of the District or the Architect for such estimate.

9.4.1.2 Determination by the District. By the District, whether or not negotiations are

initiated pursuant to Article 9.4.1.1 above based upon actual and necessary costs incurred by the Contractor as determined by the District on the basis of the Contractor's records. In the event that the procedure set forth in this Article 9.4.1.2 is utilized to determine the extent of adjustment to the Contract Price on account of Changes to the Work, promptly upon determining the extent of adjustment to the Contract Price, the District shall notify the Contractor in writing of the same; the Contractor shall be deemed to have accepted the District's determination of the amount of adjustment to the Contract Price on account of a Change to the Work unless Contractor shall notify the District, the Architect and the Project Inspector, in writing, not more than fifteen (15) days from the date of the District's written notice, of any objection to the District's determination. Failure of the Contractor to timely notify the District, the Architect and the Project Inspector of Contractor's objections to the District's determination of the extent of adjustment to the Contract Price shall be deemed Contractor's acceptance of the District's determination and a waiver of any right or basis of the Contractor to thereafter protest or otherwise object to the District's determination. Notwithstanding any objection of the Contractor to the District's determination of the extent of any adjustment to the Contract Price pursuant to this Article 9.4.1.2, Contractor shall, pursuant to Article 9.7 below, diligently proceed to perform and complete any such Change.

9.4.1.3 Basis for Adjustment of Contract Price. If Changes in the Work require an adjustment of the Contract Price pursuant to Articles 9.4.1.1 or 9.4.1.2 above, the basis for adjustment of the Contract Price shall be as follows:

9.4.1.3.1 Labor. Contractor shall be compensated for the costs of labor actually and directly utilized in the performance of the Change. Such labor costs shall be limited to field labor for which there is a prevailing wage rate classification. Wage rates for labor shall not exceed the prevailing wage rates in the locality of the Site and shall be in the labor classification(s) necessary for the performance of the Change. Use of a labor classification which would increase labor costs associated with any Change shall not be permitted. Labor costs shall exclude costs incurred by the Contractor in preparing estimate(s) of the costs of the Change, in the maintenance of records relating to the costs of the Change, coordination and assembly of materials and information relating to the Change or performance thereof, or the supervision and other overhead and general conditions costs associated with the Change or performance thereof.

9.4.1.3.2 Materials and Equipment. Contractor shall be compensated for the costs of materials and equipment necessarily and actually used or consumed in connection with the performance of Changes. Costs of materials and equipment may include reasonable costs of transportation from a source closest to the site of the Work and delivery to the Site. If discounts by Material Suppliers are available for materials necessarily used in the performance of Changes, they shall be credited to the District. If materials and/or equipment necessarily used in the performance of Changes are obtained from a supplier or source owned in whole or in part by the Contractor, compensation therefor shall not exceed the current wholesale price for such materials or equipment. If, in the reasonable opinion of the District, the costs asserted by the Contractor for materials and/or equipment in connection with any Change is excessive, or if the Contractor fails to provide satisfactory evidence of the actual costs of such materials and/or equipment from its supplier or vendor of the same, the costs of such materials

and/or equipment and the District's obligation for payment of the same shall be limited to the then lowest wholesale price at which similar materials and/or equipment are available in the quantities required to perform the Change. The District may elect to furnish materials and/or equipment for Changes to the Work, in which event the Contractor shall not be compensated for the costs of furnishing such materials and/or equipment or any mark-up thereon.

9.4.1.3.3 Construction Equipment. Contractor shall be compensated for the actual cost of the necessary and direct use of Construction Equipment in the performance of Changes to the Work. Use of such Construction Equipment in the performance of Changes to the Work shall be compensated in increments of fifteen (15) minutes. Rental time for Construction Equipment moved by its own power shall include time required to move such Construction Equipment to the site of the Work from the nearest available rental source of the same. If Construction Equipment is not moved to the Site by its own power, Contractor will be compensated for the loading and transportation costs in lieu of rental time. The foregoing notwithstanding, neither moving time or loading and transportation time shall be allowed if the Construction Equipment is used for performance of any portion of the Work other than Changes to the Work. Unless prior approval in writing is obtained by the Contractor from the Architect, the Project Inspector and the District, no costs or compensation shall be allowed for time while Construction Equipment is inoperative, idle or on standby, for any reason. The Contractor shall not be entitled to an allowance or any other compensation for Construction Equipment or tools used in the performance of Changes to the Work where such Construction Equipment or tools have a replacement value of \$500.00 or less. Construction Equipment costs claimed by the Contractor in connection with the performance of any Change to the Work shall not exceed rental rates established by distributors or construction equipment rental agencies in the locality of the Site; any costs asserted which exceed such rental rates shall not be allowed or paid. Unless otherwise specifically approved in writing by the Architect, the Project Inspector and the District, the allowable rate for the use of Construction Equipment in connection with Changes to the Work shall constitute full compensation to the Contractor for the cost of rental, fuel, power, oil, lubrication, supplies, necessary attachments, repairs or maintenance of any kind, depreciation, storage, insurance, labor (exclusive of labor costs of the Construction Equipment operator), and any all other costs incurred by the Contractor incidental to the use of such Construction Equipment.

9.4.1.3.4 Mark-up on Costs of Changes to the Work. In determining the cost to the District and the extent of increase to the Contract Price resulting from a Change adding to the Work, the allowance for mark-ups on the costs of the Change for all overhead (including home office and field overhead), general conditions costs and profit associated with the Change shall not exceed the percentage set forth in the Special Conditions, regardless of the number of Subcontractors, of any tier, performing any portion of any Change to the Work. If a Change to the Work reduces the Contract Price, no profit, general conditions or overhead costs shall be paid by the District to the Contractor for the reduced or deleted Work. In such event, the adjustment to the Contract Price shall be the actual cost reduction realized by the reduced or deleted Work multiplied by the percentage set forth in the Special Conditions for mark-ups on the cost of a Change adding to the scope of the Work.

9.4.1.3.5 Contractor Maintenance of Records. In the event that Contractor shall be directed to perform any Changes to the Work pursuant to Article 9.1 or 9.2, or should the Contractor encounter conditions which the Contractor, pursuant to Article 9.6, believes would obligate the District to adjust the Contract Price and/or the Contract Time, Contractor shall maintain detailed records on a daily basis. Such records shall include without limitation hourly records for labor and Construction Equipment and itemized records of materials and equipment used that day in connection with the performance of any Change to the Work. In the event that more than one Change to the Work is performed by the Contractor in a calendar day, Contractor shall maintain separate records of labor, Construction Equipment, materials and equipment for each such Change. In the event that any Subcontractor, of any tier, shall provide or perform any portion of any Change to the Work, Contractor shall require that each such Subcontractor maintain records in accordance with this Article. Each daily record maintained hereunder shall be signed by Contractor's Superintendent or Contractor's authorized representative; such signature shall be deemed Contractor's representation and warranty that all information contained therein is true, accurate, complete and relate only to the Change referenced therein. All records maintained by a Subcontractor, of any tier, relating to the costs of a Change to the Work shall be signed by such Subcontractor's authorized representative or Superintendent. All records maintained hereunder shall be subject to inspection, review and/or reproduction by the District, the Architect or the Project Inspector upon request. In the event that Contractor shall fail or refuse, for any reason, to maintain or make available for inspection, review and/or reproduction such records and the adjustment to the Contract Price on account of any Change to the Work is determined pursuant to this Article, the District's reasonable good faith determination of the extent of adjustment to the Contract Price on account of such Change shall be final, conclusive, dispositive and binding upon Contractor. Contractor's obligation to maintain records hereunder is in addition to, and not in lieu of, any other Contractor obligation under the Contract Documents with respect to Changes to the Work.

9.4.2 Adjustment to Contract Time. In the event of any Change(s) to the Work pursuant to this Article 9, the Contract Time shall be extended or reduced by Change Order for a period of time commensurate with the time reasonably necessary to perform such Change. In the event that any Change shall require an extension of the Contract Time, the Contractor shall not be subject to Liquidated Damages for such period of time. If completion of the Work is delayed by causes for which the District is responsible and the delay is unreasonable under the circumstances involved, and not within the contemplation of the Contractor and the District at the time of execution of the Agreement, the Contractor shall not be precluded from the recovery of damages arising therefrom.

9.4.3 Addition or Deletion of Alternate Bid Item(s). If the Bid for the Work includes proposal(s) for Alternate Bid Item(s), during Contractor's performance of the Work, the District may elect, pursuant to this Article to add any such Alternate Bid Item(s) if the same did not form a basis for award of the Contract or delete any such Alternate Bid Item(s) if the same formed a basis for award of the Contract. If the District elects to add or delete any such Alternate Bid Item(s) pursuant to the foregoing, the cost or credit for such Alternate Bid Item(s) shall be as set forth in the Contractor's Bid. If any Alternate Bid Item is added or deleted from the Work pursuant to the foregoing, the Contract Time shall be adjusted by the number of days allocated for the added or deleted Alternate Bid Item in the

Contract Documents; if days are not allocated for any Alternate Bid Item added or deleted pursuant to the foregoing, the Contract Time shall be equitably adjusted.

9.5 Change Orders. If the District approves of a Change, a written Change Order prepared by the Architect on behalf of the District shall be forwarded to the Contractor describing the Change and setting forth the adjustment to the Contract Time and the Contract Price, if any, on account of such Change. All Change Orders shall be in full payment and final settlement of all claims for direct, indirect and consequential costs, including without limitation, costs of delays or impacts related to, or arising out of, items covered and affected by the Change Order, as well as any adjustments to the Contract Time. Any claim or item relating to any Change incorporated into a Change Order not presented by the Contractor for inclusion in the Change Order shall be deemed waived. The Contractor shall execute the Change Order prepared pursuant to the foregoing; once the Change Order has been prepared and forwarded to the Contractor for execution, without the prior approval of the District which may be granted or withheld in the sole and exclusive discretion of the District, the Contractor shall not modify or amend the form or content of such Change Order, or any portion thereof. The Contractor's attempted or purported modification or amendment of any such Change Order, without the prior approval of the District, shall not be binding upon the District; any such unapproved modification or amendment to such Change Order shall be null, void and unenforceable. Unless otherwise expressly provided for in the Contract Documents or in the Change Order, any Change Order issued hereunder shall be binding upon the District only upon action of the District's Board of Trustees approving and ratifying such Change Order. In the event of any amendment or modification made by the Contractor to a Change Order for which there is no prior approval by the District, in accordance with the provisions of this Article 9.5, unless otherwise expressly stated in its approval and ratification of such Change Order, any action of the Board of Trustees to approve and ratify such Change Order shall be deemed to be limited to the Change Order as prepared by the Architect; such approval and ratification of such Change Order shall not be deemed the District's approval and ratification of any unapproved amendment or modification by the Contractor to such Change Order. Change Orders shall be issued on the form of Change Order and the content thereof, as attached to the Special Conditions.

9.6 Contractor Notice of Changes. If the Contractor should claim that any instruction, request, the Drawings, the Specifications, action, condition, omission, default, or other situation obligates the District to increase the Contract Price or to extend the Contract Time, the Contractor shall notify the District, Construction Manager, Project Inspector and the Architect, in writing, of such claim within ten (10) days from the date of its actual or constructive notice of the factual basis supporting the same. The District shall consider any such claim of the Contractor only if sufficient supporting documentation is submitted with the Contractor's notice to the District, Construction Manager, Project Inspector and the Architect. Time is of the essence in Contractor's written notice pursuant to the preceding sentence so that the District can promptly investigate and consider alternative measures to the address such instruction, request, Drawings, Specifications, action, condition, omission, default or other situation. Accordingly, Contractor acknowledges that its failure, for any reason, to give written notice (with sufficient supporting documentation to permit the District's review and evaluation) within ten (10) days of its actual or constructive knowledge of any instruction, request, Drawings, Specifications, action, condition, omission, default or other situation for which the Contractor believes there should an adjustment of the Contract Time or the Contract Price shall be deemed Contractor's waiver, release, discharge and relinquishment of any right to assert or claim any entitlement to an adjustment of the Contract Time or the Contract Price on account of any such instruction, request, Drawings, Specifications, action, condition,

omission, default or other situation. In the event that the District determines that the Contract Price or the Contract Time are subject to adjustment based upon the events, circumstances and supporting documentation submitted with the Contractor's written notice under this Article 9.6, any such adjustment shall be determined in accordance with the provisions of Articles 9.4.1 and 9.4.2.

- 9.7 Disputed Changes.** In the event of any dispute or disagreement between the Contractor and the District or the Architect regarding the characterization of any item as a Change to the Work or as to the appropriate adjustment of the Contract Price or the Contract Time on account thereof, the Contractor shall promptly proceed with the performance of such item of the Work, subject to a subsequent resolution of such dispute or disagreement in accordance with the terms of the Contract Documents. The Contractor's failure or refusal to so proceed with such Work may be deemed to be Contractor's default of a material obligation of the Contractor under the Contract Documents.
- 9.8 Emergencies.** In an emergency affecting the safety of life, or of the Work, or of property, the Contractor, without special instruction or prior authorization from the District or the Architect, is permitted to act at its discretion to prevent such threatened loss or injury. Any compensation claimed by the Contractor on account of such emergency work shall be submitted and determined in accordance with this Article 9.
- 9.9 Minor Changes in the Work.** The Architect may order minor Changes in the Work not involving an adjustment in the Contract Price or the Contract Time and not inconsistent with the intent of the Contract Documents. Such Changes shall be effected by written order and shall be binding on the District and the Contractor. The Construction Manager or the Project Inspector may direct the Contractor to perform Changes provided that each such Change does not result in an increase of more than \$500.00 to the Contract Price and no adjustment of the Contract Time. The Contractor shall carry out such orders promptly.
- 9.10 Unauthorized Changes.** Any Work beyond the extent of Work shown on the Contract Documents, or any extra Work performed or provided by the Contractor without notice to the Architect, the Construction Manager and the Project Inspector in the manner and within the time set forth in Articles 9.2 or 9.6 shall be considered unauthorized and at the sole expense of the Contractor. Work so done will not be measured or paid for, no extension to the Contract Time will be granted on account thereof and any such Work may be ordered removed at the Contractor's sole cost and expense. The failure of the District to direct or order removal of such Work shall not constitute acceptance or approval of such Work nor relieve the Contractor from any liability on account thereof.

ARTICLE 10: SEPARATE CONTRACTORS

- 10.1 District's Right to Award Separate Contracts.** The District reserves the right to perform construction or operations related to the Project with the District's own forces or to award separate contracts in connection with other portions of the Project or other construction or operations at or about the Site. If the Contractor claims that delay or additional cost is involved because of such action by the District, the Contractor shall seek an adjustment to the Contract Price or the Contract Time as provided for in the Contract Documents. Failure of the Contractor to request such an adjustment of the Contract Time or the Contract Price in strict conformity with the provisions of the Contract Documents applicable thereto shall be deemed a waiver of the same.

- 10.2 District's Coordination of Separate Contractors.** The District shall provide for coordination of the activities of the District's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the District in reviewing their respective Construction Schedules when directed to do so. The Contractor shall make any revisions to the Approved Construction Schedule for the Work hereunder deemed necessary after a joint review and mutual agreement. The Construction Schedules shall then constitute the Construction Schedules to be used by the Contractor, separate contractors and the District until subsequently revised.
- 10.3 Mutual Responsibility.** The Contractor shall afford the District and separate contractors' reasonable opportunity for storage of their materials and equipment and performance of their activities at the Site and shall connect and coordinate the Contractor's Work, construction and operations with theirs as required by the Contract Documents.
- 10.4 Discrepancies or Defects.** If part of the Contractor's Work depends for proper execution or results upon construction or operations by the District or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect and the Project Inspector any apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acknowledgment that the District's or separate contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then discoverable by the Contractor's reasonable diligence.

ARTICLE 11: TESTS AND INSPECTIONS

11.1 Tests; Inspections; Observations.

- 11.1.1 Contractor's Notice.** If the Contract Documents, laws, ordinances or any public authority with jurisdiction over the Work requires the Work, or any portion thereof, to be specially tested, inspected or approved, the Contractor shall give the Architect, the Construction Manager and the Project Inspector written notice of the readiness of such Work for observation, testing or inspection at least two (2) working days prior to the time for the conducting of such test, inspection or observation. If inspection, testing or observation is by authority other than the District, the Contractor shall inform the Project Inspector and the Construction Manager not less than two (2) working days prior to the date fixed for such inspection, test or observation. The Contractor shall not cover up any portion of the Work subject to tests, inspections or observations prior to the completion and satisfaction of the requirements of such test, inspection or observation. In the event that any portion of the Work subject to tests, inspection or approval shall be covered up by Contractor prior to completion and satisfaction of the requirements of such tests, inspection or approval, Contractor shall be responsible for the uncovering of such portion of the Work as is necessary for performing such tests, inspection or approval without adjustment of the Contract Price or the Contract Time on account thereof.
- 11.1.2 Cost of Tests and Inspections.** Except as set forth below, the District will pay for fees, costs and expenses to complete the initial tests/inspections of portions of the Work as required by law, code or regulation, provided that such tests/inspections are conducted and completed at a location within a one hundred (100) mile radius of the Site. The foregoing notwithstanding, if the portion(s) of the Work subject to tests/inspections is/are not ready for such test/inspection at the time indicated in the Contractor's notice under

Article 11.1.1 or if upon completion of such test/inspection, the portion(s) of the Work subject to such test/inspection do not meet or exceed the minimum requirements of such test/inspection, the Contractor shall be solely responsible for the payment of all fees, costs or expenses arising out of or related in any manner to subsequent tests/inspections of such portion(s) of the Work. Notwithstanding the District's payment of fees, costs or expenses for conducting initial tests/inspections, if any actions or failures to act of the Contractor or person or entity providing or performing Work under the direction or control of the Contractor require tests/inspections to be conducted over a period of more than eight (8) hours per day by any single person or on weekends/holidays, the Contractor shall be solely responsible for the payment of fees, costs or expenses which result from test/inspection services which exceed eight (8) hours per day by any single person or on weekends/holidays. If any tests/inspections are conducted outside a one hundred (100) mile radius of the Site, the Contractor shall be solely responsible for all costs, fees or expenses to conduct and complete such tests/inspections conducted at such location, including without limitation, costs to complete such tests/inspections and travel, meal and related expenses.

11.1.3 Testing/Inspection Laboratory. The District shall select duly qualified person(s) or testing laboratory(ies) to conduct the tests and inspections to be paid for by the District and required by the Contract Documents. Tests and inspections required of the Work shall be as set forth in the Contract Documents and as required by applicable law, rule or regulation, including without limitation, Title 24 of the California Code of Regulations. Test/inspection standards shall be as set forth in the Contract Documents or established by applicable law, rule or regulation. Where inspection or testing is to be conducted by an independent laboratory or testing agency, materials or samples thereof shall be selected by the laboratory, testing agency, the Project Inspector, the Construction Manager or the Architect and not by the Contractor.

11.1.4 Additional Tests, Inspections and Approvals. If the Architect, the Construction Manager, the Project Inspector or public authorities having jurisdiction over the Work determine that portions of the Work require additional testing, inspection or approval, the Architect will, upon written authorization from the District, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the District, and the Contractor shall give timely notice to the Architect, the Construction Manager and the Project Inspector of when and where tests and inspections are to be made so the Project Inspector and the Architect may observe such procedures. The District shall bear the costs of such additional tests, inspections or approvals, except to the extent that such additional tests, inspections or approvals reveal any failure of the Work to comply with the requirements of the Contract Documents, in which case the Contractor shall bear all costs made necessary by such failures, including without limitation, the costs of corrections, repeat tests, inspections or approvals and the costs of the Architect's services or its consultants in connection therewith.

11.2 Delivery of Certificates. Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager.

11.3 Timeliness of Tests, Inspections and Approvals. Tests or inspections required and conducted pursuant to the Contract Documents shall be made or arranged by Contractor to avoid delay in the progress of the Work. Neither the Contract Time nor Contract Price shall be adjusted on account of the failure of the Contractor to timely arrange for the conduct of

required tests/inspections and the Contractor shall be liable to the District for all consequences of such failures, including without limitation, the assessment of Liquidated Damages for delayed Substantial Completion of the Work resulting from such failure of the Contractor.

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK

12.1 Inspection of the Work.

12.1.1 Access to the Work. All Work and all materials and equipment forming a part of the Work or incorporated into the Work are subject to inspection by the District, the Construction Manager, the Architect and the Project Inspector for conformity with the Contract Documents. The Contractor shall, at its cost and without adjustment to the Contract Price or the Contract Time, furnish any facilities necessary for sufficient and safe access to the Work for purposes of inspection by the District, the Construction Manager, the Architect, the Project Inspector, DSA or any other public or quasi-public authority with jurisdiction over the Work or any portion thereof.

12.1.2 Limitations Upon Inspections. Inspections, tests, measurements, or other acts of the Architect, the Construction Manager and the Project Inspector hereunder are for the sole purpose of assisting them in determining that the Work, materials, equipment, progress of the Work, and quantities generally comply and conform with the requirements of the Contract Documents. These acts or functions shall not relieve the Contractor from performing the Work in full compliance with the Contract Documents. No inspection by the Architect or the Project Inspector shall constitute or imply acceptance of Work inspected. Inspection of the Work hereunder is in addition to, and not in lieu of, any other testing, inspections or approvals of the Work required under the Contract Documents.

12.2 Uncovering of Work. If any portion of the Work is covered contrary to the request of the Architect, the Construction Manager, the Project Inspector or the requirements of the Contract Documents, it must, if required by the Architect or the Project Inspector, be uncovered for observation by the Architect, Construction Manager and the Project Inspector and be replaced at the Contractor's expense without adjustment of the Contract Time or the Contract Price.

12.3 Rejection of Work. Prior to the District's Final Acceptance of the Work, any Work or materials or equipment forming a part of the Work or incorporated into the Work which is defective or not in conformity with the Contract Documents may be rejected by the District, the Construction Manager the Architect or the Project Inspector and the Contractor shall correct such rejected Work without any adjustment to the Contract Price or the Contract Time, even if the Work, materials or equipment have been previously inspected by the Architect or the Project Inspector or even if they failed to observe the defective or non-conforming Work, materials or equipment.

12.4 Correction of Work. The Contractor shall promptly correct any portion of the Work rejected by the District, the Construction Manager, the Architect or the Project Inspector for failing to conform to the requirements of the Contract Documents, or which is determined by them to be defective, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby. The Contractor shall bear all

costs of correcting destroyed or damaged construction, whether completed or partially completed, of the District or separate contractors, caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents, or which is defective. If the Contractor fails or refuses to correct Work deemed defective or non-conforming pursuant to the foregoing, such failure or refusal shall be deemed the Contractor's default in performance of a material obligation of the Contractor hereunder. In such event, the Contractor's Performance Bond Surety shall be liable for the costs to correct such defective or non-conforming Work and/or securing the performance of an alternative contractor to complete such corrective Work.

12.5 Removal of Non-Conforming or Defective Work. The Contractor shall, at its sole cost and expense, remove from the Site all portions of the Work which are defective or are not in accordance with the requirements of the Contract Documents which are neither corrected by the Contractor nor accepted by the District.

12.6 Failure of Contractor to Correct Work. If the Contractor fails to commence to correct defective or non-conforming Work within 3 days of notice of such condition and promptly thereafter complete the same within a reasonable time, the District may correct it in accordance with the Contract Documents. If the Contractor does not proceed with correction of such defective or non-conforming Work within the time fixed herein, the District may remove it and store the salvable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage after written notice, the District may sell such materials or equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including without limitation compensation for the Architect's services, attorneys fees and other expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Price shall be reduced by the deficiency. If payments of the Contract Price then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor and the Surety shall promptly pay the difference to the District.

12.7 Acceptance of Defective or Non-Conforming Work. The District may, in its sole and exclusive discretion, elect to accept Work which is defective or which is not in accordance with the requirements of the Contract Documents, instead of requiring its removal and correction, in which case the Contract Price shall be reduced as appropriate and equitable.

ARTICLE 13: WARRANTIES

13.1 Workmanship and Materials. The Contractor warrants to the District that all materials and equipment furnished under the Contract Documents shall be new, of good quality and of the most suitable grade and quality for the purpose intended, unless otherwise specified in the Contract Documents. All Work shall be of good quality, free from faults and defects and in conformity with the requirements of the Contract Documents. If required by the Architect or the District, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment incorporated into the Work. Any Work, or portion thereof not conforming to these requirements, including substitutions or alternatives not properly approved in accordance with the Contract Documents may be deemed defective. Where there is an approved substitution of, or alternative to, material or equipment specified in the Contract Documents, the Contractor warrants to the District that such installation, construction, material, or equipment will equally perform the function and have the quality of the originally specified material or equipment. The Contractor expressly warrants the

merchantability, the fitness for use, and quality of all substitute or alternative items in addition to any warranty given by the manufacturer or supplier of such item.

- 13.2 Warranty Work.** If, within one year after the date of Final Acceptance, or such other time frame set forth elsewhere in the Contract Documents, any of the Work is found to be defective or not in accordance with the requirements of the Contract Documents, or otherwise contrary to the warranties contained in the Contract Documents, the Contractor shall commence all necessary corrective action not more than seven (7) days after receipt of a written notice from the District to do so, and to thereafter diligently complete the same. In the event that Contractor shall fail or refuse to commence correction of any such item within said seven (7) day period or to diligently prosecute such corrective actions to completion, the District may, without further notice to Contractor, cause such corrective Work to be performed and completed. In such event, Contractor and Contractor's Performance Bond Surety shall be responsible for all costs in connection with such corrective Work, including without limitation, general administrative overhead costs of the District in securing and overseeing such corrective Work. Nothing contained herein shall be construed to establish a period of limitation with respect to any obligation of the Contractor under the Contract Documents. The obligations of the Contractor hereunder shall be in addition to, and not in lieu of, any other obligations imposed by any special guarantee or warranty required by the Contract Documents, guarantees or warranties provided by any manufacturer of any item or equipment forming a part of, or incorporated into the Work, or otherwise recognized, prescribed or imposed by law. Neither the District's Final Acceptance, the making of Final Payment, any provision in Contract Documents, nor the use or occupancy of the Work, in whole or in part, by District shall constitute acceptance of Work not in accordance with the Contract Documents nor relieve the Contractor or the Contractor's Performance Bond Surety from liability with respect to any warranties or responsibility for faulty or defective Work or materials, equipment and workmanship incorporated therein.
- 13.3 Guarantee.** Upon completion of the Work, Contractor shall execute and deliver to the District the form of Guarantee included within the Contract Documents. The Contractor's execution and delivery of the form of Guarantee is an express condition precedent to any obligation of the District to disburse the Final Payment to the Contractor.
- 13.4 Survival of Warranties.** The provisions of this Article 13 shall survive the Contractor's completion of Work under the Contract Documents, the District's Final Acceptance or the termination of the Contract.

ARTICLE 14: SUSPENSION OF WORK

- 14.1 District's Right to Suspend Work.** The District may, without cause, and without invalidating or terminating the Contract, order the Contractor, in writing, to suspend, delay or interrupt the Work in whole or in part for such period of time as the District may determine. The Contractor shall resume and complete the Work suspended by the District in accordance with the District's directive, whether issued at the time of the directive suspending the Work or subsequent thereto.
- 14.2 Adjustments to Contract Price and Contract Time.** In the event the District shall order suspension of the Work, an adjustment shall be made to the Contract Price for increases in the direct cost of performance of the Work of the Contract Documents, actually caused by suspension, delay or interruption ordered by the District; provided however that no adjustment of the Contract Price shall be made to the extent: (i) that performance is, was or

would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible under the Contract Documents; or (ii) that an equitable adjustment is made or denied under another provision of the Contract Documents. The foregoing notwithstanding, any such adjustment of the Contract Price shall not include any adjustment to increase the Contractor's overhead, general administrative costs or profit, all of which will remain as reflected in the Cost Breakdown submitted by the Contractor pursuant to the Contract Documents. In the event of the District's suspension of the Work, the Contract Time shall be equitably adjusted.

ARTICLE 15: TERMINATION

15.1 Termination for Cause.

15.1.1 District's Right to Terminate. The District may terminate the Contract upon the occurrence of any one or more of the following events of the Contractor's default: (i) if the Contractor refuses or fails to prosecute the Work with diligence as will insure Substantial Completion of the Work within the Contract Time, or if the Contractor fails to substantially Complete the Work within the Contract Time; (ii) if the Contractor becomes bankrupt or insolvent, or makes a general assignment for the benefit of creditors, or if the Contractor or a third party files a petition to reorganize or for protection under any bankruptcy or similar laws, or if a trustee or receiver is appointed for the Contractor or for any of the Contractor's property on account of the Contractor's insolvency, and the Contractor or its successor in interest does not provide adequate assurance of future performance in accordance with the Contract Documents within 10 days of receipt of a request for such assurance from the District; (iii) if the Contractor repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment; (iv) if the Contractor repeatedly fails to make prompt payments to any Subcontractor, of any tier, or Material Suppliers or others for labor, materials or equipment; (v) if the Contractor disregards laws, ordinances, rules, codes, regulations, orders applicable to the Work or similar requirements of any public entity having jurisdiction over the Work; (vi) if the Contractor disregards proper directives of the Architect, the Project Inspector or District under the Contract Documents; (vii) if the Contractor performs Work which deviates from the Contract Documents and neglects or refuses to correct such Work; or (viii) if the Contractor otherwise violates in any material way any provisions or requirements of the Contract Documents. Once the District determines that sufficient cause exists to justify the action, the District may terminate the Contract without prejudice to any other right or remedy the District may have, after giving the Contractor and the Surety at least seven (7) days advance written notice of the effective date of termination. The District shall have the sole discretion to permit the Contractor to remedy the cause for the termination without waiving the District's right to terminate the Contract, or otherwise waiving, restricting or limiting any other right or remedy of the District under the Contract Documents or at law.

15.1.2 District's Rights Upon Termination. In the event that the Contract is terminated pursuant to this Article 15.1, the District may take over the Work and prosecute it to completion, by contract or otherwise, and may exclude the Contractor from the site. The District may take possession of the Work and of all of the Contractor's tools, appliances, construction equipment, machinery, materials, and plant which may be on the site of the Work, and use the same to the full extent they could be used by the Contractor without liability to the Contractor. In exercising the District's right to prosecute the completion of the Work, the District may also take possession of all materials and equipment stored at the site of the Work or for which the District has paid the Contractor but which are stored

elsewhere, and finish the Work as the District deems expedient. In exercising the District's right to prosecute the completion of the Work, the District shall have the right to exercise its sole discretion as to the manner, methods, and reasonableness of the costs of completing the Work and the District shall not be required to obtain the lowest figure for completion of the Work. In the event that the District takes bids for remedial Work or completion of the Work, the Contractor shall not be eligible for the award of such contract(s).

15.1.3 Completion by the Surety. In the event that the Contract is terminated pursuant to this Article 15.1, the District may demand that the Surety take over and complete the Work. The District may require that in so doing, the Surety not utilize the Contractor in performing and completing the Work. Upon the failure or refusal of the Surety to take over and begin completion of the Work within twenty (20) days after demand therefor, the District may take over the Work and prosecute it to completion as provided for above.

15.1.4 Assignment and Assumption of Subcontracts. The District shall, in its sole and exclusive discretion, have the option of requiring any Subcontractor or Material Supplier to perform in accordance with its Subcontract or Purchase Order with the Contractor and assign the Subcontract or Purchase Order to the District or such other person or entity selected by the District to complete the Work.

15.1.5 Costs of Completion. In the event of termination under this Article 15.1, the Contractor shall not be entitled to receive any further payment of the Contract Price until the Work is completed. If the unpaid balance of the Contract Price as of the date of termination exceeds the District's direct and indirect costs and expenses for completing the Work, including without limitation, attorneys' fees and compensation for additional professional and consultant services, such excess shall be used to pay the Contractor for the cost of the Work performed prior to the effective date of termination with a reasonable allowance for overhead and profit. If the District's costs and expenses to complete the Work exceed the unpaid Contract Price, the Contractor and/or the Surety shall pay the difference to the District.

15.1.6 Contractor Responsibility for Damages. The Contractor and the Surety shall be liable for all damage sustained by the District resulting from, in any manner, the termination of Contract under this Article 15.1, including without limitation, attorneys' fees, and for all costs necessary for repair and completion of the Work over and beyond the Contract Price.

15.1.7 Conversion to Termination for Convenience. In the event the Contract is terminated under this Article 15.1, and it is determined, for any reason, that the Contractor was not in default under the provisions hereof, the termination shall be deemed a Termination for Convenience of the District and thereupon, the rights and obligations of the District and the Contractor shall be determined in accordance with Article 15.2 hereof.

15.1.8 District's Rights Cumulative. In the event the Contract is terminated pursuant to this Article 15.1, the termination shall not affect or limit any rights or remedies of the District against the Contractor or the Surety. The rights and remedies of the District under this Article 15.1 are in addition to, and not in lieu of, any other rights and remedies provided by law or otherwise under the Contract Documents. Any retention or payment of monies to the Contractor by the District shall not be deemed to release the Contractor or the Surety from any liability hereunder.

15.2 Termination for Convenience of the District. The District may at any time, in its sole and exclusive discretion, by written notice to the Contractor, terminate the Contract in whole or in part when it is in the interest of, or for the convenience of, the District. In such case, the Contractor shall be entitled to payment for: (i) Work actually performed and in place as of the effective date of such termination for convenience of the District, with a reasonable allowance for profit and overhead on such Work, and (ii) reasonable termination expenses for reasonable protection of Work in place and suitable storage and protection of materials and equipment delivered to the site of the Work but not yet incorporated into the Work, provided that such payments exclusive of termination expenses shall not exceed the total Contract Price as reduced by payments previously made to the Contractor and as further reduced by the value of the Work as not yet completed. The Contractor shall not be entitled to profit and overhead on Work which was not performed as of the effective date of the termination for convenience of the District. The District may, in its sole discretion, elect to have subcontracts assigned pursuant to Article 15.1.4 above after exercising the right hereunder to terminate for the District's convenience.

ARTICLE 16: MISCELLANEOUS

16.1 Governing Law. This Contract shall be governed by and interpreted in accordance with the laws of the State of California.

16.2 Marginal Headings; Interpretation. The titles of the various Articles of these General Conditions and elsewhere in the Contract Documents are used for convenience of reference only and are not intended to, and shall in no way, enlarge or diminish the rights or obligations of the District or the Contractor and shall have no effect upon the construction or interpretation of the Contract Documents. The Contract Documents shall be construed as a whole in accordance with their fair meaning and not strictly for or against the District or the Contractor.

16.3 Successors and Assigns. Except as otherwise expressly provided in the Contract Documents, all terms, conditions and covenants of the Contract Documents shall be binding upon, and shall inure to the benefit of the District and the Contractor and their respective heirs, representatives, successors-in-interest and assigns.

16.4 Cumulative Rights and Remedies; No Waiver. Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not in lieu of or otherwise a limitation or restriction of duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by the District shall constitute a waiver of a right or remedy afforded it under the Contract Documents or at law nor shall such an action or failure to act constitute approval of or acquiescence in a breach hereunder, except as may be specifically agreed in writing.

16.5 Severability. In the event any provision of the Contract Documents shall be deemed illegal, invalid, unenforceable and/or void, by a court or any other governmental agency of competent jurisdiction, such provision shall be deemed to be severed and deleted from the Contract Documents, but all remaining provisions hereof, shall in all other respects, continue in full force and effect.

16.6 No Assignment by Contractor. The Contractor shall not sublet or assign the Contract, or any portion thereof, or any monies due thereunder, without the express prior written consent and approval of the District, which approval may be withheld in the sole and exclusive discretion of the District. The District's approval to such assignment shall be upon such terms

and conditions as determined by the District in its sole and exclusive discretion.

16.7 Gender and Number. Whenever the context of the Contract Documents so require, the neuter gender shall include the feminine and masculine, the masculine gender shall include the feminine and neuter, the singular number shall include the plural and the plural number shall include the singular.

16.8 Independent Contractor Status. In performing its obligations under the Contract Documents, the Contractor is an independent contractor to the District and not an agent or employee of the District. Nothing contained herein shall be deemed or construed as creating a relationship of employer and employee between the District and the Contractor or any Subcontractors, employees of the Contractor or Subcontractors or their respective agents and representatives. Neither the Contractor, Subcontractors nor any employees of the Contractor or Subcontractors are entitled to any rights or privileges of District employees.

16.9 Notices. Except as otherwise expressly provided for in the Contract Documents, all notices which the District or the Contractor may be required, or may desire, to serve on the other, shall be effective only if delivered by personal delivery or by postage prepaid, First Class Certified Return Receipt Requested United States Mail, addressed to the District or the Contractor at their respective address set forth in the Contract Documents, or such other address(es) as either the District or the Contractor may designate from time to time by written notice to the other in conformity with the provisions hereof. In the event of personal delivery, such notices shall be deemed effective upon delivery, provided that such personal delivery requires a signed receipt by the recipient acknowledging delivery of the same. In the event of mailed notices, such notice shall be deemed effective on the third working day after deposit in the mail.

16.10 Disputes; Continuation of Work. Notwithstanding any claim, dispute or other disagreement between the District and the Contractor regarding performance under the Contract Documents, the scope of Work thereunder, or any other matter arising out of or related to, in any manner, the Contract Documents, the Contractor shall proceed diligently with performance of the Work in accordance with the District's written direction, pending any final determination or decision regarding any such claim, dispute or disagreement.

16.11 Dispute Resolution; Arbitration.

16.11.1 Claims Under \$375,000.00. Claims between the District and the Contractor of \$375,000.00 or less shall be resolved in accordance with the procedures established in Part 3, Chapter 1, Article 1.5 of the California Public Contract Code, §§20104 et seq.; provided however that California Public Contract Code §20104.2(a) shall not supersede the requirements of the Contract Documents with respect to the Contractor's notification to the District of such claim or extend the time for the giving of such notice as provided in the Contract Documents. The term "claims" as used herein shall be as defined in California Public Contract Code §20104(b) (2).

16.11.2 Government Code Claim Requirements. Pursuant to Government Code §930.6, any claim, demand, dispute, disagreement or other matter in controversy asserted by the Contractor against the District for money or damages, including, without limitation, a demand for arbitration, except for those subject to resolution pursuant to Article 16.11.1, shall be deemed a "suit for money or damages" and shall be subject to the provisions of Government Code §§945.4, 945.6 and 946. Notwithstanding the resolution of disputes

pursuant to the arbitration provisions set forth in Article 16.11.3 any claim, demand, dispute, disagreement or other matter in controversy between the Contractor and the District seeking money or damages in excess of \$375,000 shall first be presented to the District and acted upon or deemed rejected by the District in accordance with California Government Code section 900, et seq., as a condition precedent to the Contractor's commencement of arbitration proceedings. Any arbitration proceeding pursuant to Article 16.11.3 commenced by the Contractor without first complying with the foregoing provisions of the Government Code shall be stayed pending the Contractor's compliance with the foregoing provisions of the Government Code.

16.11.3 Arbitration. Except as provided in Article 16.11.1, any other claims, disputes, disagreements or other matters in controversy between the District and the Contractor arising out of, or related, in any manner, to the Contract Documents, or the interpretation, clarification or enforcement thereof shall be resolved by arbitration conducted in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association ("AAA") in effect as of the date that a Demand for Arbitration is filed, except as expressly modified herein. The locale for any arbitration commenced hereunder shall be the regional office of the AAA closest to the Site. The award rendered by the Arbitrator(s) ("Arbitration Award") shall be final and binding upon the District and the Contractor only if the Arbitration Award is supported by law and substantial evidence pursuant to California Code of Civil Procedure §1296, including findings of fact and conclusions of law in conformity with California Code of Civil Procedure §1296 and Rule R-43 of the AAA Construction Industry Arbitration Rules. The District and Contractor hereby expressly agree that the Court shall, subject to California Code of Civil Procedure §§1286.4 and 1296, vacate the Arbitration Award if, after review of the Arbitration Award, the Court determines either that the Arbitration Award is: (i) not supported by substantial evidence; (ii) not accompanied by findings of fact and conclusions of law; or (iii) based on an error of law. In connection with any arbitration proceeding commenced hereunder, the discovery rights and procedures provided for in California Code of Civil Procedure §1283.05 shall be applicable, and the same shall be deemed incorporated herein by this reference. A Demand for Arbitration shall be filed and served within a reasonable time after the occurrence of the claim, dispute or other disagreement giving rise to the Demand for Arbitration, but in no event shall a Demand for Arbitration be filed or served after the date when the institution of legal or equitable proceedings based upon such claim, dispute or other disagreement would be barred by the applicable statute of limitations. In the event more than one Demand for Arbitration is made by either the District or the Contractor, all such controversies shall be consolidated into a single arbitration proceeding, unless otherwise agreed to by the District and the Contractor. The Contractor's Surety, a Subcontractor or Material Supplier to the Contractor and other third parties may be permitted to join in and be bound by an arbitration commenced hereunder if required by the terms of their respective agreements with the Contractor, except to the extent that such joinder would unduly delay or complicate the expeditious resolution of the claim, dispute or other disagreement between the District and the Contractor, in which case an appropriate severance order shall be issued by the Arbitrator(s). The expenses and fees of the Arbitrator(s) shall be divided equally among the parties to the arbitration. Each party to any arbitration commenced hereunder shall be responsible for and shall bear its own attorneys' fees, witness fees and other cost and expense incurred in connection with such arbitration. The foregoing notwithstanding, the Arbitrator(s) may award arbitration costs, including Arbitrators' fees but excluding attorneys' fees, to the prevailing party. The confirmation, enforcement, vacation or correction of an arbitration award rendered hereunder shall be the Superior Court of the State of California for the county in which the

Site is situated. The substantive and procedural rules for such post-award proceedings shall be as set forth in California Code of Civil Procedure §1285 et seq.

16.11.4 Inapplicability to Bid Bond. The provisions of this Article 16.11 shall not be applicable to disputes, disagreements or enforcement of rights or obligations under the Bid Bond; all claims, disputes and actions to enforce rights or obligations under the Bid Bond shall be adjudicated only by judicial proceedings commenced in a court of competent jurisdiction.

16.12 Capitalized Terms. Except as otherwise expressly provided, capitalized terms used in the Contract Documents shall have the meaning and definition for such term as set forth in the Contract Documents.

16.13 Attorney's Fees. Except as expressly provided for in the Contract Documents, or authorized by law, neither the District nor the Contractor shall recover from the other any attorney's fees or other costs associated with or arising out of any legal, administrative or other proceedings filed or instituted in connection with or arising out of the Contract Documents or the performance of either the District or the Contractor thereunder.

16.14 Waiver of Special/Consequential Damages. Notwithstanding any right conferred by law or arising by operation of law, by executing the Agreement, the Contractor expressly waives and relinquishes any and all right or entitlement to assert or recover any damages, losses or liabilities from the District which are in the nature of special or consequential damages, losses or liabilities arising out of or related in any manner to the District's breach or default of its obligations under the Contract Documents.

16.15 Provisions Required by Law Deemed Inserted. Each and every provision of law and clause required by law to be inserted in the Contract Documents is deemed to be inserted herein and the Contract Documents shall be read and enforced as though such provision or clause are included herein, and if through mistake, or otherwise, any such provision or clause is not inserted or if not correctly inserted, then upon application of either party, the Contract Documents shall forthwith be physically amended to make such insertion or correction.

16.16 Days. Unless otherwise expressly stated, references to "days" in the Contract Documents shall be deemed to be calendar days.

16.17 Prohibited Interests. No employee of the District, who is authorized in such capacity on behalf of the District to negotiate, make, accept or approve, or to take part in negotiating, making, accepting or approving any architectural, engineering, inspection, construction or material supply contract or subcontract in connection with the Work shall become directly or indirectly financially interested in the Work or any part thereof.

16.18 Entire Agreement. The Contract Documents contain the entire agreement and understanding between the District and the Contractor concerning the subject matter hereof, and supersedes and replaces all prior negotiations, proposed agreements or amendments, whether written or oral. No amendment or modification to any provision of the Contract Documents shall be effective or enforceable except by an agreement in writing executed by the District and the Contractor.

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SPECIAL CONDITIONS

Application of Special Conditions. These Special Conditions are a part of the Contract Documents for the Work generally described as: **BID NO.: B20/21-07, Domestic Water Booster System Project**

1. Drawings and Specifications The number of sets of the Drawings and Specifications which the District will provide the Contractor, pursuant to Article 2.1.3 of the General Conditions will be mutually agreed upon and reasonable at the District’s discretion and will not exceed 3 sets.

2. Insurance

2.1 Insurance Requirements for Contractor Minimum coverage amounts for each policy of insurance required of the Contractor shall be as follows:

Workers Compensation Insurance	In accordance with applicable law
Employers Liability Insurance	\$1,000,000
Commercial General Liability Insurance (including coverage for bodily injury, death, property damage and motor vehicle liability)	
Per Occurrence	\$2,000,000
Aggregate	\$4,000,000
 Builder’s Risk	 Full value of the Work; seismic coverage is not required

2.2 Insurance Requirements for Subcontractors Minimum coverage amounts for each policy of insurance to be obtained and maintained by each Subcontractor to the Contractor shall be as follows:

Workers Compensation Insurance	In accordance with applicable law
Employers Liability Insurance	\$1,000,000
Commercial General Liability Insurance (including coverage for bodily injury, death, property damage and motor vehicle liability)	
Per Occurrence	\$1,000,000
Aggregate	\$2,000,000

3. Contract Time, Liquidated Damages

3.1 Contract Time The Contract Time for the Contractor’s Substantial Completion of the Work is **Seventy-Four (74) Calendar days** after the date for commencement of the Work as set forth in the Notice to Proceed issued by or on behalf of the District to the Contractor. The anticipated Notice to Proceed date of March 1, 2021.

3.2 Liquidated Damages

3.2.1 Delayed Submission of Preliminary Construction Schedule If the Contractor fails to submit the Contractor’s Preliminary Construction Schedule within the time established in the General Conditions, the Contractor shall be subject to assessment of Liquidated Damages in the amount of **Five Hundred Dollars (\$500.00)** per day from the date the Preliminary Construction Schedule is required to be submitted until submission thereof to the District.

3.2.2 Delayed Substantial Completion If the Contractor fails to achieve Substantial

Completion of the Work within the Contract Time, including adjustments thereto in accordance with the Contract Documents, the Contractor shall be subject to assessment of Liquidated Damages in the amount of **Five Hundred Dollars (\$500.00)** per day from the scheduled date of Substantial Completion until Substantial Completion is achieved.

3.2.3 Delayed Task Substantial Completion If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, including adjustments thereto in accordance with the Contract Documents, the Contractor shall be subject to assessment of Liquidated Damages in the amount of **Five Hundred Dollars (\$500.00)** per day from the scheduled date of Substantial Completion until Substantial Completion is achieved.

3.2.4 Delayed Completion of Punchlist Items If the Contractor fails to complete all Punchlist Items noted upon Substantial Completion within the time established for completion of all Punchlist Items, the Contractor shall be subject to assessment of Liquidated Damages in the amount of **Five Hundred Dollars (\$500.00)** per day from the scheduled date of completion until all Punchlist Items are completed.

3.2.5 District Withhold of Liquidated Damages; Performance Bond Surety If the Contractor is subject to assessment of Liquidated Damages for delayed Substantial Completion and/or delay completion of Punchlist Items, the District may withhold such assessments from the Contract Price then or thereafter due the Contractor. If the assessment of Liquidated Damages exceeds the then remaining balance of the Contract Price, the Contractor and the Surety issuing the Performance Bond shall be jointly and severally liable to the District for such amounts.

3.3 Delays due to Unanticipated, Unusually Severe Weather Conditions Delays due to adverse weather conditions will only be granted to the extent they exceed the “normal” anticipated Inclement Weather Days set forth herein. A weather delay day shall be granted for each calendar day the Contractor can document adverse weather caused critical path delays in excess of 19 calendar days. This is the number to be used in the schedules under the activity entitled “Remaining Inclement Weather Days”. See General Conditions Paragraph 7.3.9 for further information and notice requirements documenting “Inclement Weather Days”.

3.4 Notice of Delay The Contractor shall notify the Construction Manager, in writing, of all delays Pursuant to Articles 7 and 9 of the General Conditions.

4. District Provided Temporary Utilities Pursuant to Article 4.3.4 of the General Conditions, during the Contractor’s performance of the Work, the District will provide utility services and a point of connection for electrical power and domestic potable water. The connection and placement, relocation and removal of temporary distributions of the electrical power and domestic potable water utility service provided by the District will be by the Contractor at its cost and expense without adjustment of the Contract Price. The Contractor may use the temporary electrical power and domestic potable water service furnished by the District provided that: (a) the District may discontinue, limit or condition use of such services by a Contractor if the District reasonably determines that the Contractor has wasted such utilities, and (b) the District shall not be liable to the Contractor, nor shall the Contract Time or the Contract Price be increased if any District provided temporary utility service is discontinued or disrupted for any reason other than the District’s non-payment of undisputed utility charges.

5. Mark-Ups on Changes to the Work In the event of Changes to the Work, pursuant to Article 9

of the General Conditions, the mark-up for all overhead (including home and field office overhead), general conditions costs and profit, shall not exceed the percentage of allowable direct actual costs for performance of the Change as set forth below. For the portion of any Change performed by Subcontractors of any tier, the percentage mark-up on allowable actual direct labor and materials costs incurred by all Subcontractors of any tier shall be Twelve Percent (12%). In addition, for the portion of any Change performed by a Subcontractor of any tier, the Contractor may add an amount equal to Five Percent (5%) of the allowable actual direct labor and materials costs of Subcontractors performing the Change. For the portion of any Change performed by the Contractor's own forces, the mark-up on the allowable actual direct labor and materials costs of such portion of a Change shall be Fifteen Percent (15%).

6. **Form and Content of Change Orders** In accordance with the provisions of Article 9.5 of the General Conditions, if the District approves of a Change Order, the Change Order issued by the District and executed by the District, Architect, Construction Manager and Contractor shall be in the form and content as set forth in Attachment A to these Special Conditions.
7. **Asbestos and Other Hazardous Materials Certification** Upon completion of the Work and as an additional express condition precedent to the District's obligation to disburse the Final Payment to the Contractor, the Contractor's duly authorized representative shall deliver to the District the completed and executed form of Asbestos and Other Hazardous Materials Certification included as Attachment B to the Special Conditions; the signature of the Contractor's representative shall be notarized by a California Notary Public.
8. **Debris Recycling Statement** The District's form of Debris Recycling Statement is attached to these Special Conditions as Attachment C. The Contractor shall complete, execute and submit the Debris Recycling Statement in accordance with applicable provisions of the Contract Documents, under General Conditions, Supervision and Construction Procedures, Section 4.3.9.
9. **Public Works Contractor Registration Certificate.** The District's form of Public Works Contractor Registration Certification form is attached to these Special Conditions as Attachment D. The Contractor and its Sub-Contractors shall complete, execute and submit the Public Works Contractor Registration Certification form with the Bid Proposal in accordance with the Bid Documents.
10. **Additional Definitions** In addition to terms defined elsewhere in the Contract Documents, the following terms used in the Contract Documents are defined as set forth herein.
 - 10.1 **Owner** Unless otherwise expressly provided, references to the "Owner" shall be deemed references to the District, as that term is defined in the Contract Documents.
 - 10.2 **Inspector; Inspector of Record; IOR; Owner's Inspector** Unless otherwise expressly provided, references to Inspector, Inspector of Record, IOR or Owner's Inspector shall be deemed references to the Project Inspector as that term is defined in the Contract Documents.
 - 10.3 **Contract Sum** Unless otherwise expressly provided, the terms "Contract Price" and "Contract Sum" are synonymous.
 - 10.4 **Campus** Unless otherwise expressly provided, the term "Campus" shall be deemed to refer to the District's Chabot College campus.
 - 10.5 **Rain Days.** Pursuant to Article 7.3.9 of the General Conditions, the rain days included within the contract period shall be ten (10) calendar days.

**CHANGE ORDER FORM
(ATTACHMENT A TO SPECIAL CONDITIONS)**

Project: _____
Date: _____

Change Order #: _____

Contractor: _____

Pursuant to the General Conditions, this Change Order Form shall be used for all Change Orders associated with the Work. No additions or deletions to this form shall be allowed, except with permission of the District.

You are hereby directed to provide the extra work necessary to comply with this Change Order.

DESCRIPTION OF CHANGE:

Contractor accepts the terms and conditions stated as full and final settlement of any and all claims arising from this Change Order. Contractor agrees to perform the above described changes in accordance with the terms set forth herein and in compliance with applicable sections of the Contract Documents. This Change Order is hereby agreed to, accepted and approved, all in accordance with the General Conditions of the Contract Documents. The adjustment of the Contract Price and the Contract Time for the changes noted in this Change Order (the "Changes") represents the full and complete adjustment of the Contract Time and the Contract Price due the Contractor for providing and completing such Changes, including without limitation: (i) all costs (whether direct or indirect) for labor, equipment, materials, tools, supplies and/or services; (ii) all general and administrative overhead costs (including without limitation, home office, field office and Site general conditions costs) and profit; and (iii) all impacts, delays, disruptions, interferences, or hindrances in providing and completing the Changes. Contractor waives all rights, including without limitation those arising under Civil Code Section 1542, for any other adjustment of the Contract Price or the Contract Time on account of the Changes set forth in this Change Order or the Contractor's performance and completion of the Changes.

NOT VALID UNTIL SIGNED BY THE OWNER, ARCHITECT, AND CONTRACTOR

The original Contract Sum was \$ _____

Net change by previously authorized Change Orders \$ _____

The Contract Sum prior to this Change Order was. \$ _____

The Contract Sum will be changed by this Change Order in the amount of. \$ _____

The adjusted Contract Sum including this Change Order will be. \$ _____

The Contract Time will be (increased) (decreased) (unchanged) by. (_____) Days

The Contractual date of Substantial Completion as of the date of this Change Order therefore is: . . . ____/____/____

ARCHITECT	CONTRACTOR	CONSTRUCTION MANAGER
By: _____	By: _____	By: _____
Date: _____	Date: _____	Date: _____

Vice Chancellor Fac/Bond	OWNER CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT 7600 Dublin Blvd., 3 rd Floor, Dublin, CA 94568
By: _____	By: _____
Date: _____	Date: _____

**ASBESTOS AND OTHER HAZARDOUS MATERIALS CERTIFICATION
(ATTACHMENT B TO SPECIAL CONDITIONS)**

This Asbestos and Other Hazardous Materials Certification form is part of the Contract made by and between the CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT and **BID NO.: B20/21-07, Domestic Water Booster System Project** (hereinafter referred to as the "Project").

To the best of my knowledge, information and belief, in completing the Work of the Project, no materials, equipment or other items furnished, installed or incorporated into the Project contains, or in itself be composed of, any asbestos, polychlorinated biphenyl (PCB), any material listed by the federal or state EPA or federal or state health agencies as a hazardous material, or defined as being hazardous under federal or state laws, rules or regulations.

The undersigned is duly authorized to complete, execute and submit this Asbestos and Other Hazardous Materials Certification on behalf of the Contractor. The undersigned has personal knowledge of the substantive representations set forth hereinabove or has made appropriate diligent inquiry to ascertain that the substantive representations set forth hereinabove are complete, true and accurate and do not omit material facts rendering such representations to be false or misleading.

("Contractor") for the work of improvement commonly referred to as
I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on this _____ day of _____, 2021 at _____
(City and State)

Name of Contractor (Print or Type)

By: _____
Signature

Print Name

Title

Subscribed and sworn before me
this ____ day of _____, 2021

Notary Public in and for the State of California

My Commission Expires:

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Chabot – Las Positas Community College District
Construction & Demolition
DEBRIS RECYCLING STATEMENT
(Attachment C to Special Conditions)

Project Name / Location: _____	
_____ Demolition	_____ Construction
Contractor Name: _____	
Contact Name: _____	Phone: _____ Fax: _____
Anticipated Start Date: _____	Anticipated Completion Date: _____
Statement Date: _____	
For the period between: _____ / _____ and _____ / _____	
Month Year	Month Year

Please indicate estimated quantities by matter, the proposed processing method and the vendor selected. Weight tag required as verification.

	Estimated Amount (Tons or Yards)			
	Recycled	Salvaged	Landfilled	
Asphalt				
Concrete				
Brick/Masonry Tile				
Corrugated Cardboard				
Dirt/Clean Full				
Drywall				
Padding – Carpet Foam				
Building Materials (doors, windows, cabinets, fixtures)				
Scrap Metals				
Mixed Recyclable Debris				
Other				
Un-painted wood/Pallets				
Green Waste/Yard Waste				
Garbage – Painted Wood- Trash				

If no materials are targeted for recycling, reuse or salvage, please state why: _____

The undersigned certifies that she/he is authorized to execute this Debris Recycling Statement on behalf of the above-identified Contractor. The undersigned further certifies that she/he has personal knowledge of the foregoing, or has made reasonable inquiry to ascertain, that the foregoing is true, complete and correct.

Submitted by: _____ Date: _____

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PUBLIC WORKS CONTRACTOR REGISTRATION CERTIFICATION
(Attachment D to Special Conditions)

I, _____, am the _____ of
(Print Name) (Title)

(Contractor Name)

I declare, state and certify to all of the following:

1. I am aware of the provisions and requirements of California Senate Bill (SB) 854, the Public Works Contractor Registration Program.
2. I am authorized to certify, and do certify, on behalf of Contractor that an annual registration fee has been paid and I am registered as eligible to bid and work on public works projects by doing all of the following:
 - A. Must have workers' compensation coverage for any employees and only use subcontractors who are glistered public works contractors;
 - B. Must have Contractors State License Board license, if applicable to trade;
 - C. Must have no delinquent unpaid wage or penalty assessments owed to any employee or enforcement agency;
 - D. Must not be under federal or state debarment;
 - E. Must not be in prior violation of this registration requirement once it becomes effective on April 1, 2015.
3. Contractor and I understand that if the District determines that Contractor has either: (a) made a false certification herein, or (b) violated this certification by failing to carry out and to implement the requirements of the Department of Industrial Relations (DIR), the Contract awarded herein is subject to termination, suspension of payments, or both. Contractor and I further understand that, should Contractor violate the terms of the Public Works Contractor Registration Certification Law of California Senate Bill 854, Contractor may be subject to debarment in accordance with the provisions of California Labor Code §§1720, et seq.
4. Contractor and I acknowledge that Contractor and I are aware of the provisions of California Senate Bill 854 and hereby certify that Contractor and I will adhere to, fulfill, satisfy and discharge all provisions of and obligations under the Public Works Contractor Registration Program.

I declare under penalty of perjury under the laws of the State of California that all of the foregoing is true and correct.

Executed at _____ this _____ day of
(City and State)

_____, 2021

(Signature)

z _____
(Handwritten or Typed Name)

Department of Industrial Relations Registration #

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Escrow Agreement for Security Deposits in Lieu of Retention
P.C.C. §22300

THIS ESCROW AGREEMENT ("Escrow Agreement") is made and entered into this ____ day of _____, 202[], by and between the CHABOT LAS POSITAS COMMUNITY COLLEGE DISTRICT (hereinafter called the "District"), whose address is 7600 Dublin Boulevard, Dublin, California 95554; _____ ("Contractor"), whose place of business is located at _____; and [District, as escrow agent ...OR... [____], a state or federally chartered bank in the State of California, whose place of business is located at _____] ("Escrow Agent").

For the consideration hereinafter set forth, District, Contractor and Escrow Agent agree as follows:

1. Pursuant to Section 22300 of 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 District pursuant to Contract Number [] entered into between District and Contractor for District-wide Emergency Call Station Project in the amount of [] dated [] (the "Contract"). Alternatively, on written request of Contractor, District shall make payments of the retention earnings directly to Escrow Agent. When Contractor deposits the securities as a substitute for Contract earnings, Escrow Agent shall notify District within ten (10) Days of the deposit. The market value of the securities at the time of substitution shall be at least equal to the cash amount then required to be withheld as retention under terms of Contract between District and Contractor. Securities shall be held in name of _____, and shall designate Contractor as the beneficial owner.
2. District shall make progress payments to Contractor for those funds which otherwise would be withheld from progress payments pursuant to Contract provisions, provided that Escrow Agent holds securities in form and amount specified in paragraph 1 of this Section 00680.
3. When District makes payment(s) of retention earned directly to Escrow Agent, Escrow Agent shall hold said payment(s) for the benefit of Contractor until the time that the escrow created under this Escrow Agreement is terminated. Contractor may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when District pays Escrow Agent directly.
4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account, and all expenses of District. Such expenses and payment terms shall be determined by District, Contractor, and Escrow Agent.
5. Interest earned on securities or money market accounts held in escrow and all interest earned on that interest shall be for sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to District.
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 District to Escrow Agent that District consents to withdrawal of amount sought to be withdrawn by Contractor.

7. District shall have the right to draw upon the securities in event of default by Contractor. Upon seven (7) Days written notice to Escrow Agent from District of the default, Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by District.
8. Upon receipt of written notification from District certifying that the Contract is final and complete, and that Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.
9. Escrow Agent shall rely on written notifications from District and Contractor pursuant to paragraphs 5 through 8, inclusive, of this Section 00680 and District and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of securities and interest as set forth.
10. Names of persons who are authorized to give written notice or to receive written notice on behalf of District and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of Escrow Agent:

Title

Name

Signature

Address

City/State/Zip

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

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

District:

Contractor:

Vice Chancellor

Title

Title

Name

Name

Signature

Signature

7600 Dublin Boulevard

Address

Address

Dublin, California 95554

City/State/Zip

City/State/Zip

Escrow Agent:

Title

Name

Signature

Address

City/State/Zip

END OF SECTION

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GUARANTEE

District: CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT
Project: BID NO.: 20/21-07 Domestic Water Booster System Project

Contractor Name: _____

The Contractor hereby warrants and guarantees to the District that all work, materials, equipment and workmanship provided, furnished or installed by or on behalf of Contractor in connection with the above-referenced Project (the "Work") have been provided, furnished and installed in strict conformity with the Contract Documents for the Work, including without limitation, the Drawings and the Specifications. Contractor further warrants and guarantees that all work, materials, equipment and workmanship as provided, furnished and/or installed are fit for use as specified and fulfill all applicable requirements of the Contract Documents including without limitation, the Drawings and the Specifications. Contractor shall, at its sole cost and expense, repair, correct and/or replace any or all of the work, materials, equipment and/or workmanship of the Work, together with any other items which may be affected by any such repairs, corrections or replacement, that may be unfit for use as specified or defective within a period of one (1) year from the date of the District's Final Acceptance of the Work, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of the Contractor's failure and/or refusal to comply with the provisions of this Guarantee, within the period of time set forth in the Contract Documents after the District's issuance of the Notice to the Contractor of any defect(s) in the Work, materials, equipment or workmanship, Contractor authorizes the District, without further notice to Contractor, to repair, correct and/or replace any such defective item at the expense of the Contractor. The Contractor shall reimburse the District for all costs, expenses or fees incurred by the District in providing or performing such repairs, corrections or replacements within ten (10) days of the District's presentation of a demand to the Contractor for the same.

The provisions of this Guarantee and the provisions of the Contract Documents for the Work relating to the Contractor's Guarantee(s) and warranty(ies) relating to the Work shall be binding upon the Contractor's Performance Bond Surety and all successors or assigns of Contractor and/or Contractor's Performance Bond Surety.

The provisions of this Guarantee are in addition to, and not in lieu of, any provisions of the Contract Documents for the Work relating to the Contractor's guarantee(s) and warranty(ies) or any guarantee(s) or warranty(ies) provided by any material supplier or manufacturer of any equipment, materials or other items forming a part of, or incorporated into the Work, or any other guarantee or warranty obligation of the Contractor, prescribed, implied or imposed by law.

The undersigned individual executing this Guarantee on behalf of Contractor warrants and represents that he/she is duly authorized to execute this Guarantee on behalf of Contractor and to bind Contractor to each and every provision hereof.

Dated: _____

By: _____
(Signature)

(Typewritten or handwritten name)

(Title)

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Chabot-Las Positas Community College District

Measure A Bond Program

CONTRACT REQUIREMENTS

DIVISION 1 GENERAL REQUIREMENTS

SECTION 00 11 10

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SECTION 01 11 00**SUMMARY OF WORK****PART 1 – GENERAL****1.01 SUMMARY**

- A. This section includes summary of work including:
 - 1. Work covered by Contract Documents
 - 2. Bid items, Allowances and Alternates
 - 3. Work under other contracts
 - 4. Future work
 - 5. Work sequence
 - 6. Cooperation of contractor and coordination with other work
 - 7. Maintenance
 - 8. Occupancy requirements
 - 9. Reference Standards
 - 10. Products ordered in advance
 - 11. CLPCCD furnished products

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. The scope of work of this project comprises of providing a booster pump to raise campus domestic water pressure. Pressure reducing valves will also be installed at selected buildings to prevent overpressure of plumbing fixtures
- B. The work shall include all work shown and specified except for work indicated “N.I.C” or “Not in Contract”.
- C. During construction, all buildings will remain in service and be occupied during normal campus hours as this campus will remain active throughout the entire project. No work is to take place in any classrooms while they are in use.
- D. The Contractor must maintain access to the existing buildings at all times during the project. The contractor is to provide secure fencing and/or barricades to keep the general public from entering exterior work areas. Fencing is required to have a privacy screen.
- E. Unless provided otherwise in the Contract Documents, all risk of loss of Work covered by the Contract Documents shall rest with the Contractor until Final Completion and Acceptance of the Work.

1.03 BID ITEMS

- A. Base Bid- Construct and install all work shown on Drawings and described in Specifications and all other Contract Documents, including connections to existing systems for a complete and operation product.
- B. Allowance- An Owner’s unspecified allowance is as noted in Paragraph 1.1 of the Bid Proposal.

1.04 WORK UNDER OTHER CONTRACTS

Not Applicable

1.05 FUTURE WORK

Not Applicable.

1.06 WORK SEQUENCE

- A. The contractor shall coordinate their work with the Districts representative. Work will be performed on an active college campus. Campus buildings are generally in use from 7:00AM to 7:00PM Monday through Friday and from 9:00AM to 6:00PM on weekends.
- B. The contractor shall provide the Districts representative with a detailed schedule for any services interruption and shall notify the Districts representative at least 48 hours prior to commencing a shutdown. The shutdown period shall not exceed 24 hours.

1.07 COOPERATION OF CONTRACTOR AND COORDINATION WITH OTHER WORK.

- A. Should construction work, or work of any other nature, be underway by other forces or by other contractors within or adjacent to the limits of the Work at the time the Work was advertised for bids, the Contractor shall cooperate with all such other contractors or forces to the end that any delay or hindrance to their work will be avoided. The cost of such cooperation will be considered as included in the prices bid and no direct or additional payment will be made therefore. Contractor shall coordinate with such other contractors and forces as required by General Conditions.
- B. CLPCCD reserves the right to perform other or additional work, within or adjacent to the limits of the work specified, at any time by the use of other forces. Contractor shall coordinate with CLPCCD and any CLPCCD forces, or other forces, engaged by CLPCCD, as required by General Conditions. In the event that the performance of such other or additional work materially increases or decreases Contractor's costs, the work and the amount to be paid therefore will be appropriately adjusted as determined by the Construction Manager.
- C. Limit use of the Site for Work and for construction operations to allow for:
 - a. CLPCCD operation
 - b. Work by other contractors and tenants
- D. Coordinate use of the Site and access to site with other contractors, utilities, and CLPCCD forces, as required by General Conditions. Construction Manager has final authority over coordination, use of the Site, and access to site.
- E. Cooperate with CLPCCD and others who may occupy and begin work on site and inside building prior to completion of Work of this Contract.
- F. Cooperate with contractors for other area work, not included in Contract, but which may take place during construction period.

1.08 MAINTENANCE

- A. Cost of maintenance of systems and equipment prior to Final Acceptance will be considered as included in prices bid and no direct or additional payment will be made therefore.

1.09 OCCUPANCY REQUIREMENTS

- A. Whenever, in the opinion of Construction Manager, Work or any part thereof is in a condition suitable for use, and the best interest of CLPCCD requires such use, CLPCCD may take beneficial occupancy of and connect to, open for public use, or use the Work or such part thereof. In such case, CLPCCD will request Engineer to inspect the Work or part thereof, and issue a Certificate of Substantial Completion for that part of Work.
- B. Prior to date of Final Acceptance of the Work by CLPCCD, all necessary repairs or renewals in Work or part thereof so used, not due to ordinary wear and tear, but due to defective materials or workmanship or to operations of Contractor, shall be made at expense of Contractor, as required in General Conditions.

- C. Use by CLPCCD of Work or part thereof as contemplated by this section shall in no case be construed as constituting acceptance of Work or any part thereof. Such use shall neither relieve Contractor of any responsibilities under Contract, nor act as waiver by CLPCCD of any of the conditions thereof.
- D. CLPCCD may specify in the Contract Documents that portions of the Work, including electrical and mechanical systems or separate structures, shall be substantially completed on milestone dates prior to substantial completion of all of the Work. Contractor shall notify Engineer in writing when Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a Certificate of Substantial Completion for that part of the Work.

PART 2 – PRODUCTS**2.01 REFERENCE STANDARDS**

- A. For products specified by association or trade standards, comply with requirements of standard, except where more rigid requirements are specified or are required by applicable codes.

2.02 PRODUCTS ORDERED IN ADVANCE

Not applicable.

2.03 CLPCCD FURNISHED PRODUCTS

For CLPCCD furnished products as specified, if any, shall be indicated on Construction Documents.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

SECTION 01 26 00**CONTRACT MODIFICATION PROCEDURES****PART 1 – GENERAL****1.01 SUMMARY**

- A. This section describes general procedural requirements for alterations, modifications and extras.
- B. Related Sections
 - 1. Section 01 11 00: Summary of Work

1.02 GENERAL

- A. Any change in scope of work or deviation from Drawings or Specifications shall be accomplished only when authorized in writing by the Construction Manager.
 - 1. Contractor may initiate changes by submitting Requests for Information (RFI), Requests for Substitution (RFS), Notice of Concealed or Unknown Conditions, or Notice of Hazardous Waste Conditions.
 - a. RFI's shall be submitted to seek clarification of Contract Documents.
 - b. RFS's shall be submitted in accordance with paragraph 4.8.2 of General Conditions to request substitution of materials or methods of execution.
 - c. Notices of Changes shall be submitted in accordance with paragraph 9.6 of General Conditions.
 - d. Notices of Hazardous Waste Conditions shall be submitted in accordance with paragraph 4.17 of General Conditions.
 - e. Notices of concealed or unknown conditions shall be submitted to make Owner aware of a potential change in scope of the work.
 - 2. Contractor shall be responsible for its costs to implement and administer RFI's and RFS's throughout the Contract duration. Regardless of the number of RFI's submitted, Contractor will not be entitled to additional compensation. Contractor shall be responsible for both CLPCCD's and Engineers administrative costs for answering its RFI's where the answer could reasonably be found by reviewing the Contract Documents, as determined by CLPCCD; such costs will be deducted from progress payments.
 - 3. Engineer may initiate changes by issuing a Supplemental Instruction (which shall require written approval of the Construction Manager).
 - 4. Construction Manager may initiate changes by issuing Requests for Proposal (RFP) or a Field Change Notice (FCN) to Contractor. Such RFP's or FCN's will detail all proposed changes in the Work and request a quotation of changes in Contract Sum and Contract Times from Contractor. A RFP or FCN may require Contractor to expedite the work and proceed on a time and material (force account) basis.

1.03 PROCEDURE

- A. Contractor shall submit RFI to Construction manager. Contractor shall reference each RFI to an activity on its Progress Schedule and note the time criticality of the RFI, indicating the time in which the response is required. Engineer shall respond by issuing a Clarification.
 - 1. If Contractor is satisfied with the Clarification and does not request change in Contract Sum or Contract Times, then the Clarification shall be executed without a change.
 - 2. If Contractor believes that the Clarification results in change in Contract Sum or Contract Times, Contractor shall notify Construction Manager who may then deny request for change or issue RFP.
- B. Contractor shall submit RFS to Construction Manager who may then deny request or issue RFP.
- C. Contractor shall submit Notices of Changes to resolve unanticipated conditions incurred in the execution of the Work. Procedures in Paragraph 9.6 of General Conditions shall be followed. If Construction Manager determines that a change in Contract Sum or contract Times is justified, Construction Manager shall issue RFP.
- D. Contractor shall submit Notices of Hazardous Waste Conditions to resolve problems regarding hazardous materials encountered in the execution of the Work. Procedures in Paragraph 4.17 of General Conditions shall be followed. If Construction Manager determines that a change in Contract Sum or contract Times is justified, Construction Manager shall issue RFP.
- E. Engineer shall issue Supplemental Instruction to the Construction Manager who shall forward onto Contractor. Contractor shall not proceed with Supplemental Instruction until Construction Manager approves it in writing.
 - 1. If Contractor is satisfied with Supplemental Instruction and does not request change in Contract Sum or Contract Times, then Supplemental Instruction shall be executed without a Change Order.
 - 2. If Contractor believes that Supplemental Instruction results in change in Contract Sum or Contract Times, Contractor shall notify Construction Manager. Construction Manager may then deny request for change, cancel Clarification or issue RFP.
- F. Responses by recipients shall be within a reasonable time.
- G. Contractor shall respond to Construction Manager's RFP within fifteen (15) working days by furnishing a complete breakdown of costs of both credits and extras; itemizing materials, labor, taxes, overhead and profit. Subcontract work shall be so indicated.
- H. Upon approval of RFP, Construction Manager will issue a Change Order directing Contractor to proceed with extra work.
- I. Payment shall be made as follows:
 - 1. Change Orders which increase Contract Sum or Contract Times shall be included in next Contract Modification Form, signed by Construction Manager, accepted by Contractor.

2. Payment shall be made for Change Order work along with other work in progress payment following completion of Change Order work. Partial completion of Change Order work shall be paid for that part completed during the period covered by the monthly payment request.

1.04 COST DETERMINATION

A. Total cost of extra work shall be the sum of labor costs, material costs, equipment rental costs and specialist costs as defined herein plus overhead and profit as allowed herein. This limit applies in all cases of claims for extra work, whether calculating Change Orders, RFIs, or calculating claims of all types, and applies even in the event of fault, negligence, strict liability, or tort claims of all kinds, including misrepresentation, concealment, strict liability or negligence. No other costs arising out of or connected with the performance of extra work, of any nature, may be recovered by Contractor. No special, incidental or consequential damages may be claimed or recovered against CLPCCD, its representatives or agents, whether arising from breach of contract, negligence or strict liability, unless specifically authorized in the Contract Documents.

B. Overhead:

1. Overhead shall be as defined in Article 1.08.

C. Taxes:

1. Alameda County Sales Tax should be included.
2. Federal and Excise Tax shall not be included.

D. Owner Operated Equipment

When owner-operated equipment is used to perform extra work, Contractor will be paid for equipment and operator as follows:

1. Payment for equipment will be made in accordance with Paragraph 1.05. C.
2. Payment for cost of labor will be made at no more than rates of such labor established by collective bargaining agreements for type of worker and location of work, whether or not owner-operator is actually covered by such an agreement.

1.05 COST BREAKDOWN

A. Labor - Contractor will be paid cost of labor for workers (including fore persons when authorized by Construction Manager) used in actual and direct performance of extra work. Labor rate, whether employer is Contractor, subcontractor or other forces, will be sum of following:

1. **Actual Wages** - Actual wages paid shall be limited to the applicable prevailing wage rate for the classification of labor actually and reasonably necessary to complete a Change. Prevailing wage rates shall be deemed to include all direct payment of wages to workers completing a Change and all employer burdens thereon, including without limitation all employer payments to or on behalf of workers for Workers Compensation, health and welfare, pension, vacation and other similar labor burdens. Contractors and subcontractors are required to provide their corresponding wage rate breakdown for the classification of labor under which they will

complete a Change and on the form provided by the Owner for review and approval by the Owner and Construction Manager prior to processing and approval of payment for any completed Change.

B. **Material** - Only materials furnished by Contractor and necessarily used in performance of extra work will be paid for. Cost of such materials will be cost, including sales tax, to purchaser (Contractor, subcontractor or other forces) from supplier thereof, except, as the following are applicable:

1. If cash or trade discount by actual supplier is offered or available to purchaser, it shall be credited to CLPCCD notwithstanding fact that such discount may not have been taken.
2. For materials salvaged upon completion of extra work, salvage value of materials shall be deducted from cost, less discount, of materials.
3. If cost of a material is, in opinion of Construction Manager, excessive, then cost of material shall be deemed to be lowest current wholesale price at which material is available in quantities concerned delivered to Site, less any discounts as provided in subparagraph 1 above.

C. **Equipment Rental**

For Contractor or subcontractor-owned equipment, payment will be made at the lesser of actual rental rates or the rental rates listed for equipment in California Department of Transportation official equipment rental rate schedule which is in effect on date upon which extra work is accomplished and which schedule is incorporated herein by reference as though fully set forth herein. For rented equipment, payment will be made based on actual rental invoices. Equipment used on extra work shall be of proper size and type. If, however, equipment of unwarranted size or type and cost is used, cost of use of equipment shall be calculated at rental rate for equipment of proper size and type. Rental rates paid shall be deemed to cover cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals. Unless otherwise specified, manufacturer's ratings, and manufacturer-approved modifications, shall be used to classify equipment for determination of applicable rental rates. Individual pieces of equipment or tools not listed in said publication and having a replacement value of five hundred dollars (\$500) or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore as payment is included in payment for labor. Rental time will not be allowed while equipment is inoperative due to breakdowns.

1. For equipment on Site, rental time to be paid for equipment shall be the time equipment is in operation on extra work being performed. The following shall be used in computing rental time of equipment:
 - a. When hourly rates are listed, less than thirty (30) minutes of operation shall be considered to be one-half (1/2) hour of operation.
 - b. When daily rates are listed, less than four (4) hours of operation shall be considered to be one-half (1/2) day of operation. Anything over four (4) hours and not more than eight (8) hours is considered one (1) full day of operation.

2. For equipment, which must be brought to Site to be used exclusively on extra work, cost of transporting equipment to Site and its return to its original location shall be determined as follows:
 - a. CLPCCD will pay for costs of loading and unloading equipment.
 - b. Cost of transporting equipment in low bed trailers shall not exceed hourly rates charged by established haulers.
 - c. Cost of transporting equipment shall not exceed applicable minimum established rates of California Public Utilities Commission.
 - d. Payment for transporting, and loading and unloading equipment as above provided will not be made if equipment is used on Work in any other way than upon extra work.
3. Rental period shall begin at time equipment is unloaded at Site of extra work and terminate at end of day on which Construction Manager directs Contractor to discontinue use of equipment. Excluding Saturdays, Sundays, and legal holidays, unless equipment is used to perform extra work on such days, rental time to be paid per day shall be four (4) hours for zero (0) hours of operation, six (6) hours for four (4) hours of operation and eight (8) hours for eight (8) hours of operation, time being prorated between these parameters. Hours to be paid for equipment, which is operated less than eight (8) hours due to breakdowns, shall not exceed eight (8) less number of hours equipment is inoperative due to breakdowns.

D. Work Performed by Special Forces or Other Special Services

When Construction Manager and Contractor, by agreement, determine that special service or item of extra work cannot be performed by forces of Contractor or those of any subcontractors, service or extra work item may be performed by specialist. Invoices for service or item of extra work on basis of current market price thereof may be accepted without complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with established practice of special service industry to provide complete itemization. In those instances wherein Contractor is required to perform extra work necessitating a fabrication or machining process in a fabrication or machine shop facility away from Site, charges for that portion of extra work performed in such facility may, by agreement, be accepted as a specialist billing. Construction Manager must be notified in advance of all offsite work. To specialist invoice price, less credit to CLPCCD for any cash or trade discount offered or available, whether or not such discount may have been taken, will be added 15 percent (15%) in lieu of overhead and profit provided in Paragraph 1.04.B.

1.06 FORCE-ACCOUNT

- A. If it is impracticable because of nature of work, or for any other reason, to fix an increase or decrease in price definitely in advance, Change Order may fix a maximum price which shall not under any circumstances be exceeded, and subject to such limitation, such alteration, modification or extra shall be paid for at actual necessary cost as determined by CLPCCD Authority, which cost shall be determined pursuant to Article 1.04, and shall be known as Force-Account work.

- B. Whenever any Force-Account work is in progress, definite price for which has not been agreed on in advance, Contractor shall report to Construction Manager each day in writing in detail amount and cost of labor and material used, and any other expense incurred in Force-Account work on preceding work day, and no claim for compensation for Force-Account work will be allowed unless report shall have been made. Daily report(s) shall be delivered to Construction Manager within one (1) business day of the day the work was performed. No late reports will be accepted. The intent is to have daily agreement on hours expended for labor and equipment on Force-Account work.
- C. Above described methods of determining payment for work and materials shall not apply to performance of work or furnishings of material, which, in judgment of Construction Manager, may properly be classified under items for which prices are established in Contract.

1.07 CLPCCD FURNISHED MATERIALS

CLPCCD reserves right to furnish materials, as it deems advisable, and Contractor shall have no claims for costs and overhead and profit on such materials.

1.08 OVERHEAD DEFINED

The following constitutes charges that are included in overhead for all contract modifications, including Force-Account work:

1. Drawings: field drawings, shop drawings, etc. including submissions of drawings
2. Routine field inspection of work proposed
3. General Superintendence
4. General administration and preparation of change orders
5. Computer services
6. Reproduction services
7. Salaries of project engineer, Construction Manager, superintendent, timekeeper, storekeeper and secretaries
8. Janitorial services
9. Temporary on-site facilities
 - a. Offices
 - b. Telephones
 - c. Plumbing
 - d. Electrical: Power, lighting
 - e. Platforms
 - f. Fencing, etc.
10. Home office expenses
11. Insurance Premium
12. Procurement and use of vehicles and fuel used coincidentally in base bid work
13. Surveying

14. Estimating
15. Protection of work
16. Final cleanup
17. Other incidental work
18. Record Drawings
19. Warranty
20. Transportation expense to site for labor

1.09 RECORDS AND CERTIFICATION

- A. Force-Account (cost reimbursement) charges shall be recorded daily upon Cost Breakdown for Contract Modification Form obtained from Inspector. Contractor or authorized representative shall complete and sign form. Inspector shall sign form for approval. Contract Modification Form shall provide names and classifications of workers and hours worked by each, itemize materials used, and also list size type and identification number of equipment, and hours operated, and shall indicate work done by specialists.
- B. No payment for Force-Account work shall be made until Contractor submits original invoices substantiating materials and specialist charges.
- C. CLPCCD shall have the right to audit all records in possession of Contractor relating to activities covered by Contractor's claims for modification of Contract, including Force-Account work, as set forth in General Conditions.
- D. Further, CLPCCD shall have right to audit, inspect, or copy all records maintained in connection with this Contract, including financial records, in possession of Contractor relating to any transaction or activity occurring or arising out of, or by virtue of, Contract. If Contractor is a joint venture, right of CLPCCD shall apply collaterally to same extent to records of joint venture sponsor, and of each individual joint venture member.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

Not applicable to this section.

**SAMPLE ONLY
COST BREAKDOWN FORM FOR CONTRACT MODIFICATION**

One separate form shall be used by Contractor, each first tier subcontractor and each lower tier subcontractor. One form for each shall be used for each change order. One form for each, for each day shall be used for Force-Account work.

**COST BREAKDOWN FOR CONTRACTOR PRICE PROPOSAL
SHEET 1 OF 3**

GENERAL CONTRACTOR FORM

PROJECT NUMBER: _____

PROJECT NAME: _____

CONTRACTOR : _____

CHANGE ORDER NUMBER : _____ **DATE:** _____

CHANGE ORDER DESCRIPTION: _____

SUMMARY OF TOTAL COSTS				
1. TOTAL LABOR COSTS				
		\$	-	
2. Fifteen percent (15%) of Line 1				
		\$	-	
3. Sum of Lines 1 & 2				
			\$	-
4. TOTAL MATERIAL COSTS				
		\$	-	
5. Fifteen percent (15%) of Line 4				
		\$	-	
6. Sum of Lines 4 & 5				
			\$	-
7. TOTAL EQUIPMENT RENTAL COSTS				
		\$	-	
8. Fifteen percent (15%) of line 7				
		\$	-	
9. Sum of lines 7 & 8				
			\$	-
10. TOTAL OF SUBCONTRACTED COST				
		\$	-	
11. Five percent (5%) of line 10 (excluding subcontractor markup)				
		\$	-	
12. Sum of Lines 10 & 11				
			\$	-
SUBTOTAL OF DIRECT COSTS & MARK-UP				\$
COST OF BONDS (does not apply to subcontractors)				\$
TOTAL OF CONTRACT MODIFICATION				\$

**COST BREAKDOWN FOR CONTRACTOR PRICE PROPOSAL
SHEET 2 OF 3**

CONTRACTOR : _____

CHANGE ORDER NUMBER : _____ DATE: _____

CHANGE ORDER DESCRIPTION: _____

LABOR				
NAME	CLASSIFICATION	HOURS	RATE	TOTAL
				\$
				\$
				\$
				\$
TOTAL LABOR COSTS (Transfers to Line 1 of Sheet 1)				\$

MATERIALS	
DESCRIPTION	COST
SUBTOTAL MATERIAL COSTS (Without Sales Tax)	\$
SALES TAX ON MATERIAL AT 9.00%	\$
TOTAL MATERIAL COSTS (Transfers to Line 4 of Sheet 1)	\$

EQUIPMENT				
SIZE AND TYPE	I.D. #	HOURS	RATE	TOTAL
				\$
				\$
				\$
				\$
TOTAL EQUIPMENT RENTAL COSTS (Transfers to Line 7 of Sheet 1)				\$

COST BREAKDOWN FORM FOR CONTRACT MODIFICATION
SHEET 3 OF 3

CHANGE ORDER NUMBER : _____ DATE: _____

CHANGE ORDER DESCRIPTION: _____

SUBCONTRACTED WORK		
SUBCONTRACTOR	DESCRIPTION OF WORK SUBCONTRACTED	COST
TOTAL COST OF SUBCONTRACTED WORK (Transfers to Line 10 of Sheet 1)		-\$

CONTRACTOR: _____ Date: _____

VERIFIED BY INSPECTOR: _____ Date: _____

SECTION 01 31 00

PROJECT COORDINATION

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Project coordination.
- B. Field engineering.
- C. Coordination drawings.
- D. Workmanship.
- E. Incidental costs.
- F. Correspondence and Notices.
- G. Miscellaneous provisions.
- H. Damage and restoration.

1.02 RELATED SECTIONS

- A. Section 011100 - Summary of Work.
- B. Section 014500 - Quality Control.
- C. Section 015000 – Temporary Facilities.
- D. Section 017000 - Contract Closeout.

1.03 PROJECT COORDINATION

- A. Coordination scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work, which are indicated diagrammatically on drawings. Follow route shown for pipes, ducts, and conduit, as closely as practicable: place runs parallel with line of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finished elements.
- E. Submit a copy of site drawing and certificate signed by the Civil Engineer that the elevations and locations of the Work of separate Sections in preparation for Substantial Completion.

- F. Coordinate completion and cleanup of Work of separate Sections in preparation for Substantial Completion.
- G. After Owner occupancy of the Site, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.04 FIELD ENGINEERING

- A. Contractor shall locate and protect survey control and reference points.
- B. Control datum for survey is that shown on drawings.
- C. Contractor shall verify setbacks and easements; confirm drawing dimensions and elevations.
- D. Provide field engineering services. Contractor shall establish lines, and levels, utilizing recognized engineering practices

1.05 COORDINATION DRAWINGS

- A. Provide information required by Engineer for preparation of coordination drawings.
- B. Review drawings prior to submission to Engineer.

1.06 WORKMANSHIP

- A. Work shall be performed by craftsmen well experienced and competent in their particular trade.
- B. Workmanship shall be thorough, finished and complete in every detail for finest quality installations as intended under these specifications.

1.07 INCIDENTAL COSTS

- A. In addition to cost associated with GC Article 6: Insurance; Indemnity; Bonds:
 - 1. Utilities: Refer to Section 01 50 00.
 - 2. Contractors and Subcontractors shall furnish at their own cost and expense all tools, consumable supplies, appliances, equipment, etc., necessary for execution of their work; and shall be responsible for care and guarding thereof.
 - 3. Contractors and Subcontractors shall be entirely responsible for professional, trade, business or other licenses required by state statute or local government.

1.08 CORRESPONDENCE AND NOTICES

- A. Clearly identify correspondence, notices and submittals with project name, subject and detailed references to drawings and specifications.
- B. Notify Inspector or the Construction Manager two (2) working days in advance of required inspection.
- C. The District's project management system (ProjectSolve) shall be utilized for document controls for RFI, Submittals, Daily Logs, etc...

1.09 MISCELLANEOUS PROVISIONS

- A. Contractor shall immediately refer to the Construction Manager any requirement shown or specified which Contractor in their experience and background finds or believes:
 - 1. Is not equal to industry standards for achieving a first quality installation as intended;
 - 2. Is excessive in cost or effort to effect the intended results;
 - 3. Is below standard for proper enforcement of the guarantees required;
 - 4. Or, is at variance with governing laws, regulations, codes or standards.
- B. Work operations relative to any matter referred to Engineer for consideration shall not proceed until receipt of appropriate instructions from Engineer.
- C. Inspection of Work and Materials: Contractor shall immediately make a close and thorough inspection of all materials as delivered and all work in progress; shall promptly reject and return all defective materials and re-do; and shall check and verify adequate performance or satisfactory results of all tests and inspections before allowing sub-work to proceed.
- D. Warranty Period: During warranty periods, supervise investigation and correction of deficiencies found or occurring in the work.
- E. Shop Fabricate and pre-assemble interrelated parts where possible.
- F. Closing up of walls, partitions or furred spaces, backfilling and other covering up operations shall not proceed until all enclosed or covered work and inspections have been completed. Verify before proceeding.
- G. Provide holes, slots, cutouts, blocking, screeds, nailers, chases and similar preparation as the work progresses, as required to receive or pass subsequent work without damage to previously completed work.
- H. Exterior Work shall be made tight against direct or indirect entry of water into the concealed or interior spaces of the building. Seal joints or penetrations below grade or behind exterior trim and other conditions where water might enter the structure, as for exposed exterior work.
- I. Structural Connections and Fasteners: Include as required for complete fabrication and installation of the work; of materials, types and sizes adequate for the purposes.
 - 1. Place in concealed or obscured locations where possible.
 - 2. Include suitable welding or brazing where required.
- J. Powder Activated Fasteners: Limited to uses particularly shown, specified or approved by Engineer. Operators shall be certified in accordance with California Industry Safety orders.
- K. Ferrous Work permanently exposed to exterior or below grade shall be galvanized; related accessory members and fastening non-ferrous, galvanized or made rustproof by approved methods.

- L. Galvanizing, prime painting and related touch-up and repair shall comply with requirements for metal fabricating and painting in Section 13125 - Relocatable Buildings.
- M. Isolation: Provide between ferrous and non-ferrous or dissimilar metal components to protect the work against electrolysis, as follows:
 - 1. For architectural work, provide cork fillers, asphaltic coatings, neoprene gaskets or similar separation as necessary; and use stainless steel fastenings only where interconnecting dissimilar parts.
 - 2. For mechanical and electrical work, provide dielectric unions or similar separation. In particular, provide isolation as necessary between exterior underground systems and interior above-grade systems where they meet dissimilar metals.
- N. Prior to starting a particular type or kind of work, examine for relevant information, all contract documents and subsequent data issued to the project.

1.10 DAMAGE AND RESTORATION

- A. Damage to previously existing or newly placed facilities caused by movement of equipment or other operations, whether accidental or made necessary by reason of Contract requirements, shall be restored or replaced as specified or directed by Engineer or Construction Manager.
- B. Restoration shall be equal to the structural qualities or performance capacities of the original work, and finishes shall match the appearance of, as nearly as possible, like existing adjacent work. Restorations shall be subject to approval by Engineer and shall be made as necessary at no added expense to Owner unless otherwise particularly provided for.
- C. Work not properly restored or where not capable of being restored as intended under these Specifications shall be removed and replaced as directed by Engineer at no added expense to Owner.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

3.01 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements, which affects:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight-exposed elements.
- C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other Work.

2. Uncover Work to install or correct ill-timed work.
 3. Remove and replace defective and non-conforming Work.
 4. Remove samples of installed Work for testing.
 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods, which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Document.
- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- J. Identify any hazardous substance or condition exposed during the Work to the Construction Manager for decision or remedy.

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART1 – GENERAL

1.01 SUMMARY

- A. This section describes the required meetings for this work. These meetings include:
 - 1. Pre-construction Conference
 - 2. Scheduling Meetings
 - 3. Progress Meetings
 - 4. Special Meetings
- B. Related Sections
 - 1. Section 01 11 00: Summary of Work
 - 3. Section 01 32 00: Progress Schedules and Reports
 - 4. Section 01 33 00: Submittals

1.02 PRECONSTRUCTION CONFERENCE

- A. Construction Manager will call for and administer Pre-construction Conference at time and place to be announced. Conference will occur as soon after award as can be reasonably scheduled.
- B. Contractor, all subcontractors, and major suppliers shall attend Pre-construction Conference.
- C. Agenda will include, but not be limited to, the following items:
 - 1. Schedules
 - 2. Personnel
 - 3. Use of the Site
 - 4. Temporary Utilities
 - 5. Location of Contractor's on-site facilities
 - 6. Project access
 - 7. Employee parking
 - 8. Security/Safety
 - 9. Housekeeping
 - 10. Submittals
 - 11. Inspection and testing procedures, on-site and off-site
 - 12. Utility shutdown procedures
 - 13. Control and reference point survey procedures

14. Injury and Illness Prevention Program
 15. Contractor's Initial CPM Schedule
 16. Contractor Invoicing, Schedule of Values, Approval Procedures
- D. Construction Manager will distribute copies of minutes to attendees. Attendees shall have five (5) working days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of the Pre-construction Conference.

1.03 SCHEDULING MEETINGS

- A. Meet with Construction Manager and Engineer on Start Date of Contract and conduct initial review of Contractor's draft Shop Drawing and Sample Submittal Schedule, and draft Schedule of Values and Initial Construction Schedule ("Schedule Review Meeting").
- B. Authorized representative in Contractor's organization, designated in writing, who will be responsible for working and coordinating with Construction Manager's representative(s) and Engineer relative to preparation and maintenance of Progress Schedule shall attend initial Schedule Review Meeting.
- C. Contractor shall, within thirty (30) days from the Notice to Proceed date, meet with Construction Manager and Engineer to review the Original CPM Schedule submittal.
1. Contractor shall have its manager, superintendent, scheduler, and key subcontractor representatives, as required by CLPCCD, in attendance. The meeting will take place over a continuous one-day period.
 2. CLPCCD's review of Schedule Submittals will be limited to conformance to Contract requirements, including, but not limited to, coordination requirements. However, review may also include:
 - a. Clarifications of Contract Requirements
 - b. Directions to include activities and information missing from submittal
 - c. Requests to Contractor to clarify its schedule
 3. Within five (5) days of the initial Schedule Review Meeting, Contractor shall respond in writing to all questions and comments expressed by CLPCCD at the meeting.
- D. Construction Manager will administer scheduling meetings and shall distribute minutes of scheduling meetings to attendees. Attendees shall have five (5) working days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of the scheduling meetings.

1.04 PROGRESS MEETINGS

- A. Construction Manager and Engineer will schedule and administer Progress Meetings throughout duration of Work. Progress meetings will be held fortnightly unless otherwise directed by Construction Manager.
1. Meetings shall be held at Construction Manager's on-site office unless otherwise directed by Construction Manager.

2. Construction Manager will prepare agenda and distribute to Contractor, Inspector and Engineer 24 hours in advance of meeting.
 3. Construction Manager will preside at meeting.
 4. Engineer will record and distribute minutes to Contractor, Inspector, Construction Manager, all other participants, and those affected by decisions made at meeting, within three (3) working days after meeting. Attendees shall have five (5) working days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of progress meetings.
- B. Progress Meetings shall be attended by Contractor's job superintendent, major subcontractors and suppliers, when requested by Construction Manager or as appropriate, Construction Manager, Engineer, Inspector and others as appropriate to agenda topics for each meeting.
- C. Agenda will contain the following items as appropriate:
1. Review of work progress
 2. Status of Construction Schedule, adjustments
 3. Submittals
 4. Delivery schedules
 5. Utility shutdowns, traffic disruptions, and interferences with public scheduled during the subsequent 2 weeks
 6. Quality control
 7. Pending changes
 8. Substitutions
 9. Review of Contractor's safety program activities and results, including report on all serious injury and/or damage accidents
 10. Safety
 11. Other items affecting progress of work
- D. A separate meeting will be held on approximately the 25th of each month to review the schedule update submittal and progress payment application.
1. At this meeting, at a minimum, the following items will be reviewed:
 - a. percent complete of each activity
 - b. time impact evaluations for Change Orders and Time Extension Request
 - c. actual and anticipated activity sequence changes
 - d. actual and anticipated duration changes
 - e. actual and anticipated contractor delays
 2. These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, these meetings shall be attended by Contractor's General Superintendent and Scheduler.
 3. Contractor shall plan on progress meetings taking no less than four (4) hours.

1.05 SPECIAL MEETINGS

- A. Special meetings may be called by any party by notifying all desired participants, Construction Manager, Engineer, and Inspector four (4) working days in advance, giving reason for meeting. Special Meetings may be held without advance notice in emergency situations.
- B. At any time during the progress of the Work, CLPCCD shall have authority to require Contractor to attend conference of any or all of the contractors engaged in the Work or in other work, and notice of such conference shall be duly observed and complied with by Contractor.
- C. Contractor shall schedule and conduct coordination meetings as necessary to discharge coordination responsibilities in the General Conditions. Construction Manager shall be given five (5) days written notice of coordination meetings. Contractors shall maintain minutes of coordination meetings. Attendees shall have five (5) working days to submit comments or additions to minutes. Minutes will constitute final memorialization of results of the meetings.
- D. Pre-installation meetings of manufactures' warranty scope of work, i.e., roofing, water-proofing, curtain wall, etc.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01 32 00

PROGRESS SCHEDULES AND REPORTS

PART 1 – GENERAL

1.01 SUMMARY

- A. Scheduling of Work under this Contract shall be performed by Contractor in accordance with requirements of this Section.
1. Development of schedule, cost and manpower loading of the schedule and schedule updates, monthly payment requests and project status reporting requirements of the Contract shall employ computerized Critical Path Method (CPM) scheduling.
 2. Submit schedules and reports as specified in General Conditions.
- B. Upon Award of Contract, Contractor shall immediately commence development of Initial and Original CPM Schedules to ensure compliance with CPM schedule submittal requirements.
- C. Related Sections:
1. Section 01 11 00: Summary of Work
 2. Section 01 33 00: Submittals
- D. Definitions: The following definitions apply to this section:
- ACTIVITY:** A task, event or other project element on a schedule that contributes to completing the project. Activities have a description, start date, finish date, duration and one or more logic ties.

BASELINE SCHEDULE: The initial schedule representing the Contractor's work plan on the first day of the project.

CRITICAL PATH: The longest continuous chain of activities for the project that has the least amount of total float of all chains. In general, a delay on the critical path will extend the scheduled completion date.

CRITICAL PATH METHOD (CPM): A network based planning technique using activity durations and the relationships between activities to mathematically calculate a schedule for the entire project.

DATA DATE: The day after the date through which a schedule is current. Everything occurring earlier than the data date is "as-built" and everything on or after the data date is "planned".

EARLY COMPLETION TIME: The difference in time between an early scheduled completion date and the contract completion date.

FLOAT: The difference between the earliest and latest start or finish times for an activity.

MILESTONE: An event activity that has zero duration and is typically used to represent the beginning or end of a certain stage of the project.

NARRATIVE REPORT: A document submitted with each schedule that discusses topics related to project progress and scheduling.

NEAR CRITICAL PATH: A chain of activities with total float exceeding that of the critical path but having no more than 14 calendar days of total float.

SCHEDULED COMPLETION DATE: The planned project finish date shown on the current accepted schedule.

SUBSTANTIAL COMPLETION: The stage in the progress of the work when the work is complete in accordance with the Contract Documents, so that District can occupy or use the work for its intended purpose.

TIME IMPACT ANALYSIS: A schedule and narrative report developed specifically to demonstrate what effect a proposed change or delay has on the current scheduled completion date.

TIME-SCALED NETWORK DIAGRAM: A graphic depiction of a CPM schedule comprised of activity bars with relationships for each activity represented by arrows. The tail of each arrow connects to the activity bar for the predecessor and points to the successor.

TOTAL FLOAT: The amount of time that an activity or chain of activities can be delayed before extending the scheduled completion date.

UPDATED SCHEDULE: A current schedule developed from the baseline or subsequent schedule through regular monthly review to incorporate as-built progress and any planned changes.

1.02 QUALIFICATIONS

- A. Contractor shall employ experienced scheduling personnel qualified to use the latest version of Primavera Project Planner or Microsoft Project scheduling software. Experience level required is set forth below. Contractor may employ such personnel directly or may employ a consultant for this purpose. After bid opening, the apparent successful low bidder shall provide CLPCCD a written verification that Contractor has the required personnel under its employ or that Contractor will employ the required CPM scheduling consultant.
1. The written statement shall identify individual who will perform CPM scheduling.
 2. Capability and experience shall be verified by description of construction projects on which individual has successfully applied computerized CPM.
 3. Required level of experience shall include at least two projects of similar nature, scope and value not less than three-fourths the Total Bid Price of this Project. The written statement shall provide contact persons for referenced projects with current telephone and address information.
- B. CLPCCD reserves right to approve Contractor's scheduler, or consultant, and right to reject them at any time. CLPCCD also reserves right to refuse replacement of Contractor's scheduler or consultant, if it believes such replacement will negatively affect Contract.

1.03 GENERAL

- A. Progress Schedule shall be based on and incorporate milestones and completion dates specified in Contract Documents. Submit to the Owner baseline, monthly updated, and final updated schedules, each consistent in all respects with the time and order of work requirements of the contract. Work must be executed in the sequence indicated on the current accepted schedule. Schedules must show the order in which you propose to execute the work with logical links between time-scaled work activities and calculations made using the critical path method to determine the controlling activities. You are responsible for assuring that all activity sequences are logical and that each schedule shows a coordinated plan for complete performance of the work.
- B. Overall time of completion and time of completion for each milestone shown on Progress Schedule shall adhere to times as stated in Contract Agreement, unless an earlier (advanced) time of completion is requested by Contractor and agreed to by CLPCCD. Any such agreement shall be formalized by a Change Order.
1. CLPCCD is not required to accept an earlier (advanced) schedule, i.e., one that shows early completion dates for the Contract Times.

2. Contractor shall not be entitled to extra compensation in the event agreement is reached on an earlier (advanced) schedule and Contractor completes its Work, for whatever reason (excepting approved changes with added time components) beyond completion date shown in earlier (advanced) schedule but within the Contract Times.
 3. A schedule showing the work completed in less than the Contract Times, which has been accepted by CLPCCD, shall be considered to have Project Float. The Project Float is the time between the scheduled completion of the work and Contract Substantial Completion. Project Float is a resource available to both CLPCCD and the Contractor.
- C. Float Ownership: Neither CLPCCD nor Contractor owns float. The Project owns the float. As such, liability for delay of the Substantial Completion Date rests with the party whose actions, last in time, actually cause delay to the Substantial Completion Date.
1. For example, if Party A uses some, but not all of the float and Party B later uses remainder of the float as well as additional time beyond the float, Party B shall be liable for the time that represents a delay to the Substantial Completion Date.
 2. Party A would not be responsible for the time since it did not consume the entire float and additional float remained; therefore, the Substantial Completion Date was unaffected.
- D. Progress Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests associated with the changes. Responsibility for developing Contract CPM schedule and monitoring actual progress as compared to Progress Schedule rests with Contractor.
- E. The Owner's review and acceptance of schedules does not waive any contract requirements and does not relieve Contractor of any obligation or responsibility for submitting complete and accurate information. Correct rejected schedules and resubmit corrected schedules to the Owner within seven (7) days of notification by the Owner, at which time a new review period of seven (7) days will begin.
- Errors or omissions on schedules do not relieve Contractor from finishing all work within the time limit specified for completion of the contract. If, after a schedule has been accepted by the Owner, either the Contractor or the Owner discovers that any aspect of the schedule has an error or omission, it must be corrected on the next updated schedule.
- F. Use Microsoft Project for Windows or Primavera P6. Such software shall be compatible with Windows operating system. Contractor shall transmit contract schedule files to CLPCCD on CD-ROM or flash drive at times requested by CLPCCD.
- G. Transmit each item under form approved by CLPCCD.
1. Identify Project with CLPCCD Contract number and name of Contractor and file by date, project, and update number.
 2. Provide space for Contractor's approval stamp and CLPCCD's review stamps.
 3. Submittals received from sources other than Contractor will be returned to the Contractor without CLPCCD's review.

1.04 INITIAL CRITICAL PATH METHOD (CPM) SCHEDULE

- A. Initial CPM Schedule submitted for review at the pre-construction conference shall serve as Contractor's schedule for up to ninety (90) calendar days after the Notice to Proceed.
- B. Indicate detailed plan for the Work to be completed in first sixty (60) days of the Contract; details of planned mobilization of plant and equipment; sequence of early operations; and procurement of materials and equipment. Show Work beyond sixty (60) calendar days in summary form.
- C. Initial CPM Schedule shall be time-scaled.

- D. Initial CPM Schedule shall be cost and manpower loaded. Accepted cost and manpower-loaded schedule will be used as basis for monthly progress payments until acceptance of the Original CPM Schedule. Use of Initial CPM Schedule for progress payments shall not exceed sixty (60) calendar days.
- E. CLPCCD and Contractor shall meet to review and discuss the Initial CPM Schedule within seven (7) calendar days after it has been submitted to CLPCCD.
 - 1. CLPCCD's review and comment on the schedule shall be limited to Contract conformance (with sequencing, coordination, and milestone requirements) and accepted CPM principals.
 - 2. Contractor shall make corrections to schedule necessary to comply with Contract requirements and shall adjust schedule to incorporate any missing information requested by CLPCCD. Contractor shall resubmit Initial CPM Schedule if requested by CLPCCD.
- F. If, during the first sixty (60) days after Notice-to-Proceed, the Contractor is of the opinion that any of the Work included on its Initial CPM Schedule has been impacted, the Contractor shall submit to CLPCCD a written Time Impact Evaluation (TIE) in accordance with Article 1.09 of this Section. The TIE shall be based on the most current update of the Initial CPM Schedule.

1.05 ORIGINAL CRITICAL PATH METHOD (CPM) SCHEDULE

- A. Submit a detailed proposed Original CPM Schedule presenting an orderly and realistic plan for completion of the Work, in conformance with requirements as specified herein.
- B. The baseline schedule must not extend beyond the number of contract days. The baseline schedule must have a data date of the first working day of the contract and not include any completed work to date. The baseline schedule must not attribute negative float or negative lag to any activity.
- C. Progress Schedule shall include or comply with following requirements:
 - 1. Time scaled, cost and manpower loaded CPM schedule.
 - 2. No activity on schedule shall have duration longer than twenty-one (21) calendar days, with exception of submittal, approval, fabrication and procurement activities, unless otherwise approved by CLPCCD.
 - a. Activity durations shall be total number of actual days required to perform that activity.
 - b. Activity coding capabilities to sort by responsibility, location, phase and CSI division.
 - 3. The start and completion dates of all items of Work, their major components, and milestone completion dates, if any.
 - 4. CLPCCD-furnished materials and equipment, if any, identified as separate activities.
 - 5. Completion of the last activity in the schedule shall be constrained by the contract completion date. Schedule calculations shall result in a negative float when the calculated early finish date of the last activity is later than the contract completion date. The Contractor shall include as the last activity in the project schedule an activity called "Final Completion". The "Final Completion" activity shall have an "LF" constraint date equal to the contract completion date for the project, and with a zero day duration or by using the "project must finish by" date in the scheduling software. The schedule shall have no constrained dates other than those specified in the contract. The use of artificial float constraints such as "zero free float" or "zero total float" are typically prohibited. There shall only be two (2) open ended activities: Start Project (or NTP) with no predecessor logic and Final Completion with no successor logic.
 - 6. Processing/approval of submittals and shop drawings for all Contract-required material and equipment. Activities that are dependent on submittal acceptance or material delivery shall not be scheduled to start earlier than expected acceptance or delivery dates.

- a. Include time for submittals, resubmittals, and reviews by CLPCCD. Coordinate with accepted schedule for submission of shop drawings, samples and other submittals.
 - b. Contractor shall be responsible for all impacts resulting from resubmittal of shop drawings and submittals.
 7. Procurement of all contract required material and equipment, identified as separate activity.
 - a. Include time for fabrication and delivery of manufactured products for the Work.
 - b. Show dependencies between procurement and construction.
 8. Complete activity description; what Work is to be accomplished and where.
 9. The total cost of performing each activity shall be total of labor, material, equipment, excluding overhead and profit of Contractor. Total overhead and profit of the General Contractor shall be shown on a separate activity in the schedule. Sum of cost for all activities shall equal total Contract value.
 10. Resources required (labor) to perform each activity.
 11. Responsibility code for each activity corresponding to Contractor or Subcontractor responsible for performing the Work.
 12. Identify the activities, which constitute the controlling operations or critical path. No more than twenty-five (25%) of the activities shall be critical or near critical. Near critical is defined as float in the range of one (1) to ten (10) days.
 13. At least twenty-eight (28) calendar days for developing punch list(s), completion of punch list items and final clean-up for the Work or any designated portion thereof. No other activities shall be scheduled during this period.
 14. Interface with the work of other contractors, CLPCCD, and agencies such as, but not limited to, utility companies.
 15. Show detailed Subcontractor Work activities. In addition, furnish copies of Subcontractor schedules upon which CPM was built.
 - a. Also furnish for each Subcontractor, as determined by CLPCCD, submitted on Subcontractor letterhead a statement certifying that Subcontractor concurs with Contractor's Original CPM Schedule and that Subcontractor's related schedules have been incorporated, including activity duration, cost and resource loading.
 - b. Subcontractor schedules shall be independently derived and not a copy of Contractor's schedule.
 - c. In addition to Contractor's schedule and resource loading, obtain from electrical, mechanical and plumbing Subcontractors, and other Subcontractors as required by CLPCCD, productivity calculations common to their trades, such as units per person day, feet of pipe per day per person, feet of wiring per day per person, and similar information.
 - d. Furnish schedule for Contractor/Subcontractor CPM Schedule meetings which shall be held prior to submission of Original CPM Schedule to CLPCCD. CLPCCD shall be permitted to attend scheduled meetings as an observer.
 16. Activity durations shall be in calendar days.
 17. Submit with the schedule a list of anticipated non-Work days, such as weekends and holidays.
- D. Original CPM Schedule Review Meeting: Contractor shall, within thirty (30) calendar days from the Notice to Proceed date, meet with CLPCCD to review the Original CPM Schedule submittal.

1. Contractor shall have its Construction Manager, Project Superintendent, Project Scheduler, and key Subcontractor representatives, as required by CLPCCD, in attendance. The meeting will take place over a continuous one-day period.
2. CLPCCD's review will be limited to submittal's conformance to Contract requirements, including, but not limited to, coordination requirements. However, review may also include:
 - a. Accepted critical path method principles and tenets.
 - b. Clarifications of Contract Requirements.
 - c. Directions to include activities and information missing from submittal.
 - d. Requests to Contractor to clarify its schedule.
3. Within five (5) days of the Schedule Review Meeting, Contractor shall respond in writing to all questions and comments expressed by CLPCCD at the Meeting.

1.06 ADJUSTMENTS TO CRITICAL PATH METHOD (CPM) SCHEDULE

- A. Adjustments to Original CPM Schedule: Contractor shall have adjusted the Original CPM Schedule submittal to address all review comments from original CPM Schedule review meeting and resubmit network diagrams and reports for CLPCCD's review.
 1. CLPCCD, within fourteen (14) days from date that Contractor submitted the revised schedule, will either:
 - a. accept schedule and cost and resource loaded activities as submitted, or
 - b. advise Contractor in writing to review any part or parts of schedule which either do not meet Contract requirements or are unsatisfactory for CLPCCD to monitor Project's progress, resources and status or evaluate monthly payment request by Contractor.
 2. CLPCCD may accept schedule with conditions that the first monthly CPM schedule update be revised to correct deficiencies identified.
 3. When schedule is accepted, it shall be considered as the "Original CPM Schedule" which will then be immediately updated to reflect the current status of the work.
 4. CLPCCD reserves the right to require Contractor to adjust, add to, or clarify any portion of schedule which may later be discovered to be insufficient for monitoring of Work or approval of partial payment requests. No additional compensation will be provided for such adjustments, additions, or clarifications.
- B. Acceptance of Contractor's schedule by CLPCCD will be based upon schedule's compliance with Contract requirements and accepted CPM principles.
 1. By way of Contractor assigning activity durations and proposing sequence of Work, Contractor agrees to utilize sufficient and necessary management and other resources to perform work in accordance with the schedule.
 2. Upon submittal of schedule update, updated schedule shall be considered "current" CPM schedule.
 3. Submission of Contractor's schedule to CLPCCD shall not relieve Contractor of total responsibility for scheduling, sequencing, and pursuing Work to comply with requirements of Contract Documents, including adverse effects such as delays resulting from ill-timed work.
- C. Submittal of Original CPM Schedule, and subsequent schedule updates, shall be understood to be Contractor's representation that the Schedule meets requirements of Contract Documents and that Work shall be executed in sequence indicated on the schedule.

- D. Contractor shall distribute Original CPM Schedule to Subcontractors for review and written acceptance, which shall be noted on Subcontractors' letterhead to Contractor and transmitted to CLPCCD for the record.

1.07 MONTHLY CPM SCHEDULE UPDATE SUBMITTALS

- A. Following acceptance of Contractor's Original CPM Schedule, Contractor shall monitor progress of Work and adjust schedule each month to reflect actual progress and any pre-approved changes to planned activities or logic.
 - 1. Each schedule update submitted shall be complete, including all information requested for the Original CPM Schedule submittal.
 - 2. Each update shall continue to show all work activities including those already completed. These completed activities shall accurately reflect "as built" information by indicating when activities were actually started and completed.
- B. A meeting will be held on approximately the twenty-fifth (25th) of each month to review the schedule update submittal and progress payment application.
 - 1. At this meeting, at a minimum, the following items will be reviewed: Percent complete of each activity; time impact evaluations for Change Orders and Time Extension Request; anticipated activity sequence changes; anticipated duration changes; actual and anticipated contractor delays.
 - 2. These meetings are considered a critical component of overall monthly schedule update submittal and Contractor shall have appropriate personnel attend. At a minimum, these meetings shall be attended by Contractor's General Superintendent and Scheduler.
 - 3. Contractor shall plan on the meeting taking no less than four (4) hours.
- C. Within seven (7) calendar days after monthly schedule update meeting, Contractor shall submit the updated CPM Schedule update.
- D. Within seven (7) calendar days of receipt of above noted revised submittals, CLPCCD will either accept or reject monthly schedule update submittal.
 - 1. If accepted, percent complete shown in monthly update will be basis for Application for Payment by the Contractor. The schedule update shall be submitted as part of the Contractor's Application for Payment.
 - 2. If rejected, update shall be corrected and resubmitted by Contractor before the Application for Payment is submitted.
- E. Updating, changing or revising of any report, curve, schedule or narrative submitted to CLPCCD by Contractor under this Contract, nor CLPCCD's review or acceptance of any such report, curve, schedule or narrative shall not have the effect of amending or modifying, in any way, the Contract Substantial Completion date or milestone dates or of modifying or limiting, in any way, Contractor's obligations under this Contract.
- F. Final Updated Schedule. Submit final updated, as-built schedule with actual start and finish dates for the activities, within 30 days after completion of contract work. Provide a written certificate with this submittal signed by your Project Manager or an officer of the company stating, "To my knowledge and belief, the enclosed final update schedule reflects that actual start date and finish dates of the actual activities for the project contained herein". An officer of the company may delegate in writing the authority to sign the certificate to a responsible manager.

1.08 SCHEDULE REVISIONS

- A. Updating the Schedule to reflect actual progress shall not be considered revisions to the Schedule. Since scheduling is a dynamic process, revisions to activity durations and sequences are expected on a monthly basis.

- B. To reflect revisions to the schedule, the Contractor shall provide CLPCCD with a written narrative with a full description and reasons for each Work activity revised. For revisions affecting the sequence of work, the Contractor shall provide a schedule diagram which compares the original sequence to the revised sequence of work. The Contractor shall provide the written narrative and schedule diagram for revisions two (2) working days in advance of the monthly schedule update meeting.
- C. Schedule revisions shall not be incorporated into any schedule update until the revisions have been reviewed by CLPCCD. CLPCCD may request further information and justification for schedule revisions and Contractor shall, within three (3) days, provide CLPCCD with a complete written narrative response to CLPCCD's request.
- D. If the Contractor's revision is still not accepted by CLPCCD, and the Contractor disagrees with CLPCCD's position, the Contractor has seven (7) calendar days from receipt of CLPCCD's letter rejecting the revision, to provide a written narrative providing full justification and explanation for the revision. The Contractor's failure to respond in writing within seven (7) calendar days of CLPCCD's written rejection of a schedule revision shall be contractually interpreted as acceptance of CLPCCD's position, and the Contractor waives its rights to subsequently dispute or file a claim regarding CLPCCD's position.
- E. At CLPCCD's discretion, the Contractor can be required to provide subcontractor certifications of performance regarding proposed schedule revisions affecting said subcontractors.

1.09 RECOVERY SCHEDULE

- A. If the Schedule Update shows a substantial completion date fourteen (14) calendar days beyond the Contract Substantial Completion date, or individual milestone completion dates, the Contractor shall submit to CLPCCD the proposed revisions to recover the lost time within seven (7) calendar days. As part of this submittal, the Contractor shall provide a written narrative for each revision made to recapture the lost time. If the revisions include sequence changes, the Contractor shall provide a schedule diagram comparing the original sequence to the revised sequence of work.
- B. The revisions shall not be incorporated into any schedule update until the revisions have been reviewed by CLPCCD.
- C. If the Contractor's revisions are not accepted by CLPCCD, CLPCCD and the Contractor shall follow the procedures in paragraph 1.08.C, 1.08.D and 1.08.E above.
- D. At CLPCCD's discretion, the Contractor can be required to provide subcontractor certifications for revisions affecting said subcontractors.

1.10 TIME IMPACTS EVALUATION (TIE) FOR CHANGE ORDERS, AND OTHER DELAYS

- A. Time Impact Analysis (TIA). Submit a written TIA to the Owner with each request for adjustment of contract time, or when the Contractor or the Owner considers that an approved or anticipated change may impact the critical path or contract progress.
The TIA must illustrate the impacts of each change or delay on the current scheduled completion date or internal milestone, as appropriate. The analysis must use the accepted schedule that has a data date closest to and before the event. If the Owner determines that the accepted schedule used does not appropriately represent the conditions before the event, the accepted schedule must be updated to the day before the event being analyzed. The TIA must include an impact schedule developed from incorporating the event into the accepted schedule by adding or deleting activities, or by changing durations or logic of existing activities. If the impact schedule shows that incorporating the event modifies the critical path and scheduled completion date of the accepted schedule, the difference between scheduled completion dates of the two schedules must be equal to the adjustment of contract time. The Owner may construct and use an appropriate project schedule or other recognized method to determine adjustments in contract time until the Contractor provide the TIA.

- B. Contractor shall be required to comply with the requirements of Paragraph 1.09.A for all types of delays such as, but not limited to, Contractor/Subcontractor delays, adverse weather delays, strikes, procurement delays, fabrication delays, etc.
- C. Contractor shall be responsible for all costs associated with the preparation of Time Impact Evaluations, and the process of incorporating them into the current schedule update. The Contractor shall provide CLPCCD with 4 copies of each TIE.
- D. Once agreement has been reached on a TIE, the Contract Times will be adjusted accordingly. If agreement is not reached on a TIE, the Contract Times may be extended in an amount CLPCCD allows, and the Contractor may submit a claim for additional time claimed by Contractor.

1.11 TIME EXTENSIONS

- A. The Contractor is responsible for requesting time extensions for time impacts that, in the opinion of the Contractor, impact the critical path of the current schedule update. Notice of time impacts shall be given in accord with Articles 1.12 and 1.15 of Contract Document General Conditions.
- B. Where an event for which CLPCCD is responsible impacts the projected Substantial Completion date, the Contractor shall provide a written mitigation plan, including a schedule diagram, which explains how (e.g., increase crew size, overtime, etc.) the impact can be mitigated. The Contractor shall also include a detailed cost breakdown of the labor; equipment and material the Contractor would expend to mitigate CLPCCD caused time impact. The Contractor shall submit its mitigation plan to CLPCCD within fourteen (14) calendar days from the date of discovery of said impact. The Contractor is responsible for the cost to prepare the mitigation plan.
- C. Failure to request time, provides TIE, or provides the required mitigation plan will result in Contractor waiving its right to a time extension and cost to mitigate the delay.
- D. No time will be granted under this Contract for cumulative effect of changes.
- E. CLPCCD will not be obligated to consider any time extension request unless requirements of Contract Documents are complied with.
- F. Failure of the Contractor to perform in accordance with the current schedule update shall not be excused by submittal of time extension requests.
- G. If the Contractor does not submit a TIE within the required fourteen (14) calendar days for any issue, it is mutually agreed that the Contractor does not require a time extension for said issue.

1.12 SCHEDULE REPORTS

- A. Submit four (4) copies of the following reports with the Initial CPM Schedule, the Original CPM Schedule, and each monthly update.
- B. Required Reports:
 - 1. Two (2) activity-listing reports: one sorted by activity number and one by total float. These reports shall also include each activity's early/late and actual start and finish dates, original and remaining duration, float, responsibility code and the logic relationship of activities.
 - 2. Cost report sorted by activity number including each activity's associated cost, percentage of Work accomplished, earned value to-date, previous payments and amount earned for current update period.
 - 3. Schedule plots presenting time scaled network diagram showing activities and their relationships with the controlling operations or critical path clearly highlighted.
 - 4. Cash flow report calculated by early start, late start and indicating actual progress. Provide an exhibit depicting this information in graphic form.
- C. Furnish CLPCCD with report files in CD ROM and containing all Microsoft Project .mpp or Primavera .xer schedule files along with report files.

1.13 PROJECT STATUS REPORTING

- A. In addition to submittal requirements for CPM scheduling identified in this Section, Contractor shall provide a monthly project status report (i.e., written narrative report) to be submitted in conjunction with each CPM Schedule as specified herein. Status reporting shall be in form specified below.
- B. Contractor shall prepare monthly written narrative reports of status of Project for submission to CLPCCD. Written status reports shall include:
 - 1. Transmittal letter
 - 2. Work completed during the period, percent complete of activities
 - 3. Identification of unusual conditions or restrictions regarding labor, equipment or material: including multiple shifts, 6-day work weeks, specified overtime or work at times other than regular days or hours
 - 4. Description of the current critical path
 - 5. Changes to the critical path and scheduled completion date since the last schedule submittal
 - 6. Description of problem areas
 - 7. Current and anticipated delays:
 - 7.1 Cause of delay
 - 7.2 Impact of delay on other activities, milestones and completion dates
 - 7.3 Corrective action and schedule adjustments to correct the delay
 - 8. Contractor may include any other information pertinent to status of Project. Contractor shall include additional status information requested by CLPCCD at no additional cost.
 - 9. Status reports, and the information contained therein, shall not be construed by the Contractor as claims, notice of claims, notice of delay, or requests for changes or compensation.

1.14 WEEKLY SCHEDULE REPORT

At the Weekly Progress Meeting, the Contractor shall provide and present a time scaled four (4) week schedule one (1) week behind and three (3) week look ahead schedule that is based and correlated by activity number to the current schedule (i.e., Initial, Original CPM, or Schedule Update).

1.15 DAILY CONSTRUCTION REPORTS

On a daily basis, Contractor shall submit a daily activity report to CLPCCD for each workday, including weekends and holidays, when worked. Contractor shall develop the daily construction reports on a computer generated database capable of sorting daily Work, manpower and man-hours by Contractor, Subcontractor, area, sub area, and change order work. Upon request of CLPCCD, furnish computer disk of this database. Obtain CLPCCD's written approval of daily construction report database format prior to implementation. Include in report:

- A. Project name and Project number.
- B. Contractor's name and address.
- C. Weather, temperature and any unusual site conditions.
- D. Brief description and location of the day's scheduled activities and any special problems and accidents, including Work of Subcontractors. Descriptions shall be referenced to CPM scheduled activities.
- E. Worker quantities for its own Work force and for Subcontractors of any tier.
- F. Equipment, other than hand tools, utilized by Contractor and Subcontractors.

1.16 PERIODIC VERIFIED REPORTS

The Contractor shall complete and submit the Final Verified Report required by DSA. In addition to other conditions precedent to Final Payment, the Contractor's completion and submission of the Final Verified Report is an express condition precedent to the District's obligation to make the Final Payment. In addition to completion and submission of the Final Verified Report, as a material obligation under the Contract Documents, the Contractor shall comply all DSA requests for reports or other data relating to the Work, the status thereof or conformity of the Work to the Contract Documents.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

Not applicable to this section.

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURE

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals including:
 - 1. Procedures
 - 2. Schedule of Shop Drawing and Sample Submittals
 - 3. Safety Plan
 - 4. Progress Schedule
 - 5. Product Data
 - 6. Shop Drawings
 - 7. Samples
 - 8. Quality Control Submittals
 - 9. Design Data
 - 10. Test Reports
 - 11. Certificates
 - 12. Manufacturers' Instructions
 - 13. Machine Inventory Sheets Operations and Maintenance Manuals Computer Programs
 - 14. Project Record Documents
 - 15. LEED Submittals

1.3 RELATED SECTIONS

- A. Section 01 11 00: Summary of Work.
- B. Section 01 26 00: Contract Modification Procedures.
- C. Section 01 32 00: "Progress Schedules and Reports" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
- D. Section 01 70 00: Contract Closeout
- E. Section 01 78 00: Project Record Documents.

1.4 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Engineer's responsive action.
- B. Informational Submittals: Written information that does not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.5 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings are always through Engineer for Contractor's use in preparing submittals. Files are used as background use only.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Construction Manager's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 15 work days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Construction Manager will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Sequential Review: Where sequential review of submittals by Engineer's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
- E. Submit at own expense, one (1) electronic PDF set- Schedule of Shop Drawing and Sample Submittals, Safety Plans, Progress Schedule, Product Data, Shop Drawings, Samples, Quality Control Data, Machine Inventory Sheets, Operations and Maintenance Manuals, Computer Programs, and Project Record Documents required by the Contract Documents.
- F. Transmit each item with a standard letter of transmittal in form approved by Construction Manager.
- G. Identify project, Contractor, subcontractor, major supplier, pertinent drawing sheet and detail number, and specification section number as appropriate. Provide space for Contractor, Construction Manager and Engineer review stamps.
- H. Where manufacturer's standard drawings or data sheets are used, they shall be marked clearly to show those portions of the data, which are applicable to this project.
- I. Submit Shop Drawings, Samples and other submittals to Construction Manager for review and approval by Engineer in accordance with accepted schedule of Shop Drawings and Samples submittals. If no such schedule is agreed upon, then all Shop Drawing, Samples and product data submittals shall be completed within ninety (90) days after receipt of Notice to Proceed from CLPCCD.
- J. The data shown on the Shop Drawings shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show Engineer the materials and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes specified below. Samples shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which it is intended and otherwise as Engineer may require enabling Engineer to review the submittal. The number of each Sample to be submitted will be as specified in the Specifications.

- K. At the time of each submission, Contractor shall give Construction Manager, Engineer, and Inspector specific written notice of all variations, if any; that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, and the reasons therefore. This written notice shall be in a written communication separate from the submittal. In addition, Contractor shall cause a specific notation to be made on each Shop Drawing and Sample submitted to Construction Manager for review and approval of each such variation by Engineer. The Engineer may make adjustments to submittals that may result in changes to the contract. The appropriate change order request should be prepared by the Contractor within ten (10) days of receipt of submittals.
- L. If CLPCCD accepts deviation, CLPCCD shall issue appropriate Contract Modification.
- M. Submittal coordination and verification is responsibility of Contractor; this responsibility shall not be delegated in whole or in part to subcontractors or suppliers. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:
1. All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto;
 2. All materials with respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work; and
 3. All information relative to Contractor's sole responsibilities and of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.
- N. Contractor shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.
- O. Contractor's submission to Construction Manager of a Shop Drawing or Sample submittal will constitute Contractor's representation that it has satisfied its obligations under the Contract Documents, and as set forth immediately above, with respect to Contractor's review and approval of that submittal.
- P. Designation of work "by others", if shown in submittals, shall mean that work will be responsibility of Contractor rather than subcontractor or supplier who has prepared submittals.
- Q. After review by Engineer of each of Contractor's submittals, one electronic set will be returned to Contractor with actions defined as follows:
1. NO ACTION TAKEN – Submittal is unreviewed.
 2. NO EXCEPTIONS TAKEN - Accepted subject to its compatibility with future submittals and additional partial submittals for portions of the work not covered in this submittal. Does not constitute approval or deletion of specified or required items not shown on the submittal.
 3. MAKE CORRECTIONS NOTED (NO RESUBMISSIONS REQUIRED) - Same as 2. above, except that minor corrections as noted shall be made by Contractor.
 4. REVISE AND RESUBMIT - Rejected because of major inconsistencies or errors which shall be resolved or corrected by Contractor prior to subsequent review by Engineer.
 5. REJECTED (RESUBMIT) - Submitted material does not conform to Plans and Specifications in major respect, i.e.: wrong size, model, capacity, or material.
- R. It is considered reasonable that Contractor shall make a complete and acceptable submittal at least by second submission.
1. CLPCCD reserves the right to deduct monies from payments due Contractor to cover additional costs of Engineer's review beyond the second submission. Illegible submittals will be rejected and returned to Contractor for resubmission.
- S. Favorable review will not constitute acceptance by CLPCCD or Engineer of any responsibility for the accuracy, coordination and completeness of the submittals. Accuracy, coordination, and completeness of Submittals shall be sole responsibility of Contractor, including responsibility to back check comments, corrections, and modifications from CLPCCD's or Engineer's review before

fabrications. Submittals may be prepared by Contractor, subcontractors, or suppliers, but Contractor shall ascertain that submittals meet requirements of Contract Documents, while conforming to structural space and access conditions at point of installation. Engineer's review will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Favorable review of submittal, method of work, or information regarding materials and equipment Contractor proposes to furnish shall not relieve Contractor of responsibility for errors therein and shall not be regarded as assumption of risks or liability by Engineer or CLPCCD, or any officer or employee thereof, and Contractor shall have no claim under Contract on account of failure or partial failure or inefficiency or insufficiency of any plan or method of work or material and equipment so accepted. Favorable review shall be considered to mean merely that Engineer or CLPCCD has no objection to Contractor using, upon his own full responsibility, plan or method of work proposed, or furnishing materials and equipment proposed.

- T. Engineer's review will not extend the means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
- U. Submit complete initial submittal for those items where required by individual specification Sections. Complete submittal shall contain sufficient data to demonstrate that items comply with Specifications, shall meet minimum requirements for submissions cited in technical specifications, shall include motor data and seismic anchorage certifications, where required, and shall include necessary revisions required for equipment other than first named. If Contractor submits incomplete initial submittal, when complete submittal is required, submittal may be returned to Contractor without review.
- V. It shall be Contractor's responsibility to copy, conform and distribute reviewed submittals in sufficient numbers for Contractor's files, subcontractors and vendors.
- W. After Engineer review of submittal, revise and resubmit as required. Identify changes made since previous submittal.
 - 1. Begin no fabrication or work, which require submittals until return of submittals not requiring resubmittal.
 - 2. Normally, submittals will be processed and returned to Construction Manager within fifteen (15) working days of receipt by Engineer. The processing time spent to review submittals by Construction Manager shall be in addition to the fifteen (15) days.
 - 3. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

1.6 SCHEDULE OF SHOP DRAWING, DSA DEFERRED APPROVAL SUBMITTALS AND SAMPLE SUBMITTALS

- A. Submit preliminary Schedule of Shop Drawing and Sample Submittals as required by General Conditions. Submit one (1) electronic PDF of final and accepted schedule of submittals of shop drawings and samples as required by General Conditions, and in no event later than thirty (30) days following Notice of Award.
- B. Schedule of Shop Drawing and Sample Submittals will be used by Engineer to schedule their activities relating to review of submittals. Schedule of submittals shall indicate a spreading out of submittals and early submittals of long lead-time items and of items, which require extensive review.
- C. Schedule of Shop Drawing and Sample Submittals shall be reviewed by Construction Manager and shall be revised and resubmitted until accepted by Construction Manager.

- D. DSA Deferred Approval Submittals shall be prepared for review by the Engineer within 30 days of receipt of Notice to Proceed. Contractor shall promptly make corrections to documents for Engineer to submit to DSA for approval. Contractor shall have the sole responsibility for obtaining DSA approval via the Engineer's office for all deferred approval submittals in a timely manner. There will be no time extensions granted for delay in obtaining such approval.

1.7 SAFETY PLAN

- A. Submit one (1) electronic PDF of Safety Plan specific to this Contract to Construction Manager within fifteen (15) calendar days after Start Date of the Contract Time.
- B. No on-site work shall be started until Safety Plan has been reviewed and accepted by CLPCCD. Acceptance of Safety Plan shall not affect Contractor's responsibility for maintaining a safe working place and instituting safety programs in connection with project in full compliance with local, state and federal regulations.

1.8 PROGRESS SCHEDULE

- A. Schedule all items requiring Engineer action for submission during first 25 percent of construction period.
- B. See Section 01 32 00 "Progress Schedules and Reports" for schedule and report requirements.
- C. Submit one (1) electronic report file in PDF format, and either Microsoft Project .mpp or Primavera .xer schedule program files:
 - 1. Initial CPM Schedule at the Pre-construction Conference.
 - 2. Original CPM Schedule within thirty (30) days of Notice to Proceed (NTP).
 - 3. Adjustments to the CPM Schedule as required.
 - 4. CPM Schedule updates monthly, five (5) days prior to monthly progress meeting.
- D. Submit one (1) electronic PDF copy of the reports listed in Section 01 32 00 "Progress Schedules and Reports" with:
 - 1. Initial CPM Schedule
 - 2. Original CPM Schedule
 - 3. Each monthly Schedule update
 - 4. Each weekly three (3) week look ahead Schedule
- E. Progress Schedules and Reports shall be submitted electronically, in addition to hard copies as specified above.

1.9 QUALITY CONTROL SUBMITTALS

- A. Design Data: Not applicable.
- B. Test Reports: Three (3) copies minimum. One (1) copy will be marked with Engineer's review comments and returned to Contractor.
 - 1. Indicate that material or product conforms to or exceeds specified requirements.
 - 2. Reports may be from recent or previous tests on material or product, but must be acceptable to Construction Manager. Comply with requirements of each individual specification Section.
- C. Certificates: Three (3) copies minimum. One (1) copy will be marked with Engineer's review comments and returned to Contractor.
 - 1. Indicate that material or product conforms to or exceeds specified requirements.
 - 2. Submit supporting reference data, affidavits, and certifications as appropriate.

3. Certificates may be recent or from previous test results on material or product, but must be acceptable to Construction Manager.
- D. Manufacturers' Instructions: Three (3) copies minimum. One (1) copy will be marked with Engineer's review comments and returned to Contractor.
1. Include manufacturer's printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing.
 2. Identify conflicts between manufacturer's instructions and Contract Documents.

1.10 COMPUTER PROGRAMS

- A. When any equipment requires operation by computer programs, submit copy of program on CD(s) plus all user manuals and guides for operating the programs and making changes in the programs for upgrading and expanding the databases. Provide required licenses to CLPCCD at no additional cost.
1. Include at least three (3) years prepaid software license renewals, which includes software upgrades and updates.

1.11 PROJECT RECORD DOCUMENTS

- A. Submit one copy of each of the Project Record Documents listed in Section 01 70 00 Contract Closeout.

1.12 DELAY OF SUBMITTALS

- A. Delay of submittals by Contractor is considered avoidable delay. Liquidated damages incurred because of late submittals will be assessed to the Contractor.

PART 2 - PRODUCTS

2.1 SUBMITTALS

- A. Within fifteen (15) calendar days after Start Date of the Contract Time submit two (2) copies and one (1) electronic PDF of complete list of substitutions of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. Contractor shall be responsible for and make all submissions.
1. Submit items specified herein to Engineer and Construction Manager.
 2. Submit all submittals through the Construction Manager's Electronic Submittal Program.
 3. Identify each transmittal using the 6-digit specification number, i.e., metal handrails might be numbered 05 5000, along with an individual submittal number for each section number. Submittal numbers shall be sequential. If returning submittal "12" for re-submission, second submission would be identified as "12A". Should submittal be rejected multiple times (12b, 12c, etc), the Contractor may be required to reimburse the Owner/Engineer for labor to review subsequent submissions.
 4. Develop, for maintenance by the Construction Manager, a schedule of all submittals and their status. Refer to Paragraph 1.3 below. The schedule will be reviewed each week at the project meeting.
- C. Transmittals, shop drawings, or samples submitted to Engineer shall have the Contractor's stamp on it with his signature and be marked "approved." Contractor's stamp on these items indicates that Contractor has performed the following:

1. Verified field dimensions and quantities.
 2. Verified field construction criteria, materials, catalog numbers and similar data.
 3. Reviewed and coordinated submittal data with requirements of the Work and the Contract Documents.
 4. ITEMS NOT STAMPED BY THE CONTRACTOR WILL BE RETURNED UNREVIEWED.
- D. Indicate any item, component, material or portion of Work, which deviates from Contract Documents. Unless such departures are accepted as indicated in paragraph "Review" below, such departures will not be permitted.
- E. Make submittals sufficiently in advance of data required to allow Engineer reasonable time for review and additional resubmission and review cycles if necessary.
1. Items submitted without Contractor's review stamp will be returned, without action, for resubmission.
 2. Items not submitted in accordance with provisions of this Section will be returned, without action, for resubmission.
 3. Submissions on items not approved for use by specifications or addenda will be rejected.
 4. Drawings transmitted by other than the Prime Contractor will be returned to the Prime Contractor without action of any kind. Drawings will not be returned to subcontractors.

2.2 SUBMITTALS – PRODUCT DATA

- A. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.
- B. Tabulate products by specification section number.
- C. Supplemental Data:
1. Submit number of copies, which Contractor requires, plus three (3) copies, which will be retained by Construction Manager.
 2. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to Project.
- D. Provide copies for Project Record Documents described in Section 01 70 00 Contract Closeout.

2.3 SUBMITTALS - SHOP DRAWINGS

- A. Identify drawings with manufacturer, item, use, type, project designation, specification section or drawing detail reference.
- B. Minimum Sheet Size: 8-1/2 inches by 11 inches. All others: Multiples of 8-1/2 inches by 11 inches, 34 inches by 44 inches maximum.
- C. For 8-1/2 inch by 11 inch and 11 inch by 17-inch sheets, submit number of copies, which contractor requires plus three (3) copies, which will be retained by Construction Manager.
- D. For 17 inch by 22 inch through 34 inch by 44-inch sheets, submit one [1] electronic and a minimum of three [3] prints. After review, reproduce and distribute.
- E. Original sheet or reproducible transparency will be marked with Engineer's review comments and returned to Contractor.
- F. Each sheet/copy must include project name and project number and bid number on all sheets.
- G. Mark each copy to identify applicable Products, models, options, and other data; supplement manufacturers' standard data to provide information unique to Work.

- H. Include manufacturers' installation instructions when required by specification section.
- I. Submit a copy of the Shop Drawing Transmittal Form with each submittal and resubmittal.

2.4 SUBMITTALS - SAMPLES

- A. Identify samples with manufacturer's name, item, use, type, project designation, specification section or drawing detail reference, color, range, texture, finish and other pertinent data.
 - 1. Submit samples to illustrate functional and aesthetic characteristics of Product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.
- B. Submit full range of manufacturers' standard colors, textures, and patterns for Construction Manager's selection.
- C. Submit a minimum of three (3) samples unless otherwise specified in the construction documents.
- D. Sizes: Unless otherwise specified, provide the following:
 - 1. Paint Chips: Manufacturers' standard
 - 2. Flat or Sheet Products: Minimum 6 inches square, maximum 12 inches square
 - 3. Linear Products: Minimum 6 inches, maximum 12 inches long
 - 4. Bulk Products: Minimum 1 pint, maximum 1 gallon
- E. Full size samples may be used in Work upon approval.
- F. Mock-ups:
 - 1. Erect field samples and mock-ups at Project site in accordance with requirements of Specification sections.
 - 2. Modify or make additional field samples and mock-ups as required to provide appearance and finishes approved by Construction Manager.
 - 3. Approved field samples and mock-ups may be used in Work upon approval.
- G. Engineer may, at his option, retain samples for comparison purposes until completion of Work.
 - 1. Samples will be returned or may be used in the Work unless the technical section specifically indicates otherwise.
 - 2. Remove samples when directed.
 - 3. Pay all costs of furnishing or constructing, and removing samples.
- H. Resubmit samples of rejected items.
- I. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.
- J. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION**3.1 CONTRACTOR'S REVIEW**

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer and Construction Manager.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER REVIEW

- A. General: Engineer and Construction Manager will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Engineer and Construction Manager will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer and Construction Manager will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- C. Reproduce and distribute submittals that the Engineer reviews and stamps as follows, to indicate the action taken:
 - 1. Reviewed: Where submittal is marked "Reviewed," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
 - 2. Reviewed -- Additional Information Required: Where submittal is marked "Reviewed -- Additional Information Required," the information submitted has been reviewed and approved as noted. However, additional information as noted and/or required by Contract Documents needs to be submitted.
 - 3. Make Corrections As Noted: When submittal is marked "Furnish As Corrected," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
 - 4. Submit Specified Item: When submittal is marked "Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.
 - 5. Rejected: When submittal is marked "Rejected," information submitted is not in compliance with Contract Documents. Resubmit submittal as required by Contract Documents.
- D. Contractor shall retain 1 copy of each "Reviewed," "Reviewed -- Additional Information Required" or "Furnish as Corrected" submittal on file at the job site.
- E. Engineer shall retain 1 copy of each "Reviewed," "Reviewed -- Additional Information Required" or "Furnish as Corrected" submittal in the project file.
- F. Contractor shall resubmit items stamped "Revise and Resubmit" or "Rejected" by Engineer.
 - 1. Provide a print of previous drawing with resubmission for comparison.
 - 2. Add letter suffix to previous transmittal number, to indicate resubmission.
 - 3. It shall be the Contractor's responsibility to assure that previously approved documents are destroyed when they are superseded by a resubmittal.

- G. Engineer review is general and does not:
 - 1. Permit departure from Contract Documents.
 - 2. Relieve Contractor from responsibility for errors in detail, in dimensions or related items.
 - 3. Approve departure from previous instructions or details.
 - 4. Relieve Contractor of the responsibility to provide all components, wiring, etc., required to make item operable or usable.
 - 5. Imply acceptance of items for which no data is submitted.
- H. For items constituting a departure from Contract Documents see Section 01 2500.
- I. Reviewed samples submitted or constructed and approved by Engineer constitute criterion for judging completed work. Finish work or items not equal to samples will be rejected.
- J. Start of work which requires submittals, prior to return of submittals with Engineer or Owner's stamp indicating review and approval is at Contractor's risk.

3.3 DISTRIBUTION

- A. Contractor shall copy and distribute all "Reviewed," "Reviewed -- Additional Information Required" or "Furnish as Corrected" submittals, including one copy to the Owner.

- END OF SECTION -

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

This section includes regulatory requirements applicable to Contract.

1.02 REFERENCES TO REGULATORY REQUIREMENTS

- A. Codes, laws, ordinances, rules and regulations referred to shall have full force and effect as though printed in full in these specifications.
- B. Conform to referenced codes, laws, ordinances, rules and regulations, which are in effect on date of receipt of bids.

1.03 CODES

Codes, which apply to Contract, include, but are not limited to, the following:

2019 California Administrative Code (CAC), Part 1, Title 24 CCR*
2019 California Building Code (CBC), Part 2, Title 24 CCR
(2018 International Building Code, Vol. 1 & 2, and 2019 California amendments)
2019 California Electrical Code (CEC), Part 3, Title 24 CCR
(2017 National Electrical Code and 2019 California Amendments)
2019 California Mechanical Code (CMC), Part 4, Title 24 CCR
(2018 IAPMO Uniform Mechanical Code and 2019 California amendments)
2019 California Plumbing Code (CPC), Part 5, Title 24 CCR
(2018 IAPMO Uniform Plumbing Code and 2019 California amendments)
2019 California Energy Code (CEC), Part 6, Title 24 CCR
2019 California Fire Code (CFC), Part 9, Title 24 CCR
(2018 International Fire Code and 2019 California Amendments)
2019 California Existing Building Code (CEBC), Part 10, Title 24 CCR
(2018 International Existing Building Code and 2019 California Amendments)
2019 California Green Building Standards Code (CALGreen), Part 11, Title 24 CCR
2019 California Referenced Standards Code, Part 12, Title 24 CCR
Title 19 CCR, Public Safety, State Fire Marshal Regulations

1.04 LAWS, ORDINANCES, RULES AND REGULATIONS

- A. During prosecution of Work to be done under Contract, comply with applicable laws, ordinances, rules and regulations, including, but not limited to, the following:
- B. Federal
 - 1. Americans With Disabilities Act
 - 2. 29 CFR, Section 1910.1001, Asbestos
 - 3. 40 CFR, Subpart M, National Emission Standards for Asbestos
 - 4. Executive Order 11246
- C. State of California
 - 1. California Code of Regulations, Titles 5, 8, 19, 21, 24
 - 2. California Education Code
 - 3. California Public Contract Code

4. California Health and Safety Code
 5. California Government Code
 6. California Labor Code
 7. California Civil Code
 8. California Code of Civil Procedure
 9. CPUC General Order 95, Rules for Overhead Electric Line Construction
 10. CPUC General Order 128, Rules for Construction of Underground Electric Supply and Communications Systems
- D. State of California Agencies
- Bay Area Air Quality Management District (BAAQMD / www.baaqmd.gov)
- State and Consumer Services Agency
- Department of General Services
- Division of the State Architect Office of the State Fire Marshall Office of Public School Construction
- E. Local Agencies:
- City of Livermore, California (www.cityoflivermore.net)

1.06 COMPLIANCE WITH AMERICANS WITH DISABILITIES ACT

- A. Contractor acknowledges that, pursuant to the Americans with Disabilities Act (ADA), programs, services and other activities provided by a public entity to the public, whether directly or through a contractor, must be accessible to the disabled public. Contractor shall provide the services specified in this Agreement in a manner that complies with the ADA and any and all other applicable federal, state and local disability rights legislation. Contractor agrees not to discriminate against disabled persons in the provision of services, benefits or activities provided under this Agreement and further agrees that any violation of this prohibition on the part of Contractor, its employees, agents or assigns shall constitute a material breach of this Agreement.

PART 2 – PRODUCTS

Not applicable.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

SECTION 01 41 10

REGULATORY REQUIREMENTS – HAZARDOUS WASTE

PART 1 – GENERAL

1.01 SUMMARY

- A. This section includes regulatory requirements applicable to Contract work in connection with hazardous waste abatement and disposal, including, but not limited to, asbestos and asbestos containing materials, lead based paint, polychlorinated biphenyls, petroleum contaminated soils and materials, construction and demolition debris and any other hazardous substance or hazardous waste.
- B. This section supplements Section 01 41 00 and the work specific listings of applicable regulatory requirements elsewhere in the specifications.
- C. Related Sections.
 - 1. Section 01 41 00: Regulatory Requirements.

1.02 REFERENCES TO REGULATORY REQUIREMENTS

- A. Codes, laws, ordinances, rules and regulations applicable to the Work shall have full force and effect as though printed in full in these specifications. Codes, laws, ordinances, rules and regulations are not furnished to Contractor, since Contractor is assumed to be familiar with their requirements. The listing herein of applicable codes, laws and regulations for hazardous waste abatement work is supplied to Contractor as a courtesy and shall not limit Contractor's responsibility for complying with all applicable laws, regulations or ordinances having application to the Work. Where conflict among the requirements or with these specifications exists, the most stringent requirements shall be used.
- B. Contractor's work shall conform to all applicable codes, laws, ordinances, rules and regulations that are in effect on date of receipt of bids.

1.03 LAWS, ORDINANCES, RULES AND REGULATIONS

- A. During prosecution of Work under Contract, Contractor shall comply with applicable laws, ordinances, rules and regulations, including, but not limited to, those listed below.
- B. Federal:
 - 1. Statutory Requirements:
 - a. Resource Conservation and Recovery Act, 42 U.S.C.. 6901 et seq.
 - b. Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, 42 U.S. C" 9601 et seq.
 - c. Toxic Substances Control Act of 1976, 15 U.S.C.. 2601 et seq.
 - d. Hazardous Materials Transportation Act of 1975, 49 U.S. C" 1801 et seq.
 - e. Clean Water Act, 33 U.S.C.. 1251 et seq.
 - f. Safe Drinking Water Act, 42 U.S. C.. 3001 et seq.

- g. Clean Air Act, section 112, 42 U.S. C.. 7412
 - h. Occupational Safety and Health Act of 1970, 29 U.S.C.. 651 et seq.
 - i. Underground Storage Tank Law, 42 U.S. C.. 6991 et seq.
 - j. The Emergency Planning and Community Right to Know Act of 1986,42 U.S.C.. 11001 et seq.j.
2. Environmental Protection Agency (EPA):
- a. 40 C.F.R. Parts. 260, 264, 265, 268, 270
 - b. 40 C.F.R. Parts 258 et seq.
 - c. 40 C.F.R. Part 761
 - d. 40 C.F.R. Parts 122-124
3. Occupational Safety and Health Administration (OSHA):
- a. OSHA Worker Protection Standards, Title 29 CFR Part 1926.58, Construction Standards and 29 CFR 1910.1001 General Industry Standard
 - b. OSHA, 29 C. F. R. Part 1926.1101, Construction Standards for Asbestos
 - c. OSHA, Lead Exposure in Construction: Interim Final Rule, 29 C.F.R. 1926.62
 - d. National Emission Standard for Hazardous Air Pollutants, Title 40 CFR Part 61
 - e. Asbestos Hazardous Emergency Response Act, Title 40 C.F.R. 763
4. Department of Transportation:
- a. Title 49 C.F.R. 173.1090
 - b. Title 49 C.F.R.172
 - c. Title 49 C.F.R. 173
 - d. DOT, HM 181 and MH126f
- C. State of California Requirements:
1. Statutory Law:
- a. The Carpenter-Presley-Tanner Hazardous Substance Account Act, Cal. Health & Safety. Cod~ 25300 et seq.
 - b. Health and Safety Cod~ 25359.4
 - c. Hazardous Waste Control Law, Health & Safety Code. 25100 § seq.
 - d. Porter Cologne Water Quality Control Act, Cal. Water Cod~ 13000 et seq.
 - e. Health and Safety Cod~ 25915-25924
 - f. Cal. Labor Code Chapter 6, including, without limitation,. 6382, 6501.5-6501.9,6503.5, 9021.5, 9080
 - g. Cal. Bus. and Prof. Code, including without limitation,. 7058.5, 7065.01, 7118.5. Underground Storage of Hazardous Substance Act,
 - h. Cal. Health & Safety. Cod~ 25280 § seq.

- i. Petroleum Underground Storage Tank Cleanup, Health and Safety Cod~ 25299.10 et seq.
- j. Safe Drinking Water and Toxic Enforcement Act of 1986, Health & Saf. Cod~ 25249.5 et seq.(Proposition 65)
- k. Above Ground Petroleum Storage Act, Health and Safety Code. 25270 et seq.
2. Hazardous Materials Release Response Plans and Inventory, California Health and Safety Code Chapter 6.95.
3. Administrative Code and Regulations:
 - a. 22 C.C.R.. 6600 et seq.
 - b. Title 22 C.C.R.. Standards for Management of Hazardous and Extremely Hazardous Waste
 - c. DTSC Treatment Standard for PCB Wastes, Title 22 C.C.R.,. 66268.110
 - d. Cal OSHA Worker Protection Standards, Title 8 C.C.R.. 1529, 5208
 - e. Title 8 C. C. R.. 1532.1, Lead in Construction
 - f. 22 C.C.R.. 66999(b)
 - g. Title 23 C.C.R.. 2610 et seq.
4. Local Agency Requirements:
 - a. Bay Area Air Quality Management District, Fugitive Dust Rules
 - b. Bay Area Air Quality Management District Regulation 11-2-303
 - c. State Water Resource Control Board, General Construction Activity Stormwater Permit Requirements (Order 92-0S DWQ)
5. City Requirements:
 - a. Hayward Fire Department (www.haywardcal.us/fire_dept/fd.htm)
 - b. Ordinances

1.04 PERMITS

- A. Contractor shall comply with, implement or acknowledge effectiveness of all CLPCCD held permits, and initiate and cooperate in securing all required notifications or approvals therefore, including but not limited to permits affecting environmental work and the following:
 1. BAAQMD, Permit to Excavate or Treat Contaminated Soil;
 2. State Water Resources Control Board, General Construction Activity Stormwater Permit

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01 42 00**REFERENCES AND DEFINITIONS****PART 1 – GENERAL****1.01 SUMMARY**

- A. This section includes reference standards, abbreviations, symbols and definitions used in Contract Documents.
- B. Full titles and edition dates are given in this section for standards cited in other sections of Specifications.
- C. Material and workmanship specified by reference to number, symbol, or title of specific standard such as state standard, commercial standard, federal specifications, technical society, or trade association standard, or other similar standard shall comply with requirements of standards except when more rigid requirements are specified or required by applicable codes.
- D. Standards referred to, except as modified herein, shall have full force and effect as though printed in the Contract Documents. Standards are not furnished to Contractor, since manufacturers and trades involved are assumed to be familiar with their requirements.

**1.02 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES;
REPORTING AND RESOLVING DISCREPANCIES:**

- A. Reference to standards, specifications, manuals or codes of any technical society, organization or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard, specification, manual, code or laws or regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated in the Contract Documents.
- B. If during the performance of the Work, Contractor discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual or code or of any instruction of any supplier, Contractor shall report it in writing at once to Inspector, with copies to Construction Manager and Engineer, and Contractor shall not proceed with the Work affected thereby until consent to do so is given by the Construction Manager.
- C. Except as otherwise specifically stated in the Contract Documents or as may be provided by Change Order, or supplemental instruction, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity or discrepancy between the Contract Documents and:
 - 1. The provisions of any such standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
 - 2. The provisions of any such laws or regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such law or regulation).

No provision of any such standard, specification, manual, code or instruction shall be effective to change the duties and responsibilities of CLPCCD, Contractor, Construction Manager, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents, nor shall it be effective to assign to CLPCCD, Engineer, Construction Manager, or any of their consultants, agents or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

1.03 STANDARDS

- A. ACI (American Concrete Institute)
 - Standard 318, Building Code Requirements for Reinforced Concrete
- B. AISC (American Institute of Steel Construction)
 - Specifications and Code of Standard Practice for Steel Buildings and Bridges
- C. ANSI (American National Standards Institute, formerly American Standards Association)
 - Standard C2, NESC (National Electrical Safety Code)
- D. ASTM (American Society for Testing and Materials)
 - 1. C31, Making and Curing Concrete Test Specimens in the Field
 - 2. C42, Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
 - 3. C143, Test Method for Slump of Portland Cement Concrete
- E. IAPMO (International Association of Plumbing and Mechanical Officials)
- F. ICC (International Code Council)
 - 1. Refer to Section 01 41 00 – Regulatory Requirements
- G. NEMA (National Electric Manufacturer's Association)
- H. NFPA (National Fire Protection Association)
 - 1. Pamphlet 1, Fire Prevention Code
 - 2. Pamphlet 13, Sprinkler Systems, Installation
 - 3. Pamphlet 24, Private Fire Service Mains
 - 4. Pamphlet 70, NEC (National Electric Code)
 - 5. Pamphlet 71, Signaling Systems, Central Station
 - 6. Pamphlet 80, Fire Doors and Windows
 - 7. Pamphlet 101, Life Safety Code
- I. UL (Underwriters' Laboratories, Inc.)

1.04 ABBREVIATIONS

- A. Following abbreviations may be used in Contract Documents:

AAP	Affirmative Action Program
ACI	American Concrete Institute
ADA	American Disabled Act
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute (formerly American Standards Association)
ASI	Architect's Supplemental Instructions
ASTM	American Society for Testing and Materials
BIL	Basic Insulation Level
Cal/OSHA	California Occupational Safety and Health Administration
CCD	Construction Change Directive
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CO	Change Order

CPUC	California Public Utilities Commission
CPM	Critical Path Method
DSA	Division of State Architect
HVAC	Heating, Ventilating and Air Conditioning
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
I.D.	Identification
JATC	Joint Apprenticeship Training Committee
JV	Joint Venture
Kw	Kilowatt
LBE	Local Business Enterprise
MBE	Minority Business Enterprise
M/WBE	Minority and Woman-Owned Business Enterprise
ml	milliliter
mm	millimeter
NEC	National Electric Code
NEMA	National Electric Manufacturer's Association National Electrical Safety Code
NFPA	National Fire Protection Association
PM	Preventive Maintenance
PR	Proposal Request
RFI	Request for Information
RFS	Request for Substitution
SFM	State of California, Office of State Fire Marshal
CBC	California Building Code
CFC	California Fire Code
UL	Underwriters' Laboratories, Inc.
CMC	California Mechanical Code
CPC	California Plumbing Code
WOBE	Woman-Owned Business Enterprise
WMBE	Woman/Minority Business Enterprise

B. Additional abbreviations, used only on drawings, are listed thereon.

1.05 SYMBOLS

Symbols, used only on Drawings, are shown thereon.

1.06 DEFINITIONS

A. Wherever any of the words or phrases defined below, or a pronoun used in place thereof, is used in any part of the Contract Documents, it shall have the meaning here set forth:

ADDENDA: Written or graphic instruments issued prior to the opening of Bids, which clarify, correct or change the bidding requirements or the Contract Documents. Addenda shall not include the minutes of the Pre-bid Conference and Site Visit.

ADDITIVE BID: The sum to be added to the Base Bid if the change in scope of work as described in Additive Bid is accepted by CLPCCD.

AGREEMENT: Agreement is the basic contract document that binds the parties to construction Work. Agreement defines relationships and obligations between CLPCCD and Contractor and by reference incorporates Conditions of Contract, Drawings, and Specifications and contains Addenda and all Modifications subsequent to execution of Contract.

ALTERNATE: Work added to or deducted from the Base Bid, if accepted by CLPCCD.

APPROVED EQUAL: Approved in writing by CLPCCD as being of equivalent quality, utility and appearance.

ARCHITECT or ARCHITECT/ENGINEER: The person holding a valid California State Architect's license, whose firm has been designated within the Contract Documents as the Architect to provide architectural services on the project. Refer to Section 341, Part 1, Title 24, C. C. R.

When the Architect is referred to within the Contract Documents and no Architect has in fact been designated, then the matter shall be referred to CLPCCD. The term Architect shall be construed to include all its consultants retained for the project, as well as employees of the Architect. When the designated Architect is an employee of CLPCCD, his authorized representations on the project within the district will be included under the term Architect.

BID: The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

BIDDER: One who submits a Bid.

CLPCCD: Chabot-Las Positas Community College District. Unless otherwise expressly indicated or required by the context of usage, the terms "District" and "Owner" as used in the Contract Documents shall be deemed references to CLPCCD.

CLPCCD-FURNISHED, CONTRACTOR-INSTALLED: Items furnished by CLPCCD at its cost for installation by Contractor at its cost under this Contract.

CLPCCD REPRESENTATIVE(S): The person or persons assigned by CLPCCD to be CLPCCD's representatives or, if so designated, agent(s) at the site.

BY CLPCCD: Work that will be performed by CLPCCD or its agents at the CLPCCD's expense.

BY OTHERS: Work that is outside scope of Work to be performed by Contractor under this Contract, which will be performed by CLPCCD, other contractors, or other means.

CHANGE ORDER: A written instrument prepared by CLPCCD and signed by CLPCCD and Contractor, stating their agreement upon all of the following:

- a. a change in the Work,
- b. the amount of the adjustment in the Contract Sum, if any, and
- c. the amount of the adjustment in the Contract Time, if any.

As appropriate, change orders are subject to approval by the Division of the State Architect. Refer to section 4-338, Part 1, Title 24, California Code of Regulations.

CONCEALED: Work not exposed to view in the finished Work, including within or behind various construction elements.

CONTRACT CONDITIONS: Conditions of Contract define basic rights, responsibilities and relationships of Contractor and CLPCCD and consists of two parts: General Conditions and Supplementary Conditions.

- a. General Conditions are general clauses, which are common to the CLPCCD Contracts.
- b. Supplementary conditions modify or supplement General Conditions to meet specific requirements for this Contract.

CONSTRUCTION MANAGER: CLPCCD's authorized representative, who shall represent CLPCCD in all matters relative to this Contract. Construction Manager may authorize agents and representatives to act in carrying out Construction Manager's duties, including a "Project

Manager", to act under the authority of the Construction Manager. As CLPCCD's agent, the Construction Manager is the beneficiary of all contract obligations of Contractor to CLPCCD, including without limitation, all releases and indemnities. Construction Manager shall not have any personal liability arising from this Contract or any activity there under and Contractor releases Construction Manager fully from all loss, cost, damage, expense or liability arising out of or connected with this Project, whether arising from contract, negligence or tort claims of all kinds.

CONTRACT DOCUMENTS: Contract Documents shall consist of the documents identified as the Contract Documents in Contract Agreement, plus all changes, addenda and modifications thereto.

CONTRACT MODIFICATION: Either:

- a. a written amendment to Contract signed by Contractor and CLPCCD; or
- b. a Change Order; or
- c. a written directive for a minor change in the Work issued by CLPCCD.

CONTRACT SUM: The sum stated in the Agreement and, including authorized adjustments, the total amount payable by CLPCCD to Contractor for performance of the Work and the Contract Documents. (Also referred to as the CONTRACT PRICE.)

CONTRACT TIMES: The number or numbers of days or the dates stated in the Agreement (i) to achieve substantial completion of the Work or designated milestones and/or (ii) to complete the Work so that it is ready for final payment and is accepted.

CONTRACTOR: The person or entity identified as such in the Agreement and referred to throughout the Contract Documents as if singular in number and neuter in gender. The term "Contractor" means the Contractor or its authorized representative.

CONTRACTOR'S EMPLOYEES: Persons engaged in execution of Work under Contract as direct employees of Contractor, as subcontractors, or as employees of subcontractors.

DATE OF SUBSTANTIAL COMPLETION: Date of Substantial Completion of Work or designated portion thereof is date certified by Construction Manager when construction is sufficiently complete in accordance with Contract Documents for CLPCCD to occupy Work or designated portion thereof for its use for which it is intended.

DAY: One calendar day, unless the word "day" is specifically modified to the contrary.

DEDUCTIVE BID: The sum to be subtracting to the Base Bid if the change in scope of work as described in Deductive Bid is accepted by CLPCCD.

DEFECTIVE: An adjective which, when modifying the word "Work", refers to Work that is unsatisfactory or unsuited for the use intended, faulty, or deficient, that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents (including but not limited to approval of samples and "or equal" items), or has been damaged prior to final payment (unless responsibility for the protection thereof has been assumed by CLPCCD). Construction Manager is the judge of whether Work is defective.

DRAWINGS: The graphic and pictorial portions of Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

ENGINEER: Where referenced in the Contract Documents, the person holding a valid California State Engineer's license, whose firm has been designated (if any designated) within the Contract

Documents as the Engineer to provide engineering services on the project. Refer to section 4-341, Part 1, Title 24, C.C.R.

EQUAL: Equal in opinion of Engineer. Burden of proof of equality is responsibility of Contractor.

EXPOSED: Work exposed to view in the finished Work, including behind louvers, grilles, registers and various other construction elements.

FINAL ACCEPTANCE or FINAL COMPLETION: All Work satisfactorily completed in accordance with Contract Documents. It includes, but is not limited to:

- a. All Systems having been tested and accepted as having met requirements of Contract Documents.
- b. All required instructions and training sessions having been given by Contractor.
- c. All as-built drawings and operations and maintenance manuals and Machine Inventory Sheets having been submitted by Contractor, reviewed by Engineer and accepted by CLPCCD.
- d. All punch list work, as directed by CLPCCD, having been completed by Contractor.
- e. Generally all work, except Contractor maintenance after Final Acceptance, having been completed to satisfaction of CLPCCD.

FORCE-ACCOUNT: Work directed to be performed without prior agreement as to lump sum or unit price cost thereof, and which is to be billed at cost for labor, materials, equipment, taxes, and other costs, plus a specified percentage for overhead and profit.

FURNISH: Supply only, do not install.

INDICATED: Shown or noted on the Drawings.

INSPECTOR: The person engaged by CLPCCD to inspect the workmanship, materials, or manner of construction of buildings or portions of buildings, to determine if such construction complies with the Contract Documents and applicable codes. The inspector is subject to approval by the Engineer, CLPCCD and, as appropriate, Division of the State Architect, and he will report to CLPCCD. Refer to section 4-333 and section 4-342, Part 1, Title 24, California Code of Regulations. The terms "Inspector" and "Project Inspector" are used interchangeably in the Contract Documents.

INSTALL: Install or apply only, do not furnish.

LATENT: Not apparent by reasonable inspection, including but not limited to, the inspections and research required as a condition to bidding under the General Conditions.

MATERIAL OR MATERIALS: These words shall be construed to embrace machinery, manufactured articles, materials of construction (fabricated or otherwise), and any other classes of material to be furnished in connection with Contract, except where a more limited meaning is indicated by context.

MILESTONE: A principal event specified in Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all Work.

MODIFICATION: Same as Contract Modification.

NOT IN CONTRACT: Work that is outside the scope of work to be performed by Contractor under this Contract.

NOTICE OF AWARD: A written notice given by CLPCCD to lowest responsive, responsible bidder advising that Bidder's bid and other qualifying information is acceptable to CLPCCD, requiring Bidder to fulfill the requirements of Article 1.03 of Document 00600 General Conditions.

NOTICE TO PROCEED: A written notice given by CLPCCD to Contractor fixing the date on which the Contract Time will commence to run and on which contractor shall start to perform Contractor's obligations under the Contract Documents.

OFF SITE: Outside geographical location of the Project.

OWNER: Chabot Las Positas Community College District (CLPCCD).

PROGRESS REPORT: a periodic report submitted by Contractor to CLPCCD with progress payment invoices accompanying actual work accomplished to the Project Schedule. See Section 01310 Progress Schedules and Reports, Document 00600 General Conditions.

PROJECT: Total construction of which Work performed under this Contract may be whole or part.

PROJECT MANUAL: Project Manual consists of Bidding Requirements, Agreement, Bonds, Certificates, Contract Conditions, and Specifications. The Project Manual is deemed to include and incorporate all matters noted in any Addenda issued by or on behalf of the District during the bidding for the Work.

PROJECT STABILIZATION AGREEMENT: The Contractor or Subcontractor (CONTRACTOR) on this project accepts and agrees to be bound by the terms and conditions of the "Chabot-Las Positas Project Stabilization Agreement", together with any and all amendments and supplements now existing or which are later made by executing the Letter of Assent.

PROVIDE: Furnish and install.

REQUEST FOR INFORMATION (RFI): A document prepared by Contractor, CLPCCD or Engineer requesting information from one of the parties regarding the Project or Contract Documents. The RFI system is also a means for CLPCCD and Engineer to submit Contract Document clarifications or supplements to Contractor.

RFI-REPLY: A document consisting of supplementary details, instructions or information issued by the Engineer, which clarifies or supplements Contract Documents and with which Contractor shall comply. RFI-Replies do not constitute changes in Contract Sum or Contract Times except as otherwise agreed in writing by CLPCCD. RFI-Replies will be issued through the RFI administrative system.

SAMPLES: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

SHOP DRAWINGS: All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the work.

SHOWN: As indicated on Drawings.

SITE: The particular geographical location of Work performed pursuant to Contract, including staging areas, work areas, storage and lay down areas, access and parking.

SPECIFICATIONS: The written portion of the Contract Documents consisting of requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services; and are contained in Divisions 1 through 32.

SPECIFIED: As written in Specifications.

SUBCONTRACTOR: A person or entity who has a direct contract with Contractor to perform a portion of the Work at the site. The term "subcontractor" is referred to throughout the Contract Documents as if singular in number and neuter in gender and means a subcontractor or an authorized representative of the subcontractor. The term "subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

SUBSTANTIAL COMPLETION: The Work (or a specified part thereof) has progressed to the point where, in the opinion of the Construction Manager and the Engineer as evidenced by a Certificate of Substantial Completion, it is sufficiently complete, in accordance with Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work is complete and ready for final payment is evidenced by written recommendation of the Construction Manager and the Engineer for final payment. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

SUPPLEMENTAL INSTRUCTION: A written work change directive to Contractor from Engineer, approved by Construction Manager, ordering alterations or modifications which do not result in change in Contract Sum or Contract Times, and do not substantially change Drawings or Specifications.

UNDERGROUND FACILITIES: All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: Electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

VERIFIED REPORT: A periodic verified report submitted to DSA. Refer to sections 4-336, 4-337 and 4-343, Part 1, Title 24, California Code of Regulations.

WORK: The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all is required by the Contract Documents. Wherever the word "work" is used, rather than the word "Work", it shall be understood to have its ordinary and customary meaning.

- A. Wherever words "as directed", "as required", "as permitted", or words of like effect are used, it shall be understood that direction, requirements, or permission of CLPCCD or Construction Manager is intended. Words "sufficient", "necessary", "proper", and the like shall mean sufficient, necessary or proper in judgment of CLPCCD or Construction Manager. Words "approved", "acceptable", "satisfactory", "favorably reviewed" or words of like import, shall mean approved by, or acceptable to, or satisfactory to, or favorably reviewed by CLPCCD or Construction Manager.
- B. Wherever the word "may" is used, the action to which it refers is discretionary. Wherever the word "shall" is used, the action to which it refers is mandatory.

PART 2 – PRODUCTS

Not applicable.

PART 3 – EXECUTION

Not applicable.

END OF SECTION

SECTION 01 45 00**QUALITY CONTROL****PART 1 – GENERAL****1.01 SECTION INCLUDES**

- A. Quality assurance and control of installation.
- B. References.
- C. Mock-Up.
- D. Inspection and testing laboratory services.
- E. Manufacturer's field services.

1.02 RELATED SECTIONS

- A. Submission of manufacturers' instructions and
- B. Sections requiring Laboratory Testing:
 - 1. Section 01 33 00 - Submittals: certificates
 - 2. Section 31 22 00 – Earthwork and Grading
 - 3. Section 32 12 33 – Paving and Surfacing
 - 4. Section 32 10 00 – Water Systems
 - 5. Section 26 42 00 – Cathodic Protection

1.03 QUALITY ASSURANCE AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. If manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.04 REFERENCES

- A. Conform to reference standard by date of issue current on date specified in product sections.
- B. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

- C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 MOCK-UP

- A. Mock-up and sample panels will be performed under various sections and identified as sample panels or mock-ups.
- B. Assemble and erect specified items with specified attachments, anchorage, flashing, seals and finishes.
- C. Where mock-up has been accepted by Engineer and is specified in product specification section to be removed, remove mock-up and clear area as directed.
- D. Whereas, mock-up submittals will be submitted until the acceptance by Engineer and Construction Manager.

1.06 INSPECTION AND TESTING LABORATORY SERVICES

- A. CLPCCD will appoint, employ and pay for services of an independent firm to perform inspection and testing.
- B. The independent firm will perform inspections, tests, and other services specified in individual specification sections and as required by the Engineer. Promptly notify Construction Manager, Engineer, DSA, Project Inspector, and Contractor of observed irregularities or deficiencies of work or products.
- C. Reports will be submitted by the independent firm, one copy each, to the Construction Manager, Engineer, Contractor and Project Inspector. Indicate observations and results of tests and indicate compliance or non-compliance with Contract Documents and Title 24, C.C.R. specifically, each report will include the following:
 - 1. Date issued; date and time of sampling or inspection; date of test.
 - 2. Project title and number; testing laboratory name, address and telephone number; name and signature of laboratory inspector.
 - 3. Location of sampling or test; temperature and weather condition.
 - 4. Type of inspection or test; identification of product and specification section; results of test and compliance with Contract Documents and Title 24, C.C.R.
 - 5. Perform additional tests as required by Engineer and/or Project Inspector; interpret test results, when requested by Engineer.
 - 6. Special Inspections: as shown on attached Tests & Inspections (T&I) list for each section.
- D. Contractor shall cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
 - 1. Notify Engineer 72 hours in advance and/or independent firm 24 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
 - 3. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the work of the contract.

- E. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer and/or Project Inspector. Payment for retesting will be paid by the Contractor by deducting inspection or testing charges from the Contract Sum on the next scheduled payment.

1.07 MANUFACTURER'S FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment as applicable, and to initiate instructions when necessary.
- B. Submit qualifications of observer to Construction Manager thirty (30) calendar days in advance of required observations. Observer shall be subject to approval of Construction Manager and Engineer.
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Refer to Section 01 33 00 - Submittals: Manufacturers' Instructions.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

Not applicable to this section.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES

PART 1 GENERAL

1.01 SUMMARY

This section describes the temporary facilities required for the Project site. The Project site shall be maintained by Contractor as set forth in this section.

1.02 TEMPORARY FACILITIES

- A. Contractor shall obtain permits for, install and maintain in safe condition, whatever scaffolds, hoisting equipment, barricades, walkways, or other temporary structures, which may be required to accomplish the work on the Project. Contractor shall enclose and secure Project Site, including lay down area with a temporary chain link fence. Such structures shall be adequate for the intended use and capable of safely accepting all loads that may be imposed upon them. They shall be installed and maintained in accordance with all applicable State and local codes and regulations.
- B. Contractor shall provide and maintain temporary heat from an approved source whenever in the course of the Work it may become necessary for curing and drying of materials or to warm spaces as may be required for the installation of materials or finishes.
- C. Contractor shall provide and maintain any and all facilities that may be required for dewatering in order that work may proceed on the Project. If it is necessary for dewatering to occur continually, Contractor shall have on hand whatever spare parts or equipment that may be required to prevent interruption of dewatering.
- D. Contractor shall provide and maintain all utility services necessary to perform the work under this Contract. These may include, but are not limited to, temporary electricity, water, gas, sewer and telephone, including charges and installation fees. Contractor shall furnish and maintain all means of distribution of utility services required within the site to properly complete the Project.
- E. Materials, tools, accessories, etc., shall be stored only where directed by CLPCCD. Storage area shall be kept neat and clean. Security of stored items shall be Contractor's responsibility.
- F. When flammable materials are stored on site, extra precautions, including clear identification, shall be the responsibility of Contractor.
- G. Contractor shall provide and maintain temporary toilets in quantities and locations as required by CAL/OSHA and other local codes and regulations. They shall be maintained and supplied in a usable and sanitary condition at all times.
- H. If water at construction site is determined to be non-potable by Inspector, Contractor shall provide and maintain adequate potable water stations at site until final completion of the Project.
- I. Contractor shall maintain an office at the Project site, which will be his headquarters for the Project. Any communications delivered to this office shall be considered as delivered to Contractor. Location and size of office shall be such that it will adequately serve the needs of Contractor's superintendent and assistants in the performance of their duties.
- J. Contractor shall also provide and maintain the following temporary facilities for the duration of the project. Contractor shall obtain approval of the plans and specifications for all the following temporary facilities from Construction Manager prior to delivery to job site. Construction Manager shall have the option to reject said facilities if they do not meet Construction Manager's needs.
- K. Contractor shall promptly remove all such Temporary Facilities when they are no longer needed for the work or for completion of the Project, mutually agreed upon by Contractor and CLPCCD.

- L. Contractor shall provide and maintain in the Temporary Facilities a copy of the California Code of Regulations Title 24 (latest edition) Parts I & II.

1.03 SIGNS

No signs may be displayed on or about CLPCCD's property (except those required by law) without CLPCCD's specific approval; the size, content, and location to be as specified by CLPCCD.

1.04 USE OF ROADWAYS AND WALKWAYS

Contractor shall never block or interfere with use of any existing roadway, walkway or other facility for vehicular or pedestrian traffic, from any party entitled to use it. Wherever and whenever such interference becomes necessary for the proper and convenient performance of the Work, and no satisfactory detour route exists, Contractor shall, before beginning the interference, provide a satisfactory detour, including temporary bridge if necessary, or other proper facility for traffic to pass around or over the interference. Contractor shall maintain the detour in a safe and satisfactory condition as long as the interference continues, all without extra payment unless otherwise expressly stipulated in the Specifications.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01 61 00**MATERIAL AND EQUIPMENT****PART 1 – GENERAL****1.01 SECTION INCLUDES**

- A. Products
- B. Transportation and handling.
- C. Storage and protection.

1.02 RELATED SECTIONS

- A. Section 01 11 00 - Summary of Work.
- B. Section 01 45 00 - Quality Control: Product Quality Monitoring.

1.03 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work.
- B. Provide interchangeable components of the same manufacturer, for similar components.

1.04 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions and construction schedules. Coordinate to avoid conflict with work and conditions at the site.
- B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.05 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.
- B. For exterior storage of fabricated products, place on sloped supports, above ground, to prevent soiling and staining.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection.
- D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

- E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.
- H. Provide substantial covering and protection after installation of products from damage due to traffic and subsequent construction operations. Remove when no longer needed.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

Not applicable to this section.

END OF SECTION

SECTION 01 62 00

PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 – GENERAL

1.01 SUMMARY

- A. Procedures are described for selecting products and requesting substitutions of unlisted materials in lieu of materials named in the specifications or approved for use in addenda.
- B. Related Sections
 - 1. Section 01 26 00: Contract Modification Procedures
 - 2. Section 01 33 00: Submittals

1.02 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standard: Select any product meeting that standard.
- B. For products specified by naming one or more products or manufacturers:
 - 1. Select products of any named manufacturer meeting specifications.
 - 2. For any product or manufacturer, which is not specifically named, submit Request for Substitution (RFS).
- C. For products indicated or specified by naming only one product and manufacturer, followed by the words “no substitution allowed”, there is no option.

1.03 SUBSTITUTIONS

- A. No substitutions shall be allowed for District standard systems, products, and/or materials unless approved in writing from the Engineer’s office five (5) days prior to bid.
- B. Within a period of thirty-five (35) days after Award of Contract, Construction Manager and Engineer will consider RFS from Contractor. After that period, requests will be considered only when product becomes unavailable due to no fault of Contractor. Requests for review of proposed substitute items will not be accepted from anyone other than Contractor. The RFS will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice Contractor's achievement of substantial completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with CLPCCD for work on the Project).
- C. Submit separate RFS for each product and support each request with:
 - 1. Product identification
 - 2. Manufacturer's literature

3. Samples, as applicable
 4. Name and address of similar projects on which product has been used, and date of installation
 5. Name, address and telephone number of manufacturer's representative or sales engineer
 6. Where DSA approval is required, product shall be reviewed and approved by DSA
- D. Itemize a comparison of the proposed substitution with product specified and list significant variations. If variation from product specified is not pointed out in submittal, variation will be rejected even though submittal was favorably reviewed.
- E. State whether the substitute will require a change in any of the Contract documents (or provisions of any other direct contract with CLPCCD for work on the Project) to adapt the design of the proposed substitute, and whether or not incorporation or use of the substitute in connection with Work is subject to payment of any license fee or royalty. Submit data relating to changes in construction schedule.
- F. All variations of the proposed substitute from that specified will be identified in the RFS and available maintenance, repair and replacement service will be indicated.
- G. Include accurate cost data comparing proposed substitution with product and amount of net change in Contract price, including but not limited to, an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors effected by the resulting change, all of which will be considered by Construction Manager and Engineer in evaluating the proposed substitute. Construction Manager and Engineer may require Contractor to furnish additional data about the proposed substitute.
- H. Substitutions will not be considered for acceptance when:
1. They will result in delay meeting construction milestones or completion dates.
 2. They are indicated or implied on submittals without formal request from Contractor.
 3. They are requested directly by subcontractor or supplier.
 4. Acceptance will require substantial revision of Contract Documents.
 5. They disrupt Contractor's job rhythm or ability to perform efficiently.
- I. Substitute products shall not be ordered without written acceptance of Construction Manager and Engineer.
- J. Construction Manager and Engineer will determine acceptability of proposed substitutions and reserve right to reject proposals due to insufficient information.
- K. Accepted substitutions will be evidenced by a change order or Supplemental Instruction. All Contract requirements apply to Work involving substitutions.

1.04 CONTRACTOR'S REPRESENTATION AND WARRANTY

- A. Requests constitute a representation and warranty that Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product
 - 2. Will provide the same warranty for substitution as for specified product
 - 3. Will coordinate installation and make other changes, which may be required for Work to be complete in all respects
 - 4. Waives claims for additional costs, which may subsequently become apparent
 - 5. Will compensate CLPCCD for additional redesign costs associated with substitution, if required
 - 6. Will be responsible for Construction Schedule slippage due to substitution
 - 7. Will be responsible for Construction Schedule delay due to late ordering of available specified products caused by requests for substitution, which is subsequently rejected by Construction Manager
 - 8. Will compensate CLPCCD for all costs; including extra costs of Contract, extra cost to other contractors, and any claims brought against CLPCCD, caused by late requests for substitutions or late ordering of products.

1.05 CONSTRUCTION MANAGER'S AND ARCHITECT/ENGINEER'S DUTIES

- A. Review Contractor's RFS within seven (7) working days.
- B. Notify Contractor in writing of decision to accept or reject requested substitution within seven (7) working days.

1.06 COST OF REVIEW

- A. Construction Manager and Engineer will record time required in evaluating substitutes proposed or submitted by Contractor. Whether or not Construction Manager or Engineer accepts the substitute item so proposed or submitted by Contractor, Contractor shall reimburse CLPCCD for the charges of Engineer and Construction Manager for evaluating each such proposed substitute item.
- B. The CLPCCD reserves the right to waive the requirement of paragraph A above.

PART 2—PRODUCTS

Not used.

PART 3—EXECUTION

Not used.

END OF SECTION

SECTION 01 70 00

CONTRACT CLOSEOUT

PART 1 – GENERAL**1.01 SUMMARY**

This section describes contract closeout procedures including:

1. Removal of temporary construction facilities
2. Substantial completion
3. Final completion
4. Final cleaning
5. Project record documents
6. Material, equipment and finish data
7. Project guarantee
8. Warranties
9. Turn-in
10. Release of claims
11. Guaranty and Maintenance Bonds

1.02 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

- A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion Inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities.
- C. Restore permanent facilities used during construction to specified condition.

1.03 SUBSTANTIAL COMPLETION

- A. When Contractor considers Work or designated portion thereof as substantially complete, submit written notice, with list of items to be completed or corrected to Construction Manager.
- B. Within reasonable time, Construction Manager and Engineer will inspect to determine status of completion.
- C. Should Construction Manager or Engineer determine that Work is not substantially complete; Construction Manager will promptly notify Contractor in writing, listing all defects and omissions.
- D. Remedy deficiencies and send a second written notice of substantial completion. Engineer will reinspect the Work. If deficiencies previously noted are not corrected on reinspection, then Contractor shall pay the cost of the reinspection.
- E. When Engineer determines that Work is substantially complete, Construction Manager will issue a Certificate of Substantial Completion.
- F. Manufactured units, equipment and systems, which require startup, must have been started up and run for periods prescribed by Construction Manager, Engineer, or Owner before a Certificate of Substantial Completion will be issued.

1.04 FINAL COMPLETION

- A. When Contractor considers Work is complete, submit written certification that:

1. Contractor has inspected Work for compliance with Contract Documents.
 2. Work, except for Contractor maintenance after Final Acceptance, has been completed in accordance with Contract Documents and deficiencies listed with Certificate of Substantial Completion have been corrected.
 3. Work is complete and ready for final inspection.
 4. Contractor has achieved all requirements for Final Acceptance as that term is defined in Section 01 41 00 – Regulatory Requirements.
- B. In addition to submittals required by conditions of Contract, provide submittals required by governing authorities and submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.
- C. When Engineer finds Work is acceptable and final submittal is complete, Construction Manager will issue final change order reflecting approved adjustments to Contract Sum not previously made by Change Order.

1.05 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
1. Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment operated during construction, clean ducts, blowers and coils of units operated without filters during construction.
 2. Employ skilled workers for final cleaning.
- C. Clean Site; mechanically sweep-paved areas.
- D. Remove waste and surplus materials, rubbish, and construction facilities from Site.

1.06 PROJECT RECORD DOCUMENTS

- A. General
1. Project Record Documents required include:
 - a. Marked-up copies of Contract Drawings
 - b. Marked-up copies of Shop Drawings
 - c. Newly prepared Drawings
 - d. Marked-up copies of Specifications, Addenda and Change Orders
 - e. Marked-up Project Data submittals
 - f. Record Samples
 - g. Field records for variable and concealed conditions
 - h. Record information on Work that is recorded only schematically
 - i. Comments to all required DSA documentation
 - j. All approved change orders
 2. Specific Project Record Documents requirements that expand requirements of this Section are included in the individual Sections of Divisions 2 through 33.
 3. Maintenance of Documents and Samples:
 - a. Store Project Record Documents and samples in the field office apart from Contract Documents used for construction.
 - b. Do not permit Project Record Documents to be used for construction purposes.

- c. Maintain Project Record Documents in good order, and in a clean, dry, legible condition.
 - d. Make documents and samples available at all times for inspection by Engineer.
 4. CLPCCD will provide one set of sepias and one blue-line set of the construction drawings and one-project manuals for the Contractor's use and copying during construction.
- B. Project Record Drawings
 1. Mark-up Procedure: During the construction period, maintain a set of blue-line or blackline prints of Contract Drawings and Shop Drawings for Project Record Document purposes.
 2. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements, which would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to:
 - a. Dimensional changes to the building
 - b. Drawings Revisions to details shown on the Contract Drawings
 - c. Drawings Depths of foundations below the first floor
 - d. Locations and depths of underground utilities
 - e. Revisions to routing of piping and conduits
 - f. Revisions to electrical circuitry
 - g. Actual equipment locations
 - h. Duct size and routing
 - i. Locations of concealed internal utilities
 - j. Changes made by Change Order
 - k. Details not on original Contract Drawings
 3. Mark completely and accurately Project Record Drawing prints of Contract Drawings or Shop Drawings, whichever is the most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
 4. Mark Project Record Drawing sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.
 5. Mark important additional information, which was either shown schematically or omitted from original Drawings.
 6. Note construction change directive numbers; alternate numbers; Change Order numbers and similar identification.
 7. Responsibility for Mark-up: Where feasible, the individual or entity who obtained Project Record Drawing data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on Project Record Drawings.
 - a. Accurately record information in an understandable and legible drawing technique.
 - b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.
 8. At time of Substantial Completion, submit Project Record Drawings to Construction Manager for CLPCCD's records. Organize into sets, bind and label sets for CLPCCD's continued use.
 9. All record documents shall be submitted in an electronic format and hard copy.
- C. Preparation of Documents: Immediately prior to inspection for Certification of Substantial Completion, review completed marked-up Project Record Drawings with the Engineer. When authorized, prepare a full set of correct Contract Drawings and Shop Drawings.

1. Incorporate changes and additional information previously marked on print sets. Erase, redraw, and add details and notations where applicable. Identify and date each Drawing; include the printed designation "PROJECT RECORD DRAWINGS" in a prominent location on each Drawing.
 2. Refer instances of uncertainty to the Engineer for resolution.
 3. Review of Documents: Before copying and distributing, submit corrected drawings and the original marked-up prints to the Engineer for review. When acceptable, the Engineer will initial and date each document, indicating acceptance of general scope of changes and additional information recorded, and of the quality of drafting.
 - a. Documents and the original marked-up prints will be returned to the Contractor for organizing into sets, printing, binding, and final submittal.
- D. Copies and Distribution: After completing the preparation of Project Record Drawings, print three (3) blue-line or black-line prints of each Drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable paper cover sheets, with appropriate identification, including titles, dates and other information on cover sheets.
1. Organize and bind original marked-up set of prints that were maintained during the construction period in the same manner.
 2. Organize Project Record Drawings into sets matching the print sets. Place these sets in durable tube-type drawing containers with end caps. Mark the end cap of each container with suitable identification.
 3. Submit the marked-up Project Record Drawings set and three (3) copy sets to the Construction Manager for CLPCCD's records; the Engineer will retain one copy set.

E. PROJECT RECORD SPECIFICATIONS

During the construction period, maintain one copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.

1. Mark the Project Record Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and Modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to substitutions, selection of product options, and information on concealed installation that would be difficult to identify or measure and record later.
 - a. In each Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.
 - b. Record the name of the manufacturer, supplier and installer, and other information necessary to provide a record of selections made and to document coordination with Project Record Product Data submittals and maintenance manuals.
 - c. Note related Project Record Product Data, where applicable, for each principal product specified, indicate whether Project Record Product Data has been submitted in maintenance manual instead of submitted as Project Record Product Data.
 2. Upon completion of mark-up, submit Project Record Specifications to the Construction Manager for CLPCCD's records.
- F. PROJECT RECORD PRODUCT DATA. During the construction period, maintain one copy of each Project Record Product Data submittal for Project Record Document purposes.
1. Mark Project Record Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Project Record Product Data submitted. Include significant changes in the product delivered to the site, and changes in manufacturer's instructions and recommendations for installation.
 2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 3. Note related Change Orders and mark-up of Project Record Drawings, where applicable.

4. Upon completion of mark-up, submit a complete set of Project Record Product Data to the Construction Manager for CLPCCD's records.
5. Where Project Record Product Data is required as part of maintenance manuals, submit marked-up Project Record Product Data as an insert in the manual, instead of submittal as Project Record Product Data.
6. Each prime Contractor is responsible for mark-up and submittal of record Project Record Product Data for its own Work.

G. MATERIAL, EQUIPMENT AND FINISH DATA.

1. Provide data for primary materials, equipment and finishes as required under each specification section.
2. Submit two (2) sets prior to final inspection, bound in 8-1/2 inches by 11 inches three-ring binders with durable plastic covers; provide typewritten table of contents for each volume.
3. Arrange by Specification division and give names, addresses, and telephone numbers of subcontractors and suppliers. List:
 - a. Trade names
 - b. Model or type numbers
 - c. Assembly diagrams
 - d. Operating instructions
 - e. Cleaning instructions
 - f. Maintenance instructions
 - g. Recommended spare parts
 - h. Product data

H. FINAL AS-BUILT DRAWINGS, SPECIFICATIONS.

1. As-Built Drawings and Specifications are the official record drawing that documents what was constructed
2. These drawings shall be available to the Engineer and shall be provided to the District upon completion of the of the work.
3. Requirements:
 - a. One hard copy set of full size (24x36) or (36x48) As-Built Plans, with DSA App #, and "AS BUILT" stamped on each sheet in red.
 - b. One hard copy set of half size As-Built Plans, with DSA App #, and "AS BUILT" stamped on each sheet in red.
 - c. One hard copy set of specifications with "AS BUILT" stamped on the cover page in red.
 - d. A CD/DVD in PDF and CAD formats (CAD format to be compatible with AutoCAD 2016) with the following naming convention for the CD/DVD cover:
 - i. College Name
 - ii. Project Name
 - iii. DSA Application #
 - iv. Do not check the "read only" option
 - v. Do not password protect any files

1.08 MISCELLANEOUS PROJECT RECORD SUBMITTALS

Refer to other Specification Sections for miscellaneous record keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Construction Manager for CLPCCD's records.

Categories of requirements resulting in miscellaneous records include, but are not limited to the following:

- a. Field records on excavations and foundations
- b. Field records on underground construction and similar work
- c. Survey showing locations and elevations of underground lines
- d. Invert elevations of drainage piping
- e. Surveys establishing building lines and levels
- f. Authorized measurements utilizing unit prices or allowances
- g. Records of plant treatment
- h. Ambient and substrate condition tests
- i. Certifications received in lieu of labels on bulk products
- j. Batch mixing and bulk delivery records
- k. Testing and qualification of tradespersons
- l. Documented qualification of installation firms
- m. load and performance testing
- n. Inspections and certifications by governing authorities leakage and water-penetration tests
- o. Fire resistance and flame spread test results
- p. Final inspection and correction procedures

1.09 PROJECT GUARANTEE

- A. Neither recordation of final acceptance nor final certificate for neither payment nor provision of the Contract nor partial or entire use or occupancy of the Site by CLPCCD shall constitute acceptance of Work not done in accordance with Contract Documents nor relieve Contractor of liability in respect to express warranties or responsibility for faulty materials or workmanship.
- B. Requirements for Contractor's guarantee of completed Work are included in General Conditions, Article 1.09. Contractor shall guarantee Work done under Contract against failures, leaks or breaks or other unsatisfactory conditions due to defective equipment, materials or workmanship, and perform repair work or replacement required, at Contractor's sole expense, for period of 2 years from date of Final Acceptance, as required by paragraph 13.2 of General Conditions.
- C. CLPCCD may make repairs to defective Work as set forth in paragraph 12.6 of General Conditions, if, within 5 working days after mailing of written notice of defective work to Contractor or authorized agent, Contractor shall neglect to make or undertake with due diligence repairs; provided, however, that in case of leak or emergency where, in opinion of CLPCCD, delay would cause hazard to health or serious loss or damage, repairs may be made without notice being sent to Contractor, and Contractor shall pay cost thereof.
- D. If, after installation, operation or use of materials or equipment to be furnished under Contract proves to be unsatisfactory to Construction Manager, CLPCCD shall have right to operate and use materials or equipment until it can, without damage to CLPCCD, be taken out of service for correction or replacement. Period of use of defective materials or equipment pending correction or replacement shall in no way decrease guarantee period required for acceptable corrected or replaced items of materials or equipment.

- E. Nothing in this Section shall be construed to limit, relieve or release Contractor's, subcontractors' and equipment suppliers' liability to CLPCCD for damages sustained as result of latent defects in equipment caused by negligence of suppliers' agents, employees or subcontractors. Stated in another manner, warranty contained in the Contract Documents shall not amount to, nor shall it be deemed to be, waiver by CLPCCD of any rights or remedies (or time limits in which to enforce such rights or remedies) it may have for defective workmanship or defective materials under laws of this State pertaining to acts of negligence.

1.10 WARRANTIES AND BONDS

- A. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers, and manufacturers.
1. Provide table of contents and assemble in 8-1/2 inches by 11 inches three-ring binder with durable plastic cover.
 2. Assemble in Specification Section order.
 3. Provide an electronic copy of all warranties on thumb drive in PDF format
- B. Submit material prior to final application for payment.
1. For equipment put into use with CLPCCD's permission during construction, submit within ten (10) working days after first operation.
 2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten (10) working days after acceptance, listing date of acceptance as start of warranty period.
- C. Warranties are intended to protect CLPCCD against failure of work and against deficient, defective and faulty materials and workmanship, regardless of sources.
- D. Limitations: Warranties are not intended to cover failures, which result from the following:
1. Unusual or abnormal phenomena of the elements
 2. Vandalism after substantial completion
 3. Insurrection or acts of aggression including war
- E. Related Damages and Losses: Remove and replace Work which is damaged as result of defective Work, or which must be removed and replaced to provide access for correction of warranted Work.
- F. Warranty Reinstatement: After correction of warranted Work, reinstate warranty for corrected Work to date of original warranty expiration or to a date not less than 365 days after corrected Work was done, whichever is later.
- G. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.
- H. Warranty Forms: Submit drafts to Construction Manager for approval prior to execution. Forms shall not detract from or confuse requirements or interpretations of Contract Documents.
1. Warranty shall be countersigned by manufacturers.
 2. Where specified, warranty shall be countersigned by subcontractors and installers.
- I. Rejection of Warranties: CLPCCD reserves right to reject unsolicited and coincidental product warranties, which detract from or confuse requirements or interpretations of Contract Documents.
- J. Term of Warranties: For materials, equipment, systems and workmanship warranty period shall be two (2) years minimum from date of substantial completion of entire Work except where:
1. Detailed specifications for certain materials, equipment or systems require longer warranty periods.
 2. Materials, equipment or systems are put into beneficial use of CLPCCD prior to Substantial Completion as agreed to in writing by Construction Manager.

K. Warranty of Title: No material, supplies, or equipment for Work under Contract shall be purchased subject to any chattel mortgage, security agreement, or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all work to deliver the Site, together with improvements and appurtenances constructed or placed thereon by Contractor, to CLPCCD free from any claim, liens, security interest, or charges, and further agrees that neither Contractor nor any person, firm, or corporation furnishing any materials or labor for any Work covered by Contract shall have right to lien upon the Site or improvement or appurtenances thereon. Nothing contained in this Paragraph, however, shall defeat or impair right of persons furnishing materials or labor under bond given by Contractor for their protection or any rights under law permitting persons to look to funds due Contractor in hands of CLPCCD.

1.11 TURN-IN

Contract will not be closed out and final payment will not be made until all personnel Identification Media, vehicle permits and keys issued to Contractor during prosecution of Work are turned in to CLPCCD.

1.12 RELEASE OF CLAIMS

Contract will not be closed out and final payment will not be made until Contract Agreement and Release of Any and All Claims, is completed and executed by Contractor and CLPCCD.

1.13 FIRE INSPECTION COORDINATION

Contractor shall coordinate fire inspection and secure sufficient notice to CLPCCD to permit convenient scheduling.

PART 2 – PRODUCTS

Not applicable to this section.

PART 3 – EXECUTION

Not applicable to this section.

END OF SECTION

SECTION 01 78 00

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Administrative and procedural requirements for Project Record Documents.
- B. Project Record Documents required include:
 - 1. Marked-up copies of Drawings
 - 2. Marked-up copies of Shop Drawings
 - 3. Newly prepared Drawings
 - 4. Marked-up copies of Specifications, Addenda, Change Orders and CCDs
 - 5. Marked-up Product Data submittals
 - 6. Record Samples
 - 7. Field records for variable and concealed conditions
 - 8. Record information on Work that is recorded only schematically
 - 9. Maintenance forms for major equipment
- C. Specific Project Record Documents requirements that expand requirements of this Section are included in the individual Sections of Divisions 2 through 33.
- D. General Project closeout requirements are included in Section 01 70 00 (Contract Closeout).
- E. Maintenance of Documents and Samples:
 - 1. Store Project Record Documents and Samples in the field office apart from Contract Documents used for construction.
 - 2. Do not permit Project Record Documents to be used for construction purposes.
 - 3. Maintain Project Record Documents in good order and in a clean, dry, legible condition.
 - 4. Make Documents and Samples available at all times for inspection by District.
- F. District will provide one full size blueline set of the Drawings and one Project Manual for Contractor's use for recording as-built conditions.

1.02 PROJECT RECORD DRAWINGS

- A. Mark-up Procedure: During the construction period, maintain a set of blueline or blackline prints of Contract Drawings and Shop Drawings for Project Record Documents purposes. Label each document (on first sheet or format page) "PROJECT RECORD" in 2-inch high printed letters. Keep record documents current. Note: A reference by number to a Change Order, CCD, RFI, RFQ, RFP, Field Order or other such document is not acceptable as sufficient record information on any record document. Do not permanently conceal any Work until required information has been recorded.
 - 1. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:
 - a. Dimensional changes to the Drawings
 - b. Revisions to details shown on the Drawings
 - c. Depths of various elements of foundation in relation to main floor level or survey datum
 - d. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements
 - e. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure
 - f. Locations of underground work, points of connection with existing utilities, changes in direction, valves, manholes, catch basins, capped stub outs, invert elevations, and similar items
 - g. Actual numbering of each electrical circuit
 - h. Field changes of dimension and detail
 - i. Revisions to routing of piping and conduits
 - j. Revisions to electrical circuitry
 - k. Actual equipment locations

- I. Duct size and routing
 - m. Changes made by Change Order or CCD
 - n. Details not on original Contract Drawings
 2. Mark completely and accurately Project Record Drawing prints of Contract Drawings or Shop Drawings, whichever is the most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
 3. Mark Project Record Drawing sets with red, erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.
 4. Mark important additional information that was either shown schematically or omitted from original Drawings.
 5. Note CCD numbers; alternate numbers, Change Order numbers, and similar identification.
 6. Responsibility for Mark-up: Where feasible, the individual or entity who obtained Project Record Drawing data, whether the individual or entity is the installer, Subcontractor, or similar entity, is required to prepare the mark-up on Project Record Drawings.
 - a. Accurately record information in an understandable and legible drawing technique.
 - b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.
- B. Preparation of Record Drawings: Immediately prior to inspection for Certification of Substantial Completion, review completed marked-up Project Record Drawings with District. When authorized, prepare a full set of correct transparencies of Contract Drawings and Shop Drawings.
 1. Incorporate changes and additional information previously marked on print sets. Erase, redraw, and add details and notations where applicable. Identify and date each Drawing; include the printed designation "PROJECT RECORD DRAWING" in a prominent location on each Drawing.
 2. Refer instances of uncertainty to District for resolution.
 3. Distribution: Whether or not changes and additional information were recorded, organize and bind original marked-up set of prints that were maintained during the construction period into manageable sets. Bind the set with durable paper cover sheets, with appropriate identification, including titles, dates, and other information on cover sheets.
- C. Distribution of Marked-Up Drawings: Submit three full, bound sets and one digital set in AutoCAD 2000 format, the marked-up Project Record Drawings set to District for District's records.
- D. Shop Drawings and Samples: Maintain as record documents; legibly annotate Shop Drawings and Samples to record changes made after review.
- E. In addition to requirements of this Section, comply with supplemental requirements of Divisions 15 and 16.
 1. Divisions 15 and 16 of the Specifications require the preparation of large scale, detailed layout drawings of the Work of those Divisions. These layout drawings are not Shop Drawings as defined by General Conditions, but together with Shop Drawings or layout drawings of all other affected Sections are used to check, coordinate, and integrate the work of the various Sections.
 2. Include these layout drawings as part of the Project Record Documents.

1.03 PROJECT RECORD SPECIFICATIONS

- A. During the construction period, maintain one copy of the Project Specifications, including addenda and modifications issued, for Project Record Documents purposes.
- B. Mark the Project Record Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and Modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to substitutions, selection of product options, Change Order and Construction Change Directive work, and information on concealed installation that would be difficult to identify or measure and record later.
 1. In each Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.
 2. Record the name of the manufacturer, catalog number, supplier and installer, and other information necessary to provide a record of selections made and to document coordination with Project Record Product Data submittals and maintenance manuals.
 3. Note related Project Record Product Data, where applicable, for each principal product specified, indicate whether Project Record Product Data has been submitted in maintenance manual instead of submitted as Project Record Product Data.

4. Upon completion of mark-up, submit Project Record Specifications to District for District's records.

1.04 ADDITIONAL REQUIREMENTS FOR FINAL PROJECT RECORD DOCUMENTS

- A. Prior to Substantial Completion of the Work, District will make available to Contractor originals of the Drawings and Specifications, as Microsoft® Word 2000 for Windows, and AutoCAD 2000 Land Development Desktop for Windows in drawing format (.DWG) files. Note all changes thereon for the final Project Record Documents and provide one set of mylar reproducibles, one set of revised Specifications and one set of disks or CDs to be submitted to District.
- B. After Substantial Completion and before Final Completion, carefully transfer all data shown on the job set of Record Drawings to the corresponding computer files, coordinating the information as required.
- C. Clearly indicate at each affected detail and other drawings a full description of changes made during construction, and the actual location of items as previously specified.
- D. "Cloud" all affected areas.
- E. Stamp each Record Drawing with the following information:
 1. Project Record Document.
 2. Prepared by: Contractor's name, permanent address.
 3. Date prepared.
 4. Contractor's signature.
 5. District Contract Number.

1.05 PROJECT RECORD PRODUCT DATA

- A. During the construction period, maintain one copy of each Project Record Product Data submittal for Project Record Document purposes.
 1. Mark Project Record Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Project Record Product Data submitted. Include significant changes in the product delivered to the Site, and changes in manufacturer's instructions and recommendations for installation.
 2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 3. Note related Change Orders and mark-up of Project Record Drawings, where applicable.
 4. Upon completion of mark-up, submit a complete set of Project Record Product Data to District for District's records.
 5. Where Project Record Product Data is required as part of maintenance manuals, submit marked-up Project Record Product Data as an insert in the manual, instead of submittal as Project Record Product Data.
 6. Contractor is responsible for mark-up and submittal of Project Record Product Data for its own Work.
- B. Material, Equipment, and Finish Data:
 1. Provide data for primary materials, equipment and finishes as required under each Specification Section.
 2. Submit three (3) hard copy sets and one (1) digital copy, on compact disc (CD) prior to final inspection, bound in 8-1/2 inches by 11 inches three-ring binders with durable plastic covers; provide typewritten table of contents for each volume.
 3. Arrange by Specification Section number and give names, addresses, and telephone numbers of Subcontractors and suppliers. List:
 - a. Trade names.
 - b. Model or type numbers.
 - c. Assembly diagrams.
 - d. Operating instructions.
 - e. Cleaning instructions.
 - f. Maintenance instructions.
 - g. Recommended spare parts.
 - h. Product data.

1.06 MISCELLANEOUS PROJECT RECORD SUBMITTALS

- A. Refer to other Specification Sections for miscellaneous record keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the District for District's records. Categories of requirements resulting in miscellaneous records include, but are not limited to, the following:
 - 1. Field records on excavations and foundations
 - 2. Field records on underground construction and similar work
 - 3. Survey showing locations and elevations of underground lines
 - 4. Invert elevations of drainage piping
 - 5. Surveys establishing building lines and levels
 - 6. Authorized measurements utilizing unit prices or allowances
 - 7. Records of plant treatment
 - 8. Ambient and substrate condition tests
 - 9. Certifications received in lieu of labels on bulk products
 - 10. Batch mixing and bulk delivery records
 - 11. Testing and qualification of tradespersons
 - 12. Documented qualification of installation firms
 - 13. Load and performance testing
 - 14. Inspections and certifications by governing authorities
 - 15. Leakage and water-penetration tests
 - 16. Fire resistance and flame spread test results
 - 17. Final inspection and correction procedures
 - 18. Final As-Built Construction Schedule

PART 2 PRODUCTS

NOT APPLICABLE TO THIS SECTION.

PART 3 EXECUTION

3.01 RECORDING

Post changes and modifications to the Contract Documents as they occur. Do not wait until the end of the Project. District may periodically review Project Record Documents to assure compliance with this requirement.

3.02 SUBMITTAL

- A. At completion of Project, deliver Project Record Documents to District.
- B. Accompany submittal with transmittal letter containing:
 - 1. Date
 - 2. Project title and number
 - 3. Contractor's name and address
 - 4. Number and title of each Project Record Document
 - 5. Certification that each document as submitted is complete and accurate, and signature of Contractor or Contractor's authorized representative.

END OF SECTION

PROJECT MANUAL

DOMESTIC WATER BOOSTER PUMP PROJECT LAS POSITAS COMMUNITY COLLEGE

SANDIS
636 Ninth Street
Oakland, CA 94607
510-873-8866

SECTION 22 01 00**BASIC PLUMBING REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY****1.2 SECTION INCLUDES**

- A. Piping materials and installation instructions common to most piping systems including but not limited to: dielectric fittings, sleeves/sleeve seals, escutcheons, grout, demolition, equipment installation requirements common to equipment sections, painting and finishing, concrete bases, supports and anchorages, general coordination, plumbing/electrical wiring and device coordination.

1.3 RELATED REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
 - 1. The requirements of this Section apply to all the Work of Division 22 Plumbing.

1.4 REFERENCE STANDARDS

- A. Perform work specified in Division 23 in accordance with the codes and standards listed below, including all applicable sections and/or subsections of any Referenced Standard as may be applicable to the Work.
 - 1. AGA - American Gas Standard.
 - 2. ANSI - American National Standards Institute.
 - 3. A13.1 Scheme for Identification of Piping Systems.
 - 4. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers.
 - 5. ASME - American Society of Mechanical Engineers.
 - 6. ASSE - American Society of Sanitary Engineering.
 - 7. ASTM - American Society for Testing and Materials.
 - 8. AWWA - American Water Works Association.
 - 9. AWS - American Welding Society.
 - 10. CISPI – Cast Iron Soil Pipe Institute
 - 11. FGI Guidelines - Facilities Guideline Institute

12. Hydraulic Institute.
 13. NBS - National Bureau of Standards.
 14. NEBB - National Environmental Balancing Bureau.
 15. NEC - National Electric Code.
 16. NEMA - National Electrical Manufacturers' Association.
 17. NFPA - National Fire Protection Association.
 18. OSHA - Occupational Safety & Health Administration (including local General Industry Safety Orders).
 19. PDI - Plumbing and Drainage Institute.
 20. Rules & Regulations of local, state and national utility servicing and/or regulating entities.
 21. SMACNA - Sheet Metal and Air Conditioning Contractors National Association.
 22. UL - Underwriters Laboratories.
- B. Where materials or methods specified fail to meet applicable code and standards, provide, replace or modify materials and/or methods to meet applicable standards or code requirements. Do not provide materials or employ methods that do not conform to applicable codes and standards. Contractor shall be responsible for all repair and/or replacement of all defective work, including but not limited to removal, replacement and repair of the Work and the work of others directly or indirectly impacted.
- C. All applicable local, State and/or Federal laws, ordinances and regulations are hereby incorporated by reference into and made a part of this Specification. Where applicable, materials, and equipment shall bear stamps or seals of UL, ASME, NEMA, and other industry regulating groups. In the event of a difference or conflict between governing codes, laws, ordinances, regulations, industry standards, specifications or other provisions of the contract documents as to performance, the more stringent requirement shall apply, or as to quality, the highest quality provision shall apply and be included, each without cost or schedule impact. Contractor shall promptly notify Architect, in writing, of such differences and/or conflicts, and in all cases, prior to procurement, fabrication or installation of the work.
- D. Comply with the Safety Orders issued by OSHA and any other safety, health or environmental regulations of the state in which the project is located and any districts having jurisdictional authority.

1.5 DEFINITIONS

- A. Following is a list of abbreviations generally used in Division 22.
1. AHJ Authority Having Jurisdiction.
 2. FM Factory Mutual Global.

3. HVAC Heating, Ventilating and Air Conditioning.
 4. IBC International Building Code, latest adopted version with State amendments.
 5. IFC International Fire Code.
 6. IMC International Mechanical Code.
 7. ICC ES International Code Council Evaluation Service.
 8. MSS Manufacturers Standardization Society.
- B. The following are industry abbreviations for plastic materials:
1. ABS Acrylonitrile-butadiene-styrene plastic.
 2. CPVC Chlorinated polyvinyl chloride plastic.
 3. PE Polyethylene plastic.
 4. PVC Polyvinyl chloride plastic.
- C. The following are industry abbreviations for rubber materials:
1. EPDM Ethylene-propylene-dieneterpolymer rubber.
 2. NBR Acrylonitrile-butadiene rubber.
- D. Terms used on the drawings or in the specifications shall have the following meanings:
1. Approved Equal: An item suggested by the Contractor that is permitted, in writing by the Engineer to replace an item listed in the Specifications or Drawings. The burden of proof of equality is the responsibility of the Contractor.
 2. Furnish: Supply and deliver, ready for installation, assembly or intended use, all materials, labor, equipment, testing apparatus, controls, tests, accessories, and all other items customarily required for the proper and complete application for the particular work referred to.
 3. Install: Includes unloading, unpacking, assembling, erecting, installation, applying, finishing, protecting, cleaning and similar operations at the project site as required to complete all items of work as required for the intended use/operation including all testing, certification, commissioning, and other requirements for final turnover to the Owner.
 4. Provide: "Furnish" and "Install."
 5. Owner Furnished, Contractor Installed: The Owner will furnish at his cost and the Contractor shall receive, protect, store and install in the performance of the Work.

6. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
7. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
8. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
9. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include installations above ceilings, in shafts, trenches, partitions, or other enclosures.
10. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations embedded in or below masonry or concrete construction, earthwork/trenches, within unheated shelters, crawl spaces or enclosures.
11. Wiring: All wires, raceways, fittings, conductors, connectors, tape, junction and outlet boxes, connectors, splices, and all other items necessary and/or required in connection with such work.
12. Raceway: All raceways, conduit, fittings, hangers, supports, sleeves, etc.

1.6 GENERAL REQUIREMENTS

- A. Examine the drawings, specifications and other contract documents relating to the work and the work of all trades and become fully informed as to the extent and character of work required. Coordinate all work with that of others to ensure proper and complete installation of all materials, equipment and supports. It is the intent of the drawings, specifications and related Contract Documents to provide a complete working installation of all systems and equipment called for, in proper operating condition, finished, tested and ready for its intended use (hereinafter "Design Intent"). Provide all items not specifically shown on the drawings, called for in the specifications or related Contract Documents, but required to conform to the Design Intent without additional cost or schedule impact. The scope of work shall include all labor, material and equipment to achieve the Design Intent and all necessary and required temporary and incidental equipment, connections, services, supports, hoisting and scaffolding, access provisions, tools, appliances, consumables, fees, permits and licenses, debris removal/disposal, supervision and labor, including required start-up, check-out and training to provide complete and fully operable systems in full compliance with the Contract Documents.
- B. The drawings, specifications and related Contract Documents are intended to be complementary and interrelated; what is required by one is as if required by another. Similarly, information and/or requirements may be included in one and not another. Contractor is responsible to conduct a full and thorough review all Contract Documents to ascertain requirements of the Work before proceeding, including but not limited to all drawings and, specifications. Where there is a conflict in or between the drawings,

specifications or other related Contract Documents as to performance, the more stringent requirement shall apply, or as to quality, the highest quality provision shall be applied and be included, each without cost or schedule impact. All such conflicts shall immediately be brought to the attention to the Architect.

- C. Before submitting a bid and prior to the start of work, Contractor shall examine all conditions relating to the Work, including that associated with the work of other trades upon which Contractor's work may rely or otherwise depend, to achieve the Design Intent, in accordance with the best trade practices, workmanship and highest quality product installation, taking into account the sequence of the work, delivery, storage and hoisting requirements, requirements for access, testing and temporary services and all other site limitations and project complexities. Report to the Architect/Engineer any conditions which might prevent installation of materials and/or equipment in the manner intended by the Contract Documents or contrary to applicable codes, standards or regulations.
- D. No consideration or allowance will be granted for any alleged misunderstanding of materials, equipment or components to be furnished or work to be done; it being agreed that tender of proposal carries with it agreement to items, terms and conditions required by the Contract Documents.
- E. Site Visit - Visit the site and verify the exact conditions relating to the work and obtain such information as may be necessary to present a complete and comprehensive bid. No allowance will be made for any extra expense due to Contractor's failure to make such a visit and reasonably verify all actual/existing conditions. In the event of a conflict between existing conditions and the requirements of the Contract Documents, perform the necessary work to conform to Design Intent. The Owner or his representative will be the sole individual to interpret the intent of the Drawings in the event of a conflict between (1) existing conditions and those shown on the drawings, or (2) quality of existing material and quality of material indicated on the drawings or in the specifications. Wherever a conflict such as this occurs, the higher standard shall prevail.

1.7 SPECIAL REQUIREMENTS

- A. When applicable, Contractor acknowledges the ongoing operations of the Owner at or in close proximity to the Project and agrees to coordinate the timing of the Work with the Owner's ongoing operations; perform the Work in a manner that minimizes or eliminates any adverse impact upon the Owner's ongoing operations; confine operations at the site to areas approved by Owner, permitted by law, permits and the Contract Documents; comply with the Owner's standard security, health and safety policies and procedures; not unreasonably encumber the site with any materials or equipment; and not place signs or advertising on or about the site without prior approval of Owner.
- B. Where applicable, all seismic construction, restraints, bracing, mounts and hanging systems shall be in full compliance with the requirements of all Authorities Having Jurisdiction (AHJ's), including but not limited to submission and review requirements as well as requirements for pre-approval, certification and engineering (including certified engineering calculations and stamps). Contractor shall be solely responsible for obtaining and complying with all requirements of the AHJ.

1.8 SUBMITTALS

- A. Reference Division 01 for submittal requirements.
1. Contractor shall submit for the Architect's approval a Submittal Schedule for the performance of the work that is consistent with the requirements of the project schedule. The Submittal Schedule shall allow reasonable time for the Architect and other consultants review as specified in Section 013300 Submittal Procedures. If the time for Architects review is not otherwise specified, the review period (from date of receipt) shall be fifteen(15) days. Once approved by the Architect/Engineer, submittal dates and time limits established by the Submittal Schedule shall not, except for reasonable cause, be changed or exceeded by the Contractor.
 2. For each submittal required by the Contract Documents the schedule shall include: specification section number, subsection/paragraph identification number, item description (as stated in the applicable specification section, subsection or other Contract Document) and the scheduled delivery date to the Architect/Engineer.
 3. Contractor shall be responsible to the Architect/Engineer and/or Owner for all costs, expenses and impact to the project schedule resulting from any deviation to the approved Submittal Schedule, including but not limited to; payment for required overtime, out-of-house resources/consultants or other higher cost resources of the Architect/Engineer as may be required to perform out of sequence, stacked, critical, delayed, unscheduled or multiple reviews of required submittals necessitated by rejection of a prior submittal, (cumulatively and hereinafter, "Additional Review Costs")
- B. General:
1. Review is for general conformance with the Contract Documents and is not intended to otherwise approve or verify dimensions, quantities, or to coordinate the Work shown on shop drawings on or between Contractor and the work of other trades or Sections. Contractor is solely responsible for quantities, dimensions, means and methods. Dimensions shall be confirmed and correlated by Contractor at the jobsite prior to the start of the Work (procurement, fabrication, construction or other commencement activities). Contractor's failure to fully verify conditions at the jobsite prior to commencement of the work shall not relieve Contractor of its obligations under the Contract Documents and Contractor shall be responsible for all damages caused by or related to its failure to comply with the requirements of this provision.
 2. Submittal review shall be performed to show compliance with the design intent. Contractor shall specifically note any deviations from the Contract Documents and explain the reason and nature of the deviation. Such deviations will be reviewed or rejected on the submittal. Deviations not so identified shall not relieve the Contractor from the requirements of the Contract Documents.

3. Resubmittals will be reviewed for compliance with comment(s) made on the original submittal only. Architect/Engineer shall not be responsible for changes made upon resubmittal that are not clearly identified (highlighted), and respond directly to the initial rejection. Resubmittals should not be packaged with non-related first time submittals, All resubmittals must be marked with the resubmittal number and date and must otherwise comply with all submittal requirements
4. Submit shop drawings, commissioning plan(s) and checklists, penetration locations, supplemental data, etc. as may be required by the Contract Documents for all materials, equipment and other components of the Work included in all Sections of this Division and other provisions of the Contract Documents in accordance with the requirements of this Division and Division 01.
5. All submittals must be reviewed by Contractor, and bear Contractors review stamp and signoff for conformity to the Contract Documents, prior to the submission of any required submittal to Architect/Engineer. Submittals that fail to meet this requirement will be considered incomplete, will not be reviewed by Architect/Engineer and will be returned to Contractor, without review and/or rejected and resubmittal will be required. Contractor shall be solely responsible for any and all Additional Review Costs and/or other project costs or schedule impact.
6. Forward all submittals to Architect/Engineer in a coherent, organized fashion, complete and packaged as required herein. Unless approved by the Architect/Engineer in advance, all submittals for this division shall be submitted as a single package. Architect/Engineer may reject submittals that fail to comply with this or any other provision of the Contract Documents and Contractor shall be solely responsible for any and all Additional Review Costs and/or other project costs or schedule impact.
7. Subject to other provisions of the Contract Documents and in the absence of a more stringent requirement, Architect/Engineer will review a submittal not more than two (2) times. Contractor shall be solely responsible for any subsequent reviews and all Additional Review Costs and/or other project costs or schedule impact.
8. Resubmittals will be reviewed for compliance with comment(s) made on the original submittal only. Architect/Engineer shall not be responsible for changes made upon resubmittal that are not clearly identified (highlighted), and respond directly to the initial rejection. Resubmittals should not be packaged with non-related first time submittals. All resubmittals must be marked with the resubmittal number and date and must otherwise comply with all submittal requirements.
9. Identify each submittal item by reference to Specification Section paragraph in which item is specified, or drawing/detail number, as applicable. In addition, for equipment submittals include identification numbers appearing on the equipment schedule.

10. Identify each item by manufacturer, brand, trade name, number, size, rating, or whatever other data is necessary to properly identify and check materials and equipment. Words "as specified" are not sufficient identification.
11. Organize submittals in same sequence as they appear in specification sections, articles or paragraphs.
12. All materials and equipment submittals shall have a summary sheet at the front complete with catalog numbers. Where materials or equipment pertain to more than one building, submittals shall clearly indicate at which locations the materials or equipment is to be installed.
13. Submittals shall show physical arrangement, construction details, finishes, materials used in fabrications, provisions for piping and/or conduit entrance, access requirements for installation and maintenance, physical size and dimension, mechanical/electrical characteristics and requirements, foundations/curbs and all permanent and temporary support details as well as all information relating to weight, including but not limited to live and dead weights.

C. Catalog Cuts and Submittal Literature:

1. Catalog cuts, submittal literature and published material may be included to supplement scale drawings.
2. Prepare submittal material binders in accordance with the following and Section 01300:
 - a. Insert all literature in standard 3-ring binders for 8-1/2 inch by 11 inch pages with individual tabs. Do not staple literature on different products together.
 - b. Number all binders on the outside of the cover and indicate the specification section. Mark binder no. 1 Architect's copy and no. 2 Engineer's copy. Both these binders shall contain original manufacturer's literature.
 - c. Provide an index with each binder. This index shall follow the same sequence as the Specifications.
3. Submittal literature, drawings and diagrams shall be specifically applicable to this project and shall not contain extraneous material or optional choices. Clearly mark literature to indicate the proposed item. Substitutions: Comply with Division 01 Product Substitution Procedures.

D. Shop Drawings:

1. Shop drawings shall include all significant Division systems, equipment and components, including but not limited to all terminal devices, connections and elevations. Include all related specialty rooms (i.e. mechanical, electrical, data/technology). Drawings shall be at a minimum scale of 1/4" per 1'-0" and shall be fully coordinated with the work of other trades and/or Sections.

2. Identify congested areas and clearly indicate solutions to space problems, developed in conjunction with the work of other trades and/or Sections. Identification of space problems without proposed solutions is not acceptable and is grounds rejection. For such areas indicate, superimposed, the work of all trades and/or Sections involved and:
 - a. Clearly identify each area of congestion and deviations from the Contract Documents, and: proposed solution(s), clearly documented and signed-off by all other trades and/or Sections involved.
- E. Anchorage and Supports: Submit details and calculations for support and anchors that are not specifically detailed on the drawings. All calculations must meet requirements of the AHJ.
1. Provide details and calculations for equipment per requirements of the AHJ.:
 - a. Having an operating weight over 400 pounds or more and mounted directly to the floor.
 - b. Having an operating weight over 20 pounds and suspended from the roof, floor, or wall or supported by vibration isolation devices.
 - c. Where pre-approved bracing systems will be employed, submit:
 - 1) System component brochure describing components used and detailed installation instructions.
 - 2) Loads to be transmitted to the structure at anchor points.
 - d. Where anchorage, support, and bracing are not detailed on the drawings, and pre-approved systems are not used, submit details and calculations of proposed systems. Include:
 - 1) Detailed drawings showing system to be installed, stamped by a Structural Engineer registered in the State of California.
 - 2) Calculations, stamped by a Structural Engineer registered in the State of California.
 - 3) A certification on the calculation sheet stating, "These calculations demonstrate that the system detailed complies with the requirements of Chapter 16 of the California Building Code. The system on which this bracing will be applied is rigid as defined in Chapter 16."
 - e. Anchorage and Supports
 - 1) Where equipment substitutions change the weight, size, configuration, or other aspects of systems and equipment that will affect the performance of anchorages and/or supports, submit calculations for

proposed anchors and supports, and install them as shown in these calculations.

- 2) Where substitutions will have no effect on anchors and supports detailed on Contract Documents, submit information on sizes, weights, center of gravity and other relevant information to demonstrate this fact.
- F. Shop Fabrication Drawings: Drawings are for the Contractor's use and shall be its responsibility. Do not submit shop fabrication documents unless specifically requested
- G. Testing and Balancing: Coordinate Shop Drawings to include any additional components for proper system testing and balancing.
- H. Certificates: Submit final inspection certificates signed by governing authorities.
- I. Operating and Maintenance Instructions and Manuals.
1. Instructions on major items, including but not limited to: switchgear, generators, pumps, air compressors, water heaters, water softeners, water treatment, medical gas and vacuum source equipment and alarms, plumbing fixtures, specialty units, fans, air handlers, AC units and temperature controls, shall be by representative of manufacturer of respective equipment.
 2. Submit as identified below and as directed in Division 01.
 - a. Names, addresses and phone numbers of contractors and subcontractors. Alphabetical list of all system components, with the name, address, and 24-hour phone number of the company responsible for servicing each item during the first year of operation.
 - b. Complete operating and maintenance instructions and parts lists of all equipment and component parts. Data sheets to show complete internal wiring, and electrical ratings and characteristics, catalog data on component parts whether furnished by equipment manufacturer or others, names, addresses and telephone numbers of source of supply for parts subject to wear or failure, and description of operating, test, adjustment, and maintenance procedures.
 - c. Where data sheets included in manual cover equipment, options, or other features not part of equipment actually furnished, line out these references or otherwise clearly mark so remaining text, diagrams, drawings, schedules, and similar information shall apply specifically to equipment furnished.
 - d. Operating Instructions should include, but not be limited to:
 - 1) Normal starting, operational and shutdown procedures, including emergency procedures for each type of equipment/system.
 - 2) Equipment wiring diagrams.

- 3) All other items as may be specified/required by this Section and the Contract Documents.
- e. Maintenance Instructions
- 1) All items as may be specified/required by this Section and the Contract Documents.
- f. Manufacturers Data (each piece of equipment)
- 1) Installation instructions
 - 2) Drawings and specifications
 - 3) Parts List, including recommended stock and long lead parts/components.
 - 4) Wiring and riser diagrams.
 - 5) Warranties and guarantees for all equipment, materials and components, including repair, replacement and labor from both Contractor and manufacturer as required by the Contract Documents.
 - 6) Certificates of Installation – manufacturer’s certification of supervision during equipment installation and start-up procedures.
 - 7) Instruction certificates – certificates of compliance with Sections specific training and instruction programs.
 - 8) All other items as may be specified/required by this Section and the Contract Documents.
- J. Record Documents:
1. Maintain one (1) complete set of blueline prints and specifications at the job site exclusively for recording deviations from the drawings which are necessary because of job conditions, request for information and/or approved change orders. Record locations and depths of buried and concealed piping, conduits or other systems components from fixed, easily identifiable objects, such as building walls or other fixed physical objects. Where piping or conduits are concealed in walls or other fixed physical objects, indicate distances from building corners or other building features not likely to be disturbed by fixture alterations. Drawings, specifications (as-builts) and approved submittals.
 2. Where the project uses a BIM model the contractor shall keep the model updated in a similar fashion, maintaining the current project record as described in (a), above and submit, in addition to all other requirements of this Section and other provisions of the Contract Documents a complete and accurate BIM model for the project.

3. Prior to Substantial Completion, obtain from the Architect a complete set of electronic CADD drawings. Record all revisions to these drawings to indicate as-built conditions. Indicate all changes, including RFIs, on this set of documents. Submit one set of blueprints of these revised drawings for review. Make necessary changes and deliver to Architect one set of reproducible and one electronic copy, including any BIM model, upon Final Completion and Acceptance. Refer to Division 01 for additional requirements.
4. Provide full size copies of record one-line diagrams. Obtain Record prints from Owner's Representative at Contractor's cost.
5. Furnish one valve chart for plumbing systems. Tag all valves with brass disc and chain. Use no duplicate numbers. Valve chart to indicate valve number, size, location, function and normal position. Bind valve charts with Operating and Maintenance Manuals.
6. All test reports, certifications, and inspection reports.
7. AHJ/Specialty AHJ Approvals (i.e. Fire Marshal and/or Fire Department system approvals).
8. Substantial and Final inspection certificate signed by governing authorities.
9. All other items as may be specified/required by this Section and/or other provisions of the Contract Documents.

1.9 EQUIPMENT DEVIATIONS AND SUBSTITUTIONS

- A. See Division 01 for requirements and procedures related to Deviations and Substitutions. Unless specified elsewhere in the Contract Documents, a minimum of two (2) weeks shall be allowed for evaluation. The burden of all systems re-engineering/design, testing, suitability and constructability is solely placed upon the Contractor for all deviations from the basis of design as reflected in the Contract Documents.
- B. No substitutions will be allowed and/or considered unless the description of a product includes the phrase "approved equal" and then only upon a determination as to equivalency and impact upon the project budget, schedule and the work of others, including any redesign of the project or its system components by the Architect, Engineer or other trades. The final determination as to sufficiency or acceptance of any such substitution and/or deviation properly requested and submitted by Contractor will lie solely with the Architect/Engineer. Contractor may not implement substitutions that have not been approved by Architect/Engineer.
- C. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings which requires any redesign of any portion of the project, including but not limited to the mechanical, electrical, plumbing, structure, or architectural design or any of their respective subcomponents. Contractor shall be responsible to the Architect/Engineer and/or Owner for all costs, expenses and impact to the project budget and/or schedule resulting from any required investigation, analysis or redesign, including but not limited to; payment for required overtime, out-of-house resources/consultants or other higher cost resources of the Architect/Engineer,

Owner or AHJ as may be required to perform the investigation, analysis or redesign (cumulatively and hereinafter, "Deviation Review Costs")

- D. If approved by Architect/Engineer, all such redesign, including and all new drawings and detailing required will be prepared by the Architect/Engineer and their sub-consultants for Change Order documentation for approval by Owner and the Authority having Jurisdiction will be paid by the Contractor as part of the Deviation Review Costs.
- E. Where such approved deviation requires a different quantity and arrangement of piping, wiring, conduit, supports, foundations, pads, curbs, or equipment from that specified or indicated on the drawings or other Contract Documents, Contractor shall be responsible for all such costs, including the work of other trades and shall be solely responsible to furnish and install any such piping, structural supports, insulation, controllers, motors, starters, electrical wiring and conduit, and any other additional equipment required by the system at no additional cost or schedule impact to the project. (Cumulatively and hereinafter "Deviation Construction Costs").

1.10 COORDINATION

- A. Drawings and corresponding electronic media are diagrammatic and indicate the general arrangement of systems and work included in the Work. Consult the drawings, details and other electronic media, for locations of fixtures and equipment; where same are not definitely located, obtain this information from the Architect/Engineer.
- B. The drawings and related electronic media have been made to scale with the best knowledge of conditions, dimensions and space requirements available at the time of design and shall be followed as closely as possible during performance of the Work and coordination with the work of others. The forgoing however shall not relieve Contractor from its responsibility to verify all conditions, dimensions and space requirements prior to commencement of the Work and to immediately report any errors or discrepancies to the Architect/Engineer.
- C. Check drawings and related electronic media of other trades to verify spaces and conditions in which work will be performed prior to commencement of the work. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, Architect shall be notified before proceeding with installation.
- D. If directed by the Architect/Engineer or required for proper installation, execution and coordination of the work, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed.
- E. Take all dimensions from Architectural and Structural Drawings, certified equipment drawings and from the actual field measurements before fabricating work. All conflicts shall immediately be reported to the Architect/Engineer. Contractor is solely responsible for conflicts known or which reasonably should have been known but not reported or resolved before commencement of the work.
- F. Coordinate equipment furnished with all associated project requirements for controls, sequence of operation, and building automation system monitoring and alarms.

- G. Equipment furnished shall fit in allocated space with due provision for manufacturer's recommended access and proper maintenance requirements. Verify and coordinate space requirements with all trades and equipment which comprise the Work. Contractor shall locate equipment and products (specifically including but not limited to water heaters, pumps, , motor control centers, valves, traps, cleanouts, motors, water hammer arrestors, trap primers), which require service, operation, observation, or maintenance in fully accessible positions and so that at least the minimum clearance recommended by manufacture, standard or required by code is provided, even if such clearance is not indicated in the Contract Documents. If required for better accessibility, any change(s) of location shall be submitted to the Architect/Engineer for review and approval before relocation is made. Contractor shall provide access panels, even if not specifically shown on drawings, for concealed devices requiring service. Access panels shall be of a type and finish specified in the Contract Documents, or if not specified shall be of the quality and type acceptable to Architect.
- H. Diagrams - Mechanical, plumbing and electrical riser and other such flow and/or riser diagrams that appear on the drawings and related electronic media are provided with the intent of showing equipment, pipe, valves, conduit, feeder and related specialties and other appurtenances in their proper interrelation. Provide and connect all additional equipment, specialties and appurtenances required by the manufacturer of the equipment furnished for proper operation of the product, whether or not shown, or as required elsewhere in the Contract Documents. In the event of discrepancies between the diagrams and the plans or elevations the diagrams shall govern. Notify the Architect/Engineer in writing of any discrepancies.
- I. Prior to construction, coordinate the Work with that of other trades and building components. Prepare coordination drawings (or other specified electronic media) for all major trades, utilities and other primary systems routing in conjunction with the contract documents to maximize the pre-installation planning and coordination of trades, utilities and systems and minimize the requirement to manage field coordination through the RFI's, ASI's or other similar processes.
- J. Coordinated drawings shall employ grid line identification as used by Architects and include, at a minimum major systems routing and locations and coordination of all graded plumbing lines, fire protection, equipment and components, ceiling appurtenances, lights, fixtures and devices, electrical services, structural systems, architectural walls, features and enclosures.
- K. Coordinate the installation of all building chases, supporting devices, embedded sleeves, anchors and all other wall, floor and ceiling penetrations with structural engineer, Architect, and applicable trade contractors.
- L. Coordinate connection of systems with interior/exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- M. Coordinate requirements for access panels, doors and security grabs where such items requiring access are concealed behind finished surfaces.
- N. Coordinate installation of identifying devices after completing floor and wall covering where devices are applied to such surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment areas.

- O. Before starting work, carefully examine the site and all Contract Documents. Become thoroughly familiar with new and existing conditions governing work on this project. Verify indicated elevations, building measurements, rough-in dimensions and equipment locations before proceeding with any of the work.
- P. Drawings shall be accurately scaled to 1/4 inch = 1 foot or larger using the same version of AutoCAD or other electronic media as used by Architect/Engineer. Drawings shall include all Addenda and Change Order items.
- Q. Contractor shall be solely responsible for coordination and shall bear the cost of its failure to coordinate installation or of failure to advise Architect/Engineer of installation conflicts.
- R. Piping that must be graded shall have right-of-way over other piping or system components.
- S. Sequence, coordinate, and integrate installations of systems materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to building enclosure.

1.11 ELECTRICAL WIRING AND COORDINATION

- A. In general, power wiring will be provided under Division 26 -Electrical, and control wiring will be provided under Division 22 - Plumbing, unless otherwise specified.
- B. Electric wiring shall be in accordance with the requirements of Division 26.
- C. Except where noted otherwise, control wiring under Division 22 shall include all connections to control devices, interlock wiring, control relays, sensing devices, etc. incidental to the building automation system and the proper operation of equipment provided under Division 22.
- D. Control Voltage:
 - 1. Maximum allowable control voltage shall be 120 VAC. Fully protect control circuit conductors in accordance with National Electrical Code. Control transformers shall be provided with two primary fuses and one secondary fuse.
 - 2. Fully coordinate the requirements of each Division with regard to providing a complete DDC Building Automation System. Junction boxes and control transformer connections shall be provided under Division 26.
 - a. Carefully coordinate the interface between the Work of Division 22 (Plumbing), and Division 26 (Electrical) before submitting any equipment for review or commencing installation.
 - b. The following schedule summarizes the division or work and material responsibilities between Division 22 and 26.

ITEM	FURNISHED UNDER	SET IN PLACE OR MOUNTED UNDER	WIRED AND CONNECTED UNDER
Equipment motors	MD 1	MD 1	ED 2
Resistance Heaters	MD	MD	ED
Motor controls where specified as an integral package	MD	MD	ED
Motor controllers	MD	ED 4	ED
Resistance type heater controllers	MD 6	ED 4	ED
Magnetic contactors and magnetic starters with overload trip assembly	ED 4	ED 4	ED
integral control transformers	MD 6	ED 4	ED
Cover-mounted control devices	MD 6	ED 4	ED
Manual motor starters with overload trip assembly	ED 4	ED 4	ED
Motor starter switches	ED 4	ED 4	ED
Thermal or thermal-magnetic circuit breakers	ED 4	ED 4	ED
Control power source for temperature	ED	ED	ED
Level and float switches	MD	MD 5	MD 5
Pipe mounted control devices such as flow switches, flow sensors, valves, and wells.	MD	MD 5	MD 5

ITEM	FURNISHED UNDER	SET IN PLACE OR MOUNTED UNDER	WIRED AND CONNECTED UNDER
Variable frequency drives (VFD) specified to be mounted on or in the Plumbing	MD	MD	ED
VFD specified to be mounted separately from the mechanical equipment	MD	ED	ED

- E. Notes: (1) MD: Mechanical Divisions 21, 22, 23. (2) ED: Electrical Division 26. (3) Fire alarm-related and power wiring provided under Division 26; Control-related wiring and relays provided under Division 212223. (4) If furnished as part of factory equipment under Division 21, 22, 23, wiring and connections only by Electrical Division 26. (5) If any control devices carry the Full Load Current to any motor, they shall be furnished under Division 21, 22, 23, but shall be set in place and connected under Division 26. (6) Except where indicated as part of a motor control center on the Electrical Drawings. (7) Division 26 shall provide the logic contact closure and the wiring to the local DDC temperature control panel. Division 26 shall also provide interface with the fire alarm system, proof of flow devices (duct/fan air flow switches), connecting wiring, smoke control logic, panel, relays, damper monitoring, and associated devices for a complete smoke control system.

1.12 ACCESSIBILITY

- A. Contractor is responsible for verifying that equipment and devices will fit within the space shown on the drawings. Contractor shall locate all equipment which must be serviced, operated or maintained, in fully accessible positions. Such equipment shall include, but not be limited to, valves, traps, clean outs, drain points, motors, controllers, motor control centers, service panels, and drain points, etc. Provide sufficient access space for: all equipment (e.g., CAV / VAV boxes control and damper devices, reheat coil and fan powered units, AHU cooling and heating coils, fire damper access doors and ability to change the linkage, all low point drain valves, heating and cooling coil vents, pre-filter and final filter removal, etc.).
- B. Equipment requiring periodic maintenance shall be installed to permit removal without damage to other work. If required for better accessibility, provide access doors for this purpose. Provide access door to the upstream side of turning vanes and all other equipment and devices requiring maintenance and replacement. All equipment

requiring lubrication shall have accessible external grease fitting for maintenance purposes.

- C. Minor deviations from the drawings may be made to allow for better accessibility, but changes of magnitude or which involve extra cost shall not be made without approval from the Architect/Engineer.

1.13 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** Company specializing in manufacturing the Products specified in this section with minimum 5 years documented experience.
- B. **Installer Qualifications:** Company specializing in performing the work of this section with a minimum of 5 years documented experience. Company personnel shall be approved by manufacturer for all product installations and required training.
- C. Conform to all applicable standards, codes and regulation and industry best practice requirements.
- D. All materials and equipment shall be new, shall bear manufacturer's name, and shall conform to the grade, quality and standards specified herein. Type, capacity and application shall be suitable and capable of satisfactory operation for the purpose intended. All equipment and components shall include UL label and/or marking on equipment body/device including manufacturer's name, pressure rating(s), electrical classification(s), limits and ratings as applicable to individual components for the purpose specified and intended.
- E. **Equipment Selection:** All items of a given type shall be the product of the same manufacturer. Equipment of greater or larger power, dimensions, capacities, and ratings may be considered provided such proposed equipment is approved in writing by Architect/Engineer and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. See Deviations & Substitutions for requirements. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.
- F. **Listing and Labeling:**
 - 1. Provide motors that are listed and labeled. Terms "listed and labeled": As defined by UL, NEC, Article 100 or other applicable recognized agency as specified in the Contract Documents.
 - 2. **Listing and Labeling Agency Qualifications:** A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
 - 3. **All Base materials:** Comply with standard of ASTM and ANSI.
 - 4. **All Pressure Vessels, Relief Valves, Safety Relief Valves and Safety Valves:** Comply with standards, ASME stamped.
 - 5. Steel piping, supports and welding

6. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
 7. Steel supports - Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
 8. Steel pipe welding - Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 9. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 10. All Electrical Devices and Wiring: Conform to standards of NEC. All devices: UL listed and identified.
- G. Cutting and Patching: Unless otherwise required by the Contract Documents, Contractor shall be responsible for all cutting, fitting and patching required to complete the Work, or to make portions of the Work and existing conditions fit together properly, and all such areas shall be restored to the conditions existing prior to the cutting, fitting and patching unless otherwise provided in the Contract Documents.
- H. Contractor shall promptly correct any portion of the Work that is defective or not in accordance with the Contract Documents or rejected by Architect/Engineer or Owner. Contractor shall be responsible for, and pay for all costs arising out of, any additional testing and inspections, demolition, uncovering and replacement and additional design and consulting services required to properly correct any portion of the Work.
- I. Contractor shall comply with the Contract Documents and all Laws, standards and handling criteria regarding hazardous substances, wastes and materials, including asbestos-containing materials, lead-based paints, petroleum (or any constituent thereof), mold, radon, and polychlorinated biphenyl (PCB), ("Hazardous Materials") in performing the Work. Unless required by the Contract Documents, no Hazardous Materials shall be brought onto the Project
- J. Lead Free Requirements
1. Contractor shall endeavor to use lead free products and where required by law, ordinance, regulation or standard all materials products and practices shall comply with limitations and requirements as to the allowable limits and/or percentages of lead. Lead free products must be certified by an independent 3rd party.
 2. This provision shall apply to any and all similarly regulated materials, products and practices that may be considered hazardous or are otherwise regulated by applicable law, ordinance regulation or standard in the project local.

1.14 COMMISSIONING

- A. If, Owner has engaged the services of an independent Commissioning Agent to document the completion of the Plumbing, Controls, Electrical, Communications, and Electronic Safety and Security systems for the project. Specification Section 019113 General Commissioning Requirements detail the requirements for the commissioning

process. Comply with the requirements of specification section 019113 General Commissioning Requirements for the commissioning of the various building systems.

1.15 DELIVERY, STORAGE & HANDLING

- A. All materials and equipment shall be adequately covered and protected against dirt, water, chemical or mechanical damage, and theft. At completion, all work, equipment and materials shall be cleaned, and damage repaired by Contractor. Damaged equipment will be replaced by the contractor if Owner does not accept repairs done to the equipment. Such replacement shall be scheduled to minimize building system interruption if occupied or scheduled for occupancy.
- B. Material delivered at the site shall not be left exposed to the weather or left unattended. Deliver pipes, tubes and conduit with factory-applied end-caps. Contractor shall be responsible to maintain end-caps or provide temporary end caps on all open ended piping, tubes and conduit through shipping, storage, and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture.
- C. Protect stored material from moisture and dirt. Protect plastic pipes and materials from sunlight and support to prevent sagging and bending.
- D. Elevate stored materials above grade. When stored inside, do not exceed structural capacity of the floor.
- E. Provide protective coatings to materials to prevent damage and/or infiltration of moisture and dirt on all materials and equipment including but not limited to cast iron and steel valves.
- F. Contractor shall check the openings in the building and the size of the doors, passages, and openings through which equipment is to be admitted. Wherever necessary, he shall provide the equipment in sections or knocked down in order to admit the equipment through these openings.
- G. Contractor shall provide all rigging, erection and hoisting equipment as required to handle or place equipment and piping in position. This rigging and hoisting equipment shall only be attached and placed on the structure in locations as approved by Architect/Engineer at the site.

1.16 PERMITS, FEES AND UTILITIES

- A. Obtain and pay for all necessary permits, fees and utilities and inspections required to perform the Work.
- B. Coordinate work with local regulatory entities, utility companies and others as required to fully comply with the requirements of this Section and the Contract Documents, including those for both temporary and permanent services.
- C. Permits, fees and utility expenses to be paid by Owner, if any, shall be only as specifically required by the contract documents, and then only to the extent so specified.

1.17 DOCUMENT OWNERSHIP

- A. The Drawings and Specifications, combined with the calculations, field data, notes, and reports, are the intellectual and real property of the Architect and/or Engineer. This covers all forms of written and recorded or electronic media. The reuse of these documents without specific permission of the Engineer is prohibited. The Drawings may be employed by the Owner and Contractor for the express use of constructing, commissioning and operating the facility only upon proper execution of the Agreement for Use of Electronic Files & Data.

1.18 GUARANTEE AND WARRANTY

- A. Contractor warrants to Owner that materials and equipment provided under the Contract will be of notify Contractor of such defect or deficiency in writing. This period of correction relates only to the specific obligation to correct defects and deficiencies and in no way otherwise limits the Contractor's responsibility for Work that is not in accordance with the Contract Documents. If Contractor fails to timely correct defects or deficiencies in the Work, Owner may, at its sole option, correct them and charge contractor for all cost therefore.
- B. See Division 01 including but not limited to Section 017800 - Closeout Submittals, for additional warranty requirements.
- C. Specific exclusions, if any, from this one (1) year warrantee and guarantee period are listed in the individual specification sections.

1.19 LIMITATIONS OF LIABILITY

- A. To the extent any of the following provisions are not more stringently included in the Contract Document the following Limitations of Liability shall apply:
- B. Architect/Engineer is not responsible for Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and is not be responsible for Contractor's failure to perform or furnish the work in accordance with the Contract Documents.
- C. In the event that Architect/Engineer's employees or sub-consultants make comments or issue warnings about safety issues, such comments and warnings shall beconsidered to have been offered by a Good Samaritan and shall not impose any obligation or responsibility.
- D. Engineer will not be responsible for the acts or omissions of Owner, Contractor, any subcontractor, any supplier, or of any other person or organization performing or furnishing any of the portions of the work.
- E. Contractor understands and acknowledges that Engineer is not authorized to order extra work or issue Change Orders to or stop the work, however in the event and to the degree that Engineer may offer advice, suggestions, and opinions Contractor shall not rely on such advice, suggestions, and opinions unless directed in writing by Owner or its designated representative, and shall, in no event, make any claim against the Engineer for any such advice, suggestions, and opinions.

- F. To the fullest extent permitted by law, Contractor shall indemnify and hold harmless Architect, Engineer, and their joint ventures', officers, directors, partners, employees and agents from and against any and all claims, costs, losses and damages (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) caused in whole or in part by the negligent acts or omissions of Contractor; Contractor's officers, directors, partners, employees, agents; or Contractor's subcontractors or material men in the performance of Work. Contractor shall direct its insurer to list Architect, Engineer, and their joint ventures', as Additional Insureds on general liability insurance policies covering this project. Prior to commencing work, Contractor shall submit copies of its certificate of insurance to both Architect and Engineer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 1) AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
 - c. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

- d. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- e. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- f. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

PART 3 - EXECUTION

3.1 DEMOLITION

- A. Refer to Division 01 Sections for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove systems, equipment, and components indicated to be removed.
 - 1. Plumbing fixtures and equipment to Be Removed: Remove fixture and associated supports and piping and cap at last point of continued service. Dead legs may be no longer than 3 times the pipe diameter of the capped branch piping. Cap remaining piping with same or compatible material.

3.2 CONNECTION TO EXISTING SYSTEMS

- A. Connections to existing systems shall be performed during normal operating conditions. All tap connections shall be 'live' or 'wet'. Under the expressed written consent of the Owner, existing systems may be shut down for new connections. Upon approval of shut-down or when 'live' tap connections are to be performed, the Contractor shall schedule with the Owner and provide a minimum of five (5) working days' advanced notice.

3.3 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping to permit valve servicing.

- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
 - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
 - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece cast-brass type with polished chrome-plated finish.
 - g. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with rough-brass finish.
 - h. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
 - i. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
 - 1) Existing Piping: Use the following:
 - a) Chrome-Plated Piping: Split-casting, cast-brass type with chrome-plated finish.
 - b) Insulated Piping: Split-plate, stamped-steel type with concealed hinge and spring clips.
 - c) Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting, cast-brass type with chrome-plated finish.

- d) Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting, cast-brass type with chrome-plated finish.
 - e) Bare Piping in Unfinished Service Spaces: Split-casting, cast-brass type with rough-brass finish.
 - f) Bare Piping in Equipment Rooms: Split-casting, cast-brass type.
 - g) Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting, floor-plate type.
- L. Sleeves are not required for core-drilled holes except for wet areas.
- M. Permanent sleeves are not required for holes formed by removable PE sleeves.
- N. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation except where building separations or seismic joints require additional. Use the following sleeve materials:
 - b. Steel Pipe Sleeves: For pipes smaller than NPS 6.
 - c. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
 - d. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section for flashing.
 - 1) Seal space outside of sleeve fittings with grout.
 - 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
 - 5. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch

annular clear space between pipe and sleeve for installing mechanical sleeve seals.

- e. Install steel pipe for sleeves smaller than 6 inches in diameter.
- f. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
- g. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- 6. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for

1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

- h. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

- 7. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations details on the drawings. Refer to Division 07 Section for materials.

- O. Verify final equipment locations for roughing-in.
- P. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.4 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
 - a. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
 - b. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.5 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.6 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.7 PAINTING

- A. Painting of mechanical systems, equipment, and components is specified in Division 9 Sections.

- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.8 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 1. Construct concrete bases and form equipment anchorages as detailed in the structural drawings.
 2. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 7. Use concrete and reinforcement as specified in Division 3 Sections and the Structural Drawings.

3.9 SAFETY

- A. The Drawings and the Specifications do not include design or construction details or instructions relating to your safety precautions or to means, methods, techniques, sequences or procedures required for you to perform your work.
- B. Provide necessary shoring, railing, barricades, protective devices, safety instructions and procedures to perform the work safely and to comply with the Safety Requirements of the governing authorities.

3.10 COOPERATION WITH OTHER TRADES

- A. Cooperate with other trades in furnishing material and location requirements of sleeves, bucks, chases, mountings, backings, foundations and wiring required for installation of mechanical items. Set sleeves, inserts, anchor bolts, cast-in-place iron work, etc. Upon failure to properly direct, locate and size such work at the correct times, provide additional required cutting and patching as directed and approved.

3.11 EXCAVATION AND BACKFILL

- A. Do necessary trenching and excavating for installation of underground piping and equipment. Use necessary precautions not to affect the bearing value of soil under and near footings. Excavate pipe trenches with proper pitch six inches deeper than required by line grade and prefill to line grade with pea gravel. Where trenching occurs

through existing paving, walks, curbs, etc., patch and repair to original conditions. Compact backfill with vibratory or roller compaction equipment in nine inch layers to 90 percent density. Dispose of excess excavated material as directed. Backfill under floor slabs and under hard surfaced yard areas (i.e. walks, drives, parking areas) to be crushed rock unless otherwise indicated, compacted in nine inch layers. Backfill material and compaction to comply with Site Work Section of these Specifications.

- B. Provide and maintain ample means and devices with which to promptly remove and dispose of water entering the excavation during the time it is being prepared for the pipe or equipment laying, during the laying of pipe or equipment and until the backfill has been completed.

3.12 CLEANING

A. General

1. Clean all dirt and construction dust and debris from all plumbing systems, facilities and equipment and leave in a new condition. Touch up paint where necessary.
2. Where existing systems are expanded and/or remodeled, clean the new installation prior to making final connection to the existing systems.
 - a. Domestic Water System: Flush with clean water to eliminate grease, cuttings and foreign matter; run water until clear and free of oil. Chlorinate domestic water by filling the system with a solution containing 50 parts per million of available chlorine for a period of 24 hours. During this time open and close all valves at least twice. Flush system with water until residual chlorine content is not more than one part per million. Chlorinate or as required by AHJ.
 - b. Final disinfection of domestic water systems includes but is not limited to all domestic water outlets, flush valves faucets, emergency equipment, storage tanks.
 - c. Equipment: remove construction protection tags and labels, thoroughly clean all plumbing equipment, scour all fixtures and trim just prior to building acceptance.

3.13 FINAL OPERATION AND INSTRUCTION

- A. Upon completion of the installation of the equipment prior to final acceptance, operate the plant for a period of 2 eight-hour days; instruct the Owner in all details of operation and maintenance.

1. This requirement is in addition to "Operation Test" specified above.
 - a. Any required instructions from manufacturer's representatives shall be given during this period. The days specified under "Operation Test" do not substitute for these 2 days of final operation and instruction.
 - b. All arrangements for operation periods shall be made through Architect/Engineer and Owner's Representative.

END OF SECTION

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GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Bronze ball valves.
 2. Steel ball valves.
 3. Iron ball valves.
 4. Iron, single-flange butterfly valves.
 5. Iron, grooved-end butterfly valves.
 6. Bronze lift check valves.
 7. Bronze swing check valves.
 8. Iron swing check valves.
 9. Iron swing check valves with closure control.
 10. Iron, grooved-end swing check valves.
 11. Iron, center-guided check valves.
 12. Iron, plate-type check valves.
 13. Bronze gate valves.
 14. Iron gate valves.
 15. Chainwheels.

1.2 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of valve.
1. Certification that products comply with NSF 61 Annex G[**and NSF 372**].

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
 2. Protect threads, flange faces, grooves, and weld ends.
 3. Set gate valves closed to prevent rattling.
 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 5. Set butterfly valves closed or slightly open.
 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
1. Maintain valve end protection.
 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
1. ASME B1.20.1 for threads for threaded end valves.
 2. ASME B16.1 for flanges on iron valves.
 3. ASME B16.5 for flanges on steel valves.
 4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 5. ASME B16.18 for solder-joint connections.
 6. ASME B31.9 for building services piping valves.
- C. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.
- D. Drinking Water System Components - Health Effects and Drinking Water System Components - Lead Content Compliance: NSF 61 and NSF 372.
- E. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- F. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- G. Valve Sizes: Same as upstream piping unless otherwise indicated.
- H. RS Valves in Insulated Piping: With 2-inch stem extensions.
- I. Valve Bypass and Drain Connections: MSS SP-45.
- J. Valve Actuator Types:

1. Gear Actuator: For quarter-turn valves NPS 4 and larger; for butterfly valves NPS 8 and larger.
2. Handwheel: For valves other than quarter-turn types.
3. Handlever: For quarter-turn valves smaller than NPS 4; for butterfly valves NPS 6 and smaller.
4. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 10 plug valves, for each size square plug-valve head.
5. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator; of size and with chain for mounting height, as indicated in the "Valve Installation" Article.

K. Valves in Insulated Piping: With 2-inch stem extensions and the following features:

1. Gate Valves: With rising stem.
2. Ball Valves: Include 2-inch stem extensions.
 - a. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
 - b. Memory stops that are fully adjustable after insulation is applied.
3. Butterfly Valves: With extended neck.

2.2 BRONZE BALL VALVES

A. Bronze Ball Valves, One-Piece with Bronze Trim:

1. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 400 psig.
 - c. Body Design: One piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded.
 - f. Seats: PTFE.
 - g. Stem: Bronze.
 - h. Ball: Chrome-plated brass.
 - i. Port: Reduced.

B. Bronze Ball Valves, One-Piece with Stainless-Steel Trim:

1. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig.
 - c. Body Design: One piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded.
 - f. Seats: PTFE.
 - g. Stem: Stainless steel.
 - h. Ball: Stainless steel, vented.
 - i. Port: Reduced.

- C. Bronze Ball Valves, Two-Piece with Full Port, and Bronze or Brass Trim, Threaded or Soldered Ends:
1. Description:
 - a. Standard: MSS SP-110 or MSS-145.
 - b. CWP Rating: 600 psig.
 - c. Body Design: Two piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded and soldered.
 - f. Seats: PTFE.
 - g. Stem: Bronze or brass.
 - h. Ball: Chrome-plated brass.
 - i. Port: Full.
- D. Bronze Ball Valves, Two-Piece with Full Port, and Bronze or Brass Trim, Press Ends:
1. Description:
 - a. Standard: MSS SP-110 or MSS-145.
 - b. CWP Rating: Minimum 200 psig.
 - c. Body Design: Two piece.
 - d. Body Material: Bronze.
 - e. Ends: Press.
 - f. Press Ends Connections Rating: Minimum 200 psig.
 - g. Seats: PTFE or RTPFE.
 - h. Stem: Bronze or brass.
 - i. Ball: Chrome-plated brass.
 - j. Port: Full.
 - k. O-Ring Seal: EPDM or Buna-N.
- E. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:
1. Description:
 - a. Standard: MSS SP-110 or MSS-145.
 - b. CWP Rating: 600 psig.
 - c. Body Design: Two piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded or soldered.
 - f. Seats: PTFE.
 - g. Stem: Stainless steel.
 - h. Ball: Stainless steel, vented.
 - i. Port: Full.
- F. Bronze Ball Valves, Two-Piece with Regular Port and Bronze or Brass Trim:
1. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig.
 - c. Body Design: Two piece.
 - d. Body Material: Bronze.
 - e. Ends: Threaded.
 - f. Seats: PTFE.
 - g. Stem: Bronze or brass.

- e. Ends: Flanged or threaded.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Regular.

2.4 IRON BALL VALVES

A. Iron Ball Valves, Class 125:

1. Description:

- a. Standard: MSS SP-72.
- b. CWP Rating: 200 psig.
- c. Body Design: Split body.
- d. Body Material: ASTM A126, gray iron.
- e. Ends: Flanged or threaded.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel.
- i. Port: Full.

2.5 IRON, SINGLE-FLANGE BUTTERFLY VALVES

A. Iron, Single-Flange Butterfly Valves with Aluminum-Bronze Disc:

1. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A126, cast iron or ASTM A536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Aluminum bronze.

B. Iron, Single-Flange Butterfly Valves with Ductile-Iron Disc:

1. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A126, cast iron or ASTM A536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Nickel-plated ductile iron.

C. Iron, Single-Flange Butterfly Valves with Stainless-Steel Disc:

1. Description:

- a. Standard: MSS SP-67, Type I.
- b. CWP Rating, NPS 12 and Smaller: 200 psig.

- c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
- d. Body Material: ASTM A126, cast iron or ASTM A536, ductile iron.
- e. Seat: EPDM.
- f. Stem: One- or two-piece stainless steel.
- g. Disc: Stainless steel.

2.6 DUCTILE-IRON, GROOVED-END BUTTERFLY VALVES

- A. Ductile Iron, Grooved-End Butterfly Valves, 175 CWP:
 - 1. Description:
 - a. Standard: MSS SP-67, Type I.
 - b. CWP Rating: 175 psig.
 - c. Body Material: Coated, ductile iron.
 - d. Stem: Two-piece stainless steel.
 - e. Disc: Coated, ductile iron.
 - f. Seal: EPDM.
- B. Ductile Iron, Grooved-End Butterfly Valves, 300 CWP:
 - 1. Description:
 - a. Standard: MSS SP-67, Type I.
 - b. CWP Rating, NPS 8 NPS 8 and Smaller: 300 psig.
 - c. CWP Rating, NPS 10 and Larger: 200 psig.
 - d. Body Material: Coated, ductile iron.
 - e. Stem: Two-piece stainless steel.
 - f. Disc: Coated, ductile iron.
 - g. Seal: EPDM.

2.7 BRONZE LIFT CHECK VALVES

- A. Bronze Lift Check Valves with Bronze Disc, Class 125:
 - 1. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Vertical flow.
 - d. Body Material: ASTM B61 or ASTM B62, bronze.
 - e. Ends: Threaded or soldered. See valve schedule articles.
 - f. Disc: Bronze.
- B. Bronze Lift Check Valves with Nonmetallic Disc, Class 125:
 - 1. Description:
 - a. Standard: MSS SP-80, Type 2.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Vertical flow.
 - d. Body Material: ASTM B61 or ASTM B62, bronze.
 - e. Ends: Threaded or soldered. See valve schedule articles.
 - f. Disc: NBR, PTFE.

2.8 BRONZE SWING CHECK VALVES

- A. Bronze Swing Check Valves with Bronze Disc, Class 125:
 - 1. Description:
 - a. Standard: MSS SP-80, Type 3.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Horizontal flow.
 - d. Body Material: ASTM B62, bronze.
 - e. Ends: Threaded or soldered. See valve schedule articles.
 - f. Disc: Bronze.
- B. Bronze Swing Check Valves with Nonmetallic Disc, Class 125:
 - 1. Description:
 - a. Standard: MSS SP-80, Type 4.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Horizontal flow.
 - d. Body Material: ASTM B62, bronze.
 - e. Ends: Threaded or soldered. See valve schedule articles.
 - f. Disc: PTFE.
- C. Bronze Swing Check Valves with Bronze Disc, Class 150:
 - 1. Description:
 - a. Standard: MSS SP-80, Type 3.
 - b. CWP Rating: 300 psig.
 - c. Body Design: Horizontal flow.
 - d. Body Material: ASTM B62, bronze.
 - e. Ends: Threaded or soldered. See valve schedule articles.
 - f. Disc: Bronze.
- D. Bronze Swing Check Valves with Nonmetallic Disc, Class 150:
 - 1. Description:
 - a. Standard: MSS SP-80, Type 4.
 - b. CWP Rating: 300 psig.
 - c. Body Design: Horizontal flow.
 - d. Body Material: ASTM B62, bronze.
 - e. Ends: Threaded or soldered. See valve schedule articles.
 - f. Disc: PTFE.
- E. Bronze Swing Check Valves, Press Ends:
 - 1. Description:
 - a. Standard: MSS SP-80 and MSS SP-139.
 - b. CWP Rating: Minimum 200 psig.
 - c. Body Design: Horizontal flow.
 - d. Body Material: ASTM B584, bronze.
 - e. Ends: Press.
 - f. Press Ends Connection Rating: Minimum 200 psig.
 - g. Disc: Brass or bronze.

2.9 IRON SWING CHECK VALVES

- A. Iron Swing Check Valves with Metal Seats, Class 125:
1. Description:
 - a. Standard: MSS SP-71, Type I.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Clear or full waterway.
 - d. Body Material: ASTM A126, gray iron with bolted bonnet.
 - e. Ends: Flanged or threaded. See valve schedule articles.
 - f. Trim: Bronze.
 - g. Gasket: Asbestos free.
- B. Iron Swing Check Valves with Nonmetallic-to-Metal Seats, Class 125:
1. Description:
 - a. Standard: MSS SP-71, Type I.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Clear or full waterway.
 - d. Body Material: ASTM A126, gray iron with bolted bonnet.
 - e. Ends: Flanged or threaded. See valve schedule articles.
 - f. Trim: Composition.
 - g. Seat Ring: Bronze.
 - h. Disc Holder: Bronze.
 - i. Disc: PTFE.
 - j. Gasket: Asbestos free.
- C. Iron Swing Check Valves with Metal Seats, Class 250:
1. Description:
 - a. Standard: MSS SP-71, Type I.
 - b. CWP Rating: 500 psig.
 - c. Body Design: Clear or full waterway.
 - d. Body Material: ASTM A126, gray iron with bolted bonnet.
 - e. Ends: Flanged or threaded. See valve schedule articles.
 - f. Trim: Bronze.
 - g. Gasket: Asbestos free.

2.10 IRON SWING CHECK VALVES WITH CLOSURE CONTROL

- A. Iron Swing Check Valves with Lever- and Spring-Closure Control, Class 125:
1. Description:
 - a. Standard: MSS SP-71, Type I.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Clear or full waterway.
 - d. Body Material: ASTM A126, gray iron with bolted bonnet.
 - e. Ends: Flanged or threaded. See valve schedule articles.
 - f. Trim: Bronze.
 - g. Gasket: Asbestos free.
 - h. Closure Control: Factory-installed exterior lever and weight.

B. Iron Swing Check Valves with Lever and Weight-Closure Control, Class 125:

1. Description:

- a. Standard: MSS SP-71, Type I.
- b. CWP Rating: 200 psig.
- c. Body Design: Clear or full waterway.
- d. Body Material: ASTM A126, gray iron with bolted bonnet.
- e. Ends: Flanged or threaded. See valve schedule articles.
- f. Trim: Bronze.
- g. Gasket: Asbestos free.
- h. Closure Control: Factory-installed exterior lever and weight.

2.11 IRON, GROOVED-END SWING CHECK VALVES

A. Iron, Grooved-End Swing Check Valves, 300 CWP:

1. Description:

- a. CWP Rating: 300 psig.
- b. Body Material: ASTM A536, ductile iron.
- c. Seal: EPDM.
- d. Disc: Spring operated, ductile iron or stainless steel.

2.12 IRON, CENTER-GUIDED, SPRING-LOADED CHECK VALVES

A. Iron, Compact-Wafer, Center-Guided Check Valves with Metal Seat, Class 125:

1. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM A126, gray iron.
- d. Style: Compact wafer, spring loaded.
- e. Seat: Bronze.

B. Iron, Compact-Wafer, Center-Guided Check Valves with Metal Seat, Class 300:

1. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 500 psig.
- c. Body Material: ASTM A395/A395M or ASTM A536, ductile iron.
- d. Style: Compact wafer, spring loaded.
- e. Seat: Bronze.

C. Iron Globe, Center-Guided Check Valves with Metal Seat, Class 300:

1. Description:

- a. Standard: MSS SP-125.
- b. CWP Rating: 500 psig.
- c. Body Material: ASTM A395/A395M or ASTM A536, ductile iron.
- d. Style: Globe, spring loaded.
- e. Ends: Flanged.
- f. Seat: Bronze.

- D. Iron, Compact-Wafer, Center-Guided Check Valves with Resilient Seat, Class 125:
1. Description:
 - a. Standard: MSS SP-125.
 - b. CWP Rating: 200 psig.
 - c. Body Material: ASTM A126, gray iron.
 - d. Style: Compact wafer, spring loaded.
 - e. Seat: EPDM
- E. Iron Globe, Center-Guided Check Valves with Resilient Seat, Class 125:
1. Description:
 - a. Standard: MSS SP-125.
 - b. CWP Rating: 200 psig.
 - c. Body Material: ASTM A126, gray iron.
 - d. Style: Globe, spring loaded.
 - e. Ends: Flanged.
 - f. Seat: EPDM
- F. Iron, Compact-Wafer, Center-Guided Check Valves with Resilient Seat, Class 150:
1. Description:
 - a. Standard: MSS SP-125.
 - b. CWP Rating: 300 psig.
 - c. Body Material: ASTM A395/A395M or ASTM A536, ductile iron.
 - d. Style: Compact wafer, spring loaded.
 - e. Seat: EPDM
- G. Iron, Globe, Center-Guided Check Valves with Resilient Seat, Class 150:
1. Description:
 - a. Standard: MSS SP-125.
 - b. CWP Rating: 300 psig.
 - c. Body Material: ASTM A395/A395M or ASTM A536, ductile iron.
 - d. Style: Globe, spring loaded.
 - e. Ends: Flanged.
 - f. Seat: EPDM
- H. Iron, Compact-Wafer, Center-Guided Check Valves with Resilient Seat, Class 250:
1. Description:
 - a. Standard: MSS SP-125.
 - b. CWP Rating: 400 psig.
 - c. Body Material: ASTM A126, gray iron.
 - d. Style: Compact wafer, spring loaded.
 - e. Seat: EPDM
- I. Iron Globe, Center-Guided Check Valves with Resilient Seat, Class 250:
1. Description:
 - a. Standard: MSS SP-125.
 - b. CWP Rating: 400 psig.

- c. Body Material: ASTM A126, gray iron.
 - d. Style: Globe, spring loaded.
 - e. Ends: Flanged.
 - f. Seat: EPDM
- J. Iron, Compact-Wafer, Center-Guided Check Valves with Resilient Seat, Class 300:
- 1. Description:
 - a. Standard: MSS SP-125.
 - b. CWP Rating: 500 psig.
 - c. Body Material: ASTM A395/A395M or ASTM A536, ductile iron.
 - d. Style: Compact wafer, spring loaded.
 - e. Seat: EPDM
- K. Iron Globe, Center-Guided Check Valves with Resilient Seat, Class 300:
- 1. Description:
 - a. Standard: MSS SP-125.
 - b. CWP Rating: 500 psig.
 - c. Body Material: ASTM A395/A395M or ASTM A536, ductile iron.
 - d. Style: Globe, spring loaded.
 - e. Ends: Flanged.
 - f. Seat: EPDM

2.13 IRON, PLATE-TYPE CHECK VALVES

- A. Iron, Dual-Plate Check Valves with Metal Seat, Class 125:
- 1. Standard: API 594.
 - 2. CWP Rating: 200 psig.
 - 3. Body Design: Wafer, spring-loaded plates.
 - 4. Body Material: ASTM A126, gray iron.
 - 5. Seat: Bronze.
- B. Iron, Dual-Plate Check Valves with Metal Seat, Class 150:
- 1. Standard: API 594.
 - 2. CWP Rating: 300 psig.
 - 3. Body Design: Wafer, spring-loaded plates.
 - 4. Body Material: ASTM A395/A395M or ASTM A536, ductile iron.
 - 5. Seat: Bronze.
- C. Iron, Dual-Plate Check Valves with Metal Seat, Class 250:
- 1. Standard: API 594.
 - 2. CWP Rating: 400 psig.
 - 3. Body Design: Wafer, spring-loaded plates.
 - 4. Body Material: ASTM A126, gray iron.
 - 5. Seat: Bronze.
- D. Iron, Dual-Plate Check Valves with Metal Seat, Class 300:
- 1. Standard: API 594.
 - 2. CWP Rating: 500 psig.
 - 3. Body Design: Wafer, spring-loaded plates.
 - 4. Body Material: ASTM A395/A395M or ASTM A536, ductile iron.

5. Seat: Bronze.
- E. Iron, Single-Plate Check Valves with Resilient Seat, Class 125:
1. Standard: API 594.
 2. CWP Rating: 200 psig.
 3. Body Design: Wafer, spring-loaded plate.
 4. Body Material: ASTM A126, gray iron.
 5. Seat: EPDM
- F. Iron, Dual-Plate Check Valves with Resilient Seat, Class 125:
1. Standard: API 594.
 2. CWP Rating: 200 psig.
 3. Body Design: Wafer, spring-loaded plates.
 4. Body Material: ASTM A126, gray iron.
 5. Seat: EPDM
- G. Iron, Dual-Plate Check Valves with Resilient Seat, Class 150:
1. Standard: API 594.
 2. CWP Rating: 300 psig.
 3. Body Design: Wafer, spring-loaded plates.
 4. Body Material: ASTM A395/A395M or ASTM A536, ductile iron.
 5. Seat: EPDM
- H. Iron, Wafer, Single-Plate Check Valves with Resilient Seat, Class 250:
1. Standard: API 594.
 2. CWP Rating: 400 psig.
 3. Body Design: Wafer, spring-loaded plate.
 4. Body Material: ASTM A126, gray iron.
 5. Seat: EPDM
- I. Iron, Dual-Plate Check Valves with Resilient Seat, Class 250:
1. Standard: API 594.
 2. CWP Rating: 400 psig.
 3. Body Design: Wafer, spring-loaded plates.
 4. Body Material: ASTM A126, gray iron.
 5. Seat: [EPDM] [or] [NBR]
- J. Iron, Dual-Plate Check Valves with Resilient Seat, Class 300:
1. Standard: API 594.
 2. CWP Rating: 500 psig.
 3. Body Design: Wafer, spring-loaded plates.
 4. Body Material: ASTM A395/A395M or ASTM A536, ductile iron.
 5. Seat: [EPDM] [or] [NBR]

2.14 BRONZE GATE VALVES

- A. Bronze Gate Valves, NRS, Class 125:
1. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 200 psig.
 - c. Body Material: Bronze with integral seat and screw-in bonnet.

- d. Ends: Threaded or solder joint.
 - e. Stem: Bronze.
 - f. Disc: Solid wedge; bronze.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron, bronze, or aluminum.
- B. Bronze Gate Valves, RS, Class 125:
- 1. Description:
 - a. Standard: MSS SP-80, Type 2.
 - b. CWP Rating: 200 psig.
 - c. Body Material: Bronze with integral seat and screw-in bonnet.
 - d. Ends: Threaded or solder joint.
 - e. Stem: Bronze.
 - f. Disc: Solid wedge; bronze.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron, bronze, or aluminum.
- C. Bronze Gate Valves, NRS, Class 150:
- 1. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 300 psig.
 - c. Body Material: Bronze with integral seat and union-ring bonnet.
 - d. Ends: Threaded.
 - e. Stem: Bronze.
 - f. Disc: Solid wedge; bronze.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron, bronze, or aluminum.
- D. Bronze Gate Valves, RS, Class 150:
- 1. Description:
 - a. Standard: MSS SP-80, Type 2.
 - b. CWP Rating: 300 psig.
 - c. Body Material: Bronze with integral seat and union-ring bonnet.
 - d. Ends: Threaded.
 - e. Stem: Bronze.
 - f. Disc: Solid wedge; bronze.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron, bronze, or aluminum.
- E. Bronze Gate Valves, Press Ends:
- 1. Description:
 - a. Standard: MSS SP-80 and MSS SP-139.
 - b. CWP Rating: Minimum 200 psig.
 - c. Body Material: Bronze with integral seat and union-ring bonnet.
 - d. Ends: Press.
 - e. Press Ends Connection Rating: Minimum 200 psig.
 - f. Stem: Brass or bronze non-rising.
 - g. Disc: Solid wedge; bronze.

- h. Packing: Graphite.
- i. Port: Full.
- j. Handwheel: Malleable iron, bronze, or aluminum.

2.15 IRON GATE VALVES

- A. Iron Gate Valves, NRS, Class 150:
 - 1. Description:
 - a. Standard: MSS SP-70, Type I.
 - b. CWP Rating: 200 psig.
 - c. Body Material: Gray iron with bolted bonnet.
 - d. Ends: Flanged.
 - e. Trim: Bronze.
 - f. Disc: Solid wedge.
 - g. Packing and Gasket: Asbestos free.
- B. Iron Gate Valves, OS&Y, Class 125:
 - 1. Description:
 - a. Standard: MSS SP-70, Type I.
 - b. CWP Rating: 200 psig.
 - c. Body Material: Gray iron with bolted bonnet.
 - d. Ends: Flanged.
 - e. Trim: Bronze.
 - f. Disc: Solid wedge.
 - g. Packing and Gasket: Asbestos free.
- C. Iron Gate Valves, NRS, Class 250:
 - 1. Description:
 - a. Standard: MSS SP-70, Type I.
 - b. CWP Rating: 500 psig.
 - c. Body Material: Gray iron with bolted bonnet.
 - d. Ends: Flanged.
 - e. Trim: Bronze.
 - f. Disc: Solid wedge.
 - g. Packing and Gasket: Asbestos free.
- D. Iron Gate Valves, OS&Y, Class 250:
 - 1. Description:
 - a. Standard: MSS SP-70, Type I.
 - b. CWP Rating: 500 psig.
 - c. Body Material: Gray iron with bolted bonnet.
 - d. Ends: Flanged.
 - e. Trim: Bronze.
 - f. Disc: Solid wedge.
 - g. Packing and Gasket: Asbestos free.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Check Valves: Install check valves for proper direction of flow.
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Check Valves: In horizontal or vertical position, between flanges.
 - 3. Lift Check Valves: With stem upright and plumb.
- F. Install valve tags. Comply with requirements in Section 22 05 53 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
- G. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Check Valves: In horizontal or vertical position, between flanges.
 - 3. Lift Check Valves: With stem upright and plumb.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball, butterfly, or gate valves.
 2. Butterfly Valve Dead-End Service: Single-flange (lug) type.
 3. Throttling Service: Ball or butterfly valves.
 4. Pump-Discharge Check Valves:
 - a. NPS 2 and Smaller: Bronze swing check valves with bronze disc.
 - b. NPS 2-1/2 and Larger for Domestic Water: Iron swing check valves with lever and weight or with spring or iron, center-guided, resilient-seat check valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.
 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
 4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
 5. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 6. For Steel Piping, NPS 5 and Larger: Flanged ends.
 7. For Grooved-End Copper Tubing and Steel Piping: Valve ends may be grooved.

3.5 DOMESTIC, COLD-WATER VALVE SCHEDULE

- A. Pipe **NPS 2** and Smaller:
1. Bronze ball valve, one piece with stainless steel trim. Provide with solder-joint ends.
 2. Bronze ball valves, two-piece with full port and stainless steel trim. Provide with solder-joint ends.
 3. Bronze ball valves, two-piece with regular port and stainless-steel trim.
 4. Bronze swing check valves with bronze disc, Class 150, with soldered end connections.
- B. Pipe **NPS 2-1/2** and Larger:
1. Steel and Iron Valves, NPS 2-1/2 to NPS 4: May be provided with threaded ends instead of flanged ends.
 2. Steel ball valves, Class 150 with full port.
 3. Iron ball valves, Class 150.
 4. Iron, Single-Flange Butterfly Valves: 200 CWP, EPDM seat, stainless-steel disc.
 5. Ductile-Iron, Grooved-End Butterfly Valves: 300 CWP.
 6. Iron swing check valves with nonmetallic-to-metal seats, Class 250, with flanged end connections.

7. Iron swing check valves with closure control lever and Class 125, with flanged end connections.
8. Iron, grooved-end swing check valves, 300 CWP.
9. Iron, center-guided check valves with compact wafer, Class 300.
10. Iron, center-guided check valves with resilient seat, Class 300, with flanged end connections.
11. Iron, dual-plate check valves with resilient seat, Class 300, with flanged end connections.
12. Iron, single-plate check valves with resilient seat, Class 250, with flanged end connections.
13. Iron gate valves, NRS, Class 250 with flanged ends.

END OF SECTION

SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

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.
- B. All support systems, designed and submitted by either the mechanical contractor or separate support contractor, are to meet the criteria of performance requirements and manufacturers listed herein.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal pipe supports.
 - 2. Metal framing systems.
 - 3. Fastener systems.
 - 4. Pipe stands.
 - 5. Pipe-positioning systems.
 - 6. Equipment supports.
- B. Related Requirements:
 - 1. Section 22 05 48 "Vibration and Seismic Controls for Plumbing Piping and Equipment" for vibration isolation devices.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Metal framing systems.
 - 2. Pipe stands.
 - 3. Equipment supports.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Structural-Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.

- B. Pipe Welding Qualifications: Qualify procedures and operators according to 2015 ASME Boiler and Pressure Vessel Code, Section IX.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design trapeze pipe hangers and equipment supports.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 - 3. Design seismic-restraint supports for piping and equipment.

2.2 METAL FRAMING SYSTEMS

- A. MFMA Manufacturer Metal Framing Systems:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. B-line, an Eaton business.
 - b. Mason Industries.
 - c. Tolco Tolstrut.
 - d. Unistrut; Part of Atkore International.
 - 2. Description: Shop- or field-fabricated pipe-support assembly, made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
 - 3. Standard: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 4. Channels: Continuous slotted stainless-steel, Type 304 channel with inturned lips.
 - 5. Channel Width: Selected for applicable load criteria.
 - 6. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
 - 7. Metallic Coating: Electroplated zinc or Hot-dip galvanized.
 - 8. Paint Coating: Green epoxy, acrylic, or urethane.
 - 9. Plastic Coating: PVC
- B. Non-MFMA Manufacturer Metal Framing Systems:

1. Description: Shop- or field-fabricated pipe-support assembly, made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
2. Standard: Comply with MFMA-4, factory-fabricated components for field assembly.
3. Channels: Continuous slotted stainless-steel channel with inturred lips.
4. Channel Width: Select for applicable load criteria.
5. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Metallic Coating: Hot-dip galvanized.
7. Paint Coating: Green epoxy, acrylic, or urethane.
8. Plastic Coating: PVC.

2.3 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. B-Line.
 - b. Hilti, Inc.
 - c. MKT Fastening.
 - d. MKT Fastening, LLC.
 - e. Simpson Strong-Tie Co., Inc.
- B. Mechanical-Expansion Anchors: Insert-wedge-type anchors, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. B-line, an Eaton business.
 - b. Empire Tool and Manufacturing Co., Inc.
 - c. Hilti, Inc.
 - d. ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - e. MKT Fastening, LLC.
 2. Indoor Applications: Stainless steel.
 3. Outdoor Applications: Stainless steel.

2.4 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-carbon-steel shapes.

2.5 MATERIALS

- A. Carbon Steel: ASTM A1011/A1011M.

- B. Structural Steel: ASTM A36/A36M carbon-steel plates, shapes, and bars; black and galvanized.
- C. Stainless Steel: ASTM A240/A240M.
- D. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 SUPPORT INSTALLATION

- A. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- B. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete, after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- C. Install supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- D. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- E. Install supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- F. Install lateral bracing and supports to prevent swaying.
- G. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms, and install reinforcing bars through openings at top of inserts.

- H. Load Distribution: Install supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- I. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- J. Insulated Piping:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating Above and below Ambient Air Temperature: Clamp may project through insulation.
 - b. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - 5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.

3.3 EQUIPMENT SUPPORTS

- A. Grouting: Place grout under supports for equipment, and make bearing surface smooth.
- B. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

- A. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- B. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections, so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.6 PAINTING

- A. Touchup: Clean field welds and abraded, shop-painted areas. Paint exposed areas immediately after erecting hangers and supports. Use same materials as those used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded, shop-painted areas on miscellaneous metal are specified in Section 09 91 13 "Exterior Painting."
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A780/A780M.

3.7 HANGER AND SUPPORT SCHEDULE

- A. Specific support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel supports and metal framing systems and attachments for general service applications.
- F. Use stainless-steel or corrosion-resistant attachments for hostile environment applications.
- G. Use copper-plated pipe hangers and stainless-steel attachments for copper piping and tubing.
- H. Use padded hangers for piping that is subject to scratching.

- I. Horizontal-Piping Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
 5. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
 6. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 7. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 8. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 9. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 10. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- K. Saddles and Shields: [All pipe supports shall be OPA approved or submitted for OSHPD approval with calculations and drawings with a stamp of a licensed structural engineer in the state of California. Unless otherwise noted and except as specified in piping system sections, install pipes per details shown on drawings or as submitted and approved as OPA drawings from manufacturers listed in section 2.2. Where OPA details do not exist details shall be provided for review by OSHPD which are based (MSS) guidelines referenced.] Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal Hanger-Shield Inserts: For supporting insulated pipe.
- L. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

- M. Use powder-actuated fasteners or mechanical-expansion anchors where required in concrete construction.

END OF SECTION

SECTION 22 05 48

VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT

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. Elastomeric isolation pads.
 - 2. Elastomeric isolation mounts.
 - 3. Housed-spring isolators.
 - 4. Restrained-spring isolators.
 - 5. Pipe-riser resilient supports.
 - 6. Resilient pipe guides.
 - 7. Elastomeric hangers.
 - 8. Spring hangers.
 - 9. Seismic Snubbers.
 - 10. Restraint channel bracings.
 - 11. Restraint cables.
 - 12. Seismic-restraint accessories.
 - 13. Steel and inertia, vibration isolation equipment bases.
- B. Provide vibration and seismic restraint for plumbing equipment to prevent the transmission of vibration and mechanically transmitted sound to the building structure and meet applicable codes as indicated on the drawings.
- C. Include adjustments of each mounting system, and the measurement of isolator system performance. Specific mounting arrangements for each item of equipment shall be as described herein, and as specified in other Division 22 sections.

1.3 DEFINITIONS

- A. A_v : Effective peak velocity related acceleration coefficient

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
 - 2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic-restraint component required.

- a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
 - b. Annotate to indicate application of each product submitted and compliance with requirements.
3. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.
- B. Shop Drawings:
1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment.
- C. Delegated-Design Submittal: For each vibration isolation and seismic-restraint device.
1. Include design calculations and details for selecting vibration isolators and seismic restraints complying with performance requirements, design criteria, and analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 2. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, due to seismic forces required to select vibration isolators, and due to seismic restraints.
 3. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification that riser system was examined for excessive stress and that none exists.
 4. Seismic-Restraint Details:
 - a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
 - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
 - c. Coordinate seismic-restraint and vibration isolation details with wind-restraint details required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.
 - d. Preapproval and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of vibration isolation device installation and seismic bracing for plumbing piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.

- B. Qualification Data: For professional engineer and testing agency.
- C. Welding certificates.
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis performed according to AHJ and shall bear anchorage preapproval number, acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a Structural Engineer licensed in California. Testing and calculations must include both shear and tensile loads and 1 test or analysis at 45 degrees to the weakest mode.
- E. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7 and that is acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis performed and shall bear anchorage preapproval number, from an agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a Structural Engineer licensed in California. Testing and calculations must include both shear and tensile loads and 1 test or analysis at 45 degrees to the weakest mode.

1.7 DESIGN CRITERIA

- A. Refer to Structural Drawings and specifications for seismic performance criteria.
- B. Plumbing equipment shall be vibration isolated as specified in this section unless otherwise noted in project-specific acoustical design criteria.
- C. Equipment vibration limits:
 - 1. All equipment shall be statically and dynamically balanced to meet the following vibration limits under all design operating conditions and under support conditions comparable to the conditions specified in the equipment vibration isolation schedule, at the end of this section.

Equipment Type	Vibration Limit inches/sec, RMS
All rotating equipment	0.1
Reciprocating equipment	0.54

2. These vibration limits apply to the three orthogonal axes on the isolated equipment - either on the bearings or the equipment support structure, whichever applicable - and for frequencies between 2 and 200 Hz, using an FFT frequency resolution of 1Hz.
 3. For equipment on inertia bases or with large inertia mass these vibration limits shall be reduced by the ratio equipment weight to total weight of equipment plus inertia mass. Inertia mass refers to non-rotating mass rigidly attached to rotating equipment.
- D. All external vibration isolation and seismic restraint devices specified in this section shall be provided by a single supplier.
- E. All seismic restraint devices specified in this section shall be provided by a single supplier.
- F. All vibration isolation and seismic hardware shall be anchored at all times to the concrete structure.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Refer to structural drawings and specifications for site-specific, seismic anchoring criteria.

2.2 ELASTOMERIC ISOLATION PADS

- A. Elastomeric Isolation Pads: .
1. 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:
 - a. California Dynamics Corporation.
 - b. Kinetics Noise Control, Inc.
 - c. Mason Industries, Inc.
 2. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.
 3. Size: Factory or field cut to match requirements of supported equipment.
 4. Pad Material: Oil and water resistant with elastomeric properties.
 5. Infused nonwoven cotton or synthetic fibers.
 6. Load-bearing metal plates adhered to pads.
 7. Sandwich-Core Material: Resilient and elastomeric.
 - a. Surface Pattern: Waffle pattern.
 - b. Infused nonwoven cotton or synthetic fibers.

2.3 ELASTOMERIC ISOLATION MOUNTS

- A. Double-Deflection, Elastomeric Isolation Mounts:
1. 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:
 - a. California Dynamics Corporation.
 - b. Kinetics Noise Control, Inc.
 - c. Mason Industries, Inc.
 - d. Vibration Eliminator Co., Inc.
 - e. Vibration Isolation.
 2. Mounting Plates:
 - a. Top Plate: Encapsulated steel load transfer top plates, factory drilled and threaded.
 - b. Baseplate: Encapsulated steel bottom plates with holes provided for anchoring to support structure.
 3. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.4 RESTRAINED ELASTOMERIC ISOLATION MOUNTS

- A. Restrained Elastomeric Isolation Mounts:
1. 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:
 - a. California Dynamics Corporation.
 - b. Mason Industries, Inc.
 - c. Vibration Isolation.
 2. Description: All-directional isolator with seismic restraints containing two separate and opposing elastomeric elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
 - a. Housing: Cast-ductile iron or welded steel.
 - b. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.5 RESTRAINT CHANNEL BRACINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. B-line, an Eaton business.
 2. Hilti, Inc.

3. Mason Industries, Inc.
 4. Unistrut; Part of Atkore International.
- B. Description: MFMA-4, shop- or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

2.6 SEISMIC-RESTRAINT ACCESSORIES

- 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. B-line, an Eaton business.
 2. CADDY; a brand of nVent.
 3. Kinetics Noise Control, Inc.
 4. Mason Industries, Inc.
 5. Novia; A Division of C&P.
 6. TOLCO.
- B. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.
- C. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

2.7 MECHANICAL ANCHOR BOLTS

- 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. B-line, an Eaton business.
 2. Hilti, Inc.
 3. Kinetics Noise Control, Inc.
 4. Mason Industries, Inc.
- B. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E488.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.
- B. Hanger-Rod Stiffeners: Install hanger-rod stiffeners as required by applicable code or where indicated or scheduled on Drawings as required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry present and future static and seismic loads within specified loading limits.

3.3 VIBRATION CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

- A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 03 30 00 "Cast-in-Place Concrete."
- B. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.
- C. Equipment Restraints:
 - 1. Install seismic snubbers on plumbing equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
 - 2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
 - 3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- D. Piping Restraints:
 - 1. Comply with requirements in MSS SP-127.
- E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- F. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- G. Drilled-in Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid

prestressed 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. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

- A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment. Comply with requirements in individual plumbing system specialties specifications for piping flexible connections.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
 2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.
 3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
 4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
 5. Test to 90 percent of rated proof load of device.
 6. Measure isolator restraint clearance.
 7. Measure isolator deflection.
 8. Verify snubber minimum clearances.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

END OF SECTION

SECTION 22 05 53**IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT****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. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Pipe labels.
 - 4. Stencils.
 - 5. Valve tags.
 - 6. Warning tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS**2.1 EQUIPMENT LABELS**

- A. Metal Labels for Equipment:
 - 1. Material and Thickness: Stainless steel, 0.025-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Letter Color: White
 - 3. Background Color: Black
 - 4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 - 5. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
 - 6. Fasteners: Stainless-steel rivets or self-tapping screws.

7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 2. Letter Color: White
 3. Background Color: Black
 4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
 7. Fasteners: Stainless-steel rivets or self-tapping screws.
 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Black
- C. Background Color: Yellow
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information plus emergency notification instructions.

2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping-system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: Size letters according to ASME A13.1 for piping.

2.4 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
 - 1. Tag Material: stainless steel, 0.025-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Fasteners: Brass S-hook.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch pdf. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Valve-tag schedule shall be included in operation and maintenance data.

2.5 WARNING TAGS

- A. Description: Preprinted or partially preprinted accident-prevention tags of plasticized card stock with matte finish suitable for writing.
 - 1. Size: Approximately 4 by 7 inches
 - 2. Fasteners: Reinforced grommet and wire.
 - 3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
 - 4. Color: Safety yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

- A. Piping Color Coding: Painting of piping is specified in Section 09 91 23 "Interior Painting."
 - 1. Identification Paint: Use for contrasting background.
- B. Pipe Label Locations: Locate pipe labels where piping is exposed; pump rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through floors and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 10 feet along each run.
- C. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- D. Pipe Label Color Schedule:
 - 1. Domestic Water Piping
 - a. Background: Safety green
 - b. Letter Colors: White

3.5 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 - 1. Valve-Tag Size and Shape:
 - a. Cold Water: 2 inches, round
 - 2. Valve-Tag Colors:

a. Cold Water: Safety green

3. Letter Colors:

a. Cold Water: White

3.6 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION

SECTION 22 07 19**PLUMBING PIPING 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. Section includes insulating the following plumbing piping services:
 - 1. Domestic cold-water piping.
- B. Related Sections:
 - 1. Section 22 07 16 "Plumbing Equipment Insulation" for equipment insulation.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).
- B. Sustainable Design Submittals:
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 - 2. Detail attachment and covering of heat tracing inside insulation.
 - 3. Detail insulation application at pipe expansion joints for each type of insulation.
 - 4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 - 5. Detail removable insulation at piping specialties, equipment connections, and access panels.
 - 6. Detail application of field-applied jackets.
 - 7. Detail application at linkages of control devices.
- D. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:
 - 1. Preformed Pipe Insulation Materials: 12 inches long by NPC 2.

2. Jacket Materials for Pipe: 12 inches long by NPS 2.
3. Sheet Jacket Materials: 12 inches square.
4. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 1. Insulation Installed Indoors: Flame-spread index of 25 or less and smoke-developed index of 50 or less.
 2. Insulation Installed Outdoors: Flame-spread index of 75 or less and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come into contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable in accordance with ASTM C795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Comply with ASTM C552.
 - 1. Preformed Pipe Insulation: Type II, Class 1, without jacket.
 - 2. Preformed Pipe Insulation: Type II, Class 2, with factory-applied ASJ-SSL jacket.
 - 3. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.
 - 4. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- G. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C534/C534M, Type I for tubular materials.
- H. Mineral-Fiber, Preformed Pipe: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C547.
 - 1. Preformed Pipe Insulation: Type I, Grade A, with factory-applied ASJ-SSL.
 - 2. 850 deg F.
 - 3. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.

4. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- I. Phenolic: Preformed pipe insulation of rigid, expanded, closed-cell structure. Comply with ASTM C1126.
 1. Preformed Pipe Insulation: Type III, with factory-applied ASJ.
 2. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.
 3. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - J. Polyolefin: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C534/C534M or ASTM C1427, Type I, Grade 1, for tubular materials.

2.2 INSULATING CEMENTS

- A. Mineral-Fiber Insulating Cement: Comply with ASTM C195.
- B. Expanded or Exfoliated Vermiculite Insulating Cement: Comply with ASTM C196.
- C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C449.

2.3 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F.
- C. Flexible Elastomeric and Polyolefin Adhesive: Solvent-based adhesive.
 1. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less as tested in accordance with ASTM E84.
 2. Wet Flash Point: Below 0 deg F.
 3. Service Temperature Range: 40 to 200 deg F.
 4. Color: Black.
- D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
- E. Phenolic Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.
- F. ASJ Adhesive and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A, for bonding insulation jacket lap seams and joints.
- G. PVC Jacket Adhesive: Compatible with PVC jacket.

2.4 MASTICS AND COATINGS

- A. Materials shall be compatible with insulation materials, jackets, and substrates.
- B. Vapor-Retarder Mastic, Water Based: Suitable for indoor use on below-ambient services.
 - 1. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
 - 2. Service Temperature Range: 0 to plus 180 deg F.
 - 3. Comply with MIL-PRF-19565C, Type II, for permeance requirements.
 - 4. Color: White
- C. Vapor-Retarder Mastic, Solvent Based, Indoor Use: Suitable for indoor use on below-ambient services.
 - 1. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
 - 2. Service Temperature Range: 0 to 180 deg F.
 - 3. Color: White
- D. Vapor-Retarder Mastic, Solvent Based, Outdoor Use: Suitable for outdoor use on below-ambient services.
 - 1. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
 - 2. Service Temperature Range: Minus 50 to plus 220 deg F.
 - 3. Color: White
- E. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
 - 1. Water-Vapor Permeance: ASTM E96/E96M, greater than 1.0 perm at manufacturer's recommended dry film thickness.
 - 2. Service Temperature Range: 0 to plus 180 deg F.
 - 3. Color: White

2.5 LAGGING ADHESIVES

- A. Adhesives shall comply with MIL-A-3316C, Class I, Grade A, and shall be compatible with insulation materials, jackets, and substrates.
 - 1. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.
 - 2. Service Temperature Range: 0 to plus 180 deg F.
 - 3. Color: White.

2.6 SEALANTS

- A. Materials shall be as recommended by the insulation manufacturer and shall be compatible with insulation materials, jackets, and substrates.
- B. Joint Sealants:
 - 1. Permanently flexible, elastomeric sealant.
 - 2. Service Temperature Range: Minus 58 to plus 176 deg F.
 - 3. Color: White or gray.
- C. FSK and Metal Jacket Flashing Sealants:
 - 1. Fire- and water-resistant, flexible, elastomeric sealant.
 - 2. Service Temperature Range: Minus 40 to plus 250 deg F.
 - 3. Color: Aluminum.
- D. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:
 - 1. Fire- and water-resistant, flexible, elastomeric sealant.
 - 2. Service Temperature Range: Minus 40 to plus 250 deg F.
 - 3. Color: White.

2.7 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
 - 1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I.
 - 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.
 - 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C1136, Type II.

2.8 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Glass-Fiber Fabric: Approximately 2 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in. for covering pipe and pipe fittings.
- B. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for pipe.

2.9 FIELD-APPLIED CLOTHS

- A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 8 oz./sq. yd.

2.10 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C1136.
 - 1. Width: 3 inches
 - 2. Thickness: 11.5 mils
 - 3. Adhesion: 90 ounces force/inch in width.
 - 4. Elongation: 2 percent.
 - 5. Tensile Strength: 40 lbf/inch in width.
 - 6. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C1136.
 - 1. Width: 3 inches.
 - 2. Thickness: 6.5 mils.
 - 3. Adhesion: 90 ounces force/inch in width.
 - 4. Elongation: 2 percent.
 - 5. Tensile Strength: 40 lbf/inch in width.
 - 6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
 - 1. Width: 2 inches.
 - 2. Thickness: 6 mils.
 - 3. Adhesion: 64 ounces force/inch in width.
 - 4. Elongation: 500 percent.
 - 5. Tensile Strength: 18 lbf/inch in width.

- D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
 - 1. Width: 2 inches.
 - 2. Thickness: 3.7 mils.
 - 3. Adhesion: 100 ounces force/inch in width.
 - 4. Elongation: 5 percent.
 - 5. Tensile Strength: 34 lbf/inch in width.

2.11 SECUREMENTS

- A. Bands:
 - 1. Stainless Steel: ASTM A240/A240M, Type 304; 0.015 inch thick, 1/2 inch wide with closed seal.
 - 2. Aluminum: ASTM B209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with closed seal.
- B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
- C. Wire: 0.062-inch soft-annealed, stainless steel.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 - 1. Verify that systems to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
 - 1. Carbon Steel: Coat carbon steel operating at a service temperature of between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.

- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
 - 3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.

3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 25 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.
- P. For above-ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Cleanouts.

3.4 PENETRATIONS

1. Seal penetrations with flashing sealant.

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 2. Insulate pipe elbows using preformed fitting insulation made from same material and density as that of adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a

- smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges, mechanical couplings, and unions, using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as that of adjoining pipe insulation.

2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least 2 times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF CELLULAR-GLASS INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as that of pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.7 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as that of pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as that of pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.8 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.

3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.9 INSTALLATION OF PHENOLIC INSULATION

A. General Installation Requirements:

1. Secure single-layer insulation with stainless steel bands at 12-inch intervals, and tighten bands without deforming insulation materials.
2. Install two-layer insulation with joints tightly butted and staggered at least 3 inches. Secure inner layer with 0.062-inch wire spaced at 12-inch intervals. Secure outer layer with stainless steel bands at 12-inch intervals.

B. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets with vapor retarders on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

C. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of block insulation of same material and thickness as that of pipe insulation.

D. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed insulation sections of same material as that of straight segments of pipe insulation. Secure according to manufacturer's written instructions.

E. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed insulation sections of same material as that of straight segments of pipe insulation. Secure according to manufacturer's written instructions.

2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.10 INSTALLATION OF POLYOLEFIN INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Seal split-tube longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyolefin sheet insulation of same thickness as that of pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of polyolefin pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install cut sections of polyolefin pipe and sheet insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.11 FIELD-APPLIED JACKET INSTALLATION

- #### A.
- Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
 2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
 3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where FSK jackets are indicated, install as follows:
1. Draw jacket material smooth and tight.
 2. Install lap or joint strips with same material as jacket.
 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless steel bands 12 inches o.c. and at end joints.

3.12 FINISHES

- A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."
1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Owner. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless steel jackets.

3.13 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections.
- B. Engage a qualified testing agency to perform tests and inspections.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- D. Perform tests and inspections with the assistance of a factory-authorized service representative].
- E. Tests and Inspections: Inspect pipe, fittings, strainers, and valves, randomly selected by Approved third-party, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- F. All insulation applications will be considered defective if they do not pass tests and inspections.
- G. Prepare test and inspection reports.

3.14 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Underground piping.

3.15 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Cold Water:
 - 1. NPS 1 and Smaller: Insulation shall be one of the following:
 - a. Cellular Glass: 1-1/2 inches thick.
 - b. Flexible Elastomeric: 1 inch thick.

3.16 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

- A. Domestic Water Piping:
 - 1. All Pipe Sizes: Insulation shall be [**one of**] the following:
 - a. Cellular Glass: 2 inches thick.

- b. Flexible Elastomeric: 2 inches thick.

END OF SECTION

SECTION 22 11 16
DOMESTIC WATER PIPING

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. Ductile-iron pipe and fittings.
 - 2. PVC pipe and fittings.
 - 3. Piping joining materials.
 - 4. Transition fittings.
- B. Related Requirements:
 - 1. Section 22 11 13 "Facility Water Distribution Piping" for water-service piping outside the building from source to the point where water-service piping enters the building.

1.3 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.
- B. Sustainable Design Submittals:

1.4 INFORMATIONAL SUBMITTALS

- A. System purging and disinfecting activities report.
- B. Field quality-control reports.

1.5 FIELD CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of water service.
 - 2. Do not interrupt water service without Owner's written permission.

PART 2 - PRODUCTS**2.1 PIPING MATERIALS**

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372.

2.2 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe:
 - 1. AWWA C151/A21.51, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.
 - 2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- B. Standard-Pattern, Mechanical-Joint Fittings:
 - 1. AWWA C110/A21.10, ductile or gray iron.
 - 2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- C. Compact-Pattern, Mechanical-Joint Fittings:
 - 1. AWWA C153/A21.53, ductile iron.
 - 2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
- D. Push-on-Joint, Ductile-Iron Pipe:
 - 1. AWWA C151/A21.51.
 - 2. Push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated.
- E. Standard-Pattern, Push-on-Joint Fittings:
 - 1. AWWA C110/A21.10, ductile or gray iron.
 - 2. Gaskets: AWWA C111/A21.11, rubber.
- F. Compact-Pattern, Push-on-Joint Fittings:
 - 1. AWWA C153/A21.53, ductile iron.
 - 2. Gaskets: AWWA C111/A21.11, rubber.
- G. Plain-End, Ductile-Iron Pipe: AWWA C151/A21.51.
- H. Appurtenances for Grooved-End, Ductile-Iron Pipe:

1. Fittings for Grooved-End, Ductile-Iron Pipe: ASTM A 47/A 47M, malleable-iron castings or ASTM A 536, ductile-iron castings with dimensions that match pipe.
2. Mechanical Couplings for Grooved-End, Ductile-Iron-Piping:
 - a. AWWA C606 for ductile-iron-pipe dimensions.
 - b. Ferrous housing sections.
 - c. EPDM-rubber gaskets suitable for hot and cold water.
 - d. Bolts and nuts.
 - e. Minimum Pressure Rating:
 - 1) NPS 14 to NPS 18: 250 psig.
 - 2) NPS 20 to NPS 46: 150 psig.

2.3 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials:
 1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
 2. Full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys.
- D. Flux: ASTM B 813, water flushable.
- E. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.
- F. Solvent Cements for Joining CPVC Piping and Tubing: ASTM F 493.
- G. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
- H. Plastic, Pipe-Flange Gaskets, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.4 TRANSITION FITTINGS

- A. General Requirements:
 1. Same size as pipes to be joined.
 2. Pressure rating at least equal to pipes to be joined.
 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- C. Sleeve-Type Transition Coupling: AWWA C219.
- D. Plastic-to-Metal Transition Fittings:

1. Description:

- a. PVC one-piece fitting with manufacturer's Schedule 80 Unions in "Plastic-to-Metal Transition Unions" Paragraph below are available in NPS 1/2 to NPS 4.

E. Plastic-to-Metal Transition Unions:

1. Description:

- a. PVC four-part union.

PART 3 - EXECUTION**3.1 EARTHWORK**

- A. Comply with requirements in Section 31 20 00 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.
- D. Install underground ductile-iron pipe in PE encasement according to ASTM A 674 or AWWA C105/A21.5.
- E. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 22 05 19 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 22 11 19 "Domestic Water Piping Specialties."
- F. Install shutoff valve immediately upstream of each dielectric fitting.
- G. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 22 11 19 "Domestic Water Piping Specialties."
- H. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.
- I. Rough-in domestic water piping for water-meter installation according to utility company's requirements.

- J. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices in Section 22 05 48 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- K. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- L. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- M. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- N. Install piping to permit valve servicing.
- O. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- P. Install piping free of sags and bends.
- Q. Install fittings for changes in direction and branch connections.
- R. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- S. Install pressure gages on suction and discharge piping for each plumbing pump and packaged booster pump. Comply with requirements for pressure gages in Section 22 05 19 "Meters and Gages for Plumbing Piping."
- T. Install sleeves for piping penetrations of walls, ceilings, and floors.
- U. Install sleeve seals for piping penetrations of concrete walls and slabs.
- V. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

- D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Braze Joints" chapter.
- E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Pressure-Sealed Joints for Copper Tubing: Join copper tube and pressure-seal fittings with tools and procedure recommended by pressure-seal-fitting manufacturer. Leave insertion marks on pipe after assembly.
- G. Push-on Joints for Copper Tubing: Clean end of tube. Measure insertion depth with manufacturer's depth gage. Join copper tube and push-on-joint fittings by inserting tube to measured depth.
- H. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- I. Joint Construction for Grooved-End Copper Tubing: Make joints according to AWWA C606. Roll groove ends of tubes. Lubricate and install gasket over ends of tubes or tube and fitting. Install coupling housing sections over gasket with keys seated in tubing grooves. Install and tighten housing bolts.
- J. Joint Construction for Grooved-End, Ductile-Iron Piping: Make joints according to AWWA C606. Cut round-bottom grooves in ends of pipe at gasket-seat dimension required for specified (flexible or rigid) joint. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections over gasket with keys seated in piping grooves. Install and tighten housing bolts.
- K. Joint Construction for Grooved-End Steel Piping: Make joints according to AWWA C606. Roll groove ends of pipe as specified. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections over gasket with keys seated in piping grooves. Install and tighten housing bolts.
- L. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- M. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
 - 1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
 - 2. Fittings for NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

3.5 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings.
- C. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.6 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for seismic-restraint devices specified in Section 22 05 48 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Comply with requirements for hangers, supports, and anchor devices in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - 3. Base of Vertical Piping: MSS Type 52, spring hangers.

Support horizontal piping within 12 inches of each fitting.

- C. Support vertical runs of copper and ductile iron piping to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.

3.8 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 22 05 53 "Identification for Plumbing Piping and Equipment."
- B. Label pressure piping with system operating pressure.

3.9 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

1. Piping Inspections:
 - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
 - c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
 - d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
 2. Piping Tests:
 - a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.10 ADJUSTING

- A. Perform the following adjustments before operation:
1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Open throttling valves to proper setting.

4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
6. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.
- B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Aboveground domestic water piping, NPS 2 and smaller, shall be the following:
 1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); wrought-copper, solder-joint fittings; and soldered joints.
 2. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); copper pressure-seal-joint fittings; and pressure-sealed joints.

- D. Aboveground domestic water piping, NPS 5 to NPS 8, shall be one of the following:
1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B) wrought-copper, solder-joint fittings; and brazed joints.
 2. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); grooved-joint, copper-tube appurtenances; and grooved joints.
 3. Stainless-steel Schedule 10 pipe, grooved-joint fittings, and grooved joints.

3.13 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.
 2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
- B. Iron grooved-end valves may be used with grooved-end piping.

END OF SECTION

SECTION 221123.13**DOMESTIC-WATER PACKAGED BOOSTER PUMPS****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. Multiplex, variable-speed booster pumps.

1.3 DEFINITIONS

- A. PID: Proportional Integral Derivative.
- B. VFC: Variable-frequency controller.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, and dimensions of individual components and profiles.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
 - 3. BAS Integration: None required.
- B. Shop Drawings: For booster pumps.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include diagrams for power, signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For booster pumps to include in emergency, operation, and maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Retain protective coatings and flange's protective covers during storage.

1.7 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 - PRODUCTS**2.1 PERFORMANCE REQUIREMENTS**

- A. Drinking Water System Components - Health Effects and Drinking Water System Components - Lead Content Compliance: NSF 61 and NSF 372.
- B. Seismic Performance: Booster pumps shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. The term "withstand" means "the booster pump will remain in place without separation of any parts from the booster pump when subjected to the seismic forces specified and the booster pump will be fully operational after the seismic event."

2.2 MULTIPLEX, VARIABLE-SPEED BOOSTER PUMPS

- A. Manufacturers
 - 1. Flowtherm
 - 2. Syncroflow
 - 3. Grundfos Armstrong
 - 4. Or equal
- B. Description: Factory-assembled and tested, fluid-handling system for domestic water, with pumps, piping, valves, specialties, and controls, and mounted on base.
- C. Product: (Basis of Design)
 - 1. Manufacturers: FlowTherm Systems or approved equal. Alternate packaged system manufacturers must be able to demonstrate a successful history of manufacturing similar systems for a minimum of 10 years.
 - 2. Booster pump package shall be UL Listed, NSF 61/372 certified compliant, and have all components frame mounted, piped, painted, wired and factory tested.

All wetted surfaces shall be lead free. Package shall include triplex pumps, manifolds and control panel. Package shall have a single point 460 volt 3 phase power connection.

3. Pumps:
 - a. Pumps shall be mounted vertical multistage with stainless steel fitted construction and mechanical seals as called out on the plans. Pumps casings shall include vent and drain ports at the top and the bottom of the casings.
 - b. Pumps shall be rated with a maximum working pressure of 360 psig for vertical multi-stage and 225F continuous operating temperature.
 - c. Pumps shall run without excessive noise or vibration.
4. Pumps motors shall be VFD-rated premium efficient motors and shall meet the efficiency requirements of EISA 2007. Motor shall have an TEFC enclosure as called out in the equipment schedule. (Motor shall be provided with shaft grounding.)
5. Each pump and motor to have nameplate listing manufacturer's name, pump serial number, capacity in GPM and feet of head at design conditions, motor horsepower, voltage frequency, speed and full load current.
6. Check valves shall be NSF61/372 approved lead free, cast iron body with fusion epoxy coating, center guided with stainless steel spring, and lead-free bronze discs.
7. Isolation valves at inlet and outlet of each pump shall be NSF61/372 approved butterfly or ball valves with union or flanged connections.
8. Pump manifold headers shall be 304 stainless steel schedule 10 welded pipe for cold water service and 316 stainless steel schedule 10 welded pipe for hot water service. Header pipe size shall be designed or a maximum of 10 fps velocity. All pipe welds shall be performed by ASME Section IX certified welders and shall be welded to ASME/ANSI B31-9 specifications. System suction and discharge connections shall be grooved.
9. Pressure transducers shall be supplied on the suction and discharge manifold headers and factory wired to the control panel. For atmospheric break tank applications, the suction pressure transducer is mounted on the break tank to indicate tank level on the touchscreen display.
10. The control system shall be configured for "pressure staging" in a lead/lag sequence.
11. Each pump shall be fitted with a thermally activated purge valve to allow water to be purged to a remote drain in the event of a system overheating.
12. The booster pump package shall include a factory wired Aqualogic™ XL control panel, UL 508 listed in a NEMA 3R enclosure with double dead front door with single point power connection and all necessary components to allow for automatic operation of the variable speed pumps. The panel shall include the following components:
 - a. Main power disconnect, non-fused
 - b. Control circuit transformer with fused secondary.
 - c. Variable Frequency Drive for each pump
 - d. Through the door circuit breaker disconnect for each pump.
 - e. H-O-A selector switch for each pump
 - f. Door Mounted Pump Status Lights shall include as a minimum:

- 1) Pump Run
 - 2) Pump Out Of Service
 - 3) General Alarm
- g. Digital programmable logic controller
- h. HMI - Door mounted 6" color graphic touch screen display.
- i. Audible General Fault Alarm – includes a push to silence button and a set of dry contacts wired to a terminal strip for remote monitoring. A general fault alarm shall occur upon pump fault, VFD fault, PLC fault, transducer failure, high system pressure, low suction pressure, overload and network failure. The PLC shall maintain a data log including a date and time stamp of the past 20 system and VFD faults. These faults shall be displayed in English text on the HMI.
- j. The micro-processor based supervisory controller (HMI) shall be a panel door mounted unit with color graphic touch screen display. The controller shall include PID control functions and control the VFD's through a network interface. In addition to sending the run command and speed reference signal to the VFD's through the network interface, the HMI shall display line voltage, output frequency, output current and fault conditions for each VFD. The HMI shall provide an easy to use operator interface to all system parameters and display those parameters in plain English and engineering unites. Monitoring functions shall be available to all users, but access to parameters shall be restricted by two levels of password protection.
- k. Standard Variable Frequency Drive (VFD) features shall include over current, earth fault, electronic motor overload protection, over temperature, over voltage, under voltage, phase failure, PID close-loop controller, and automatic energy saving mode, motor synchronization, and user macro storage, auto restart after power failure, electronic motor potentiometer, 16 mixed frequencies and min/max frequency limitation.
- l. Control logic shall include an energy saving proof of no demand shutdown, NDS, which tests the system demand and then shuts off the lead pump if no demand is proven. The lag pumps shall shut off when it operates at its minimum speed for an adjustable elapsed time.

The control logic shall also include the energy saving feature of dynamic set point adjustment, DSA, which automatically lowers or increases the system discharge operating pressure set point as the system demand changes. Alternative designs that do not utilize a built in software algorithm to compensate for the variable friction losses shall not be allowed to have their pressure transducer mounted on the discharge header; instead their transducer shall be provided loose and installed at the furthest remote location of the system to account for the variable friction losses within the piping system. The controls shall automatically stage the pumps and adjust the pump speed based on discharge pressure control. The lead and lag pumps shall be rotated after each system shutdown. The controls shall start a lag pump on lead pump failure. A high temperature safety shut down system shall be provided which uses a temperature sensor which measures the discharge water temperature and is directly connected to the PLC. If a high temperature occurs the system shall shut down and go into alarm. The pump water temperature monitoring must be used as a safety feature and cannot be used as an operating control. The controls shall

include pump minimum run time and pump maximum run time adjustable set points.

- m. The entire system shall be pre-assembled on a heavy structural steel frame. The frame shall be welded in accordance with AWS D1.1 specifications. The steel frame shall have a zinc oxide primer and a machine enamel finish coat.
- n. Hydro-pneumatic bladder tank shall be ASME rated with a ring base and replaceable bladder. The tank shall be provided a union isolation ball valve, pressure gauge and drain valve. The tank shall ship loose for field installation.
- o. Refer to booster pump schedule on project drawings for capacity requirements.
- p. Motors: Select motors that will not overload through full range of pump performance curve.
- q. VFC: Comply with Section 262923 "Variable-Frequency Motor Controllers."
 - 1) Instrumentation: Suction and discharge pressure gauges.
 - 2) Lights: Running light for each pump.
 - 3) Alarm Signal Device: Sounds alarm when backup pumps are operating.
 - a) Time Delay: Controls alarm operation; adjustable from 1 to 300 seconds, with automatic reset.
 - 4) Thermal-bleed cutoff.
 - 5) Low-suction-pressure cutout.
- r. Base: Structural steel.
- s. Capacities and Characteristics: See schedule on drawings.

2.3 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors.
 - 1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
 - 2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in NFPA 70.

2.4 SOURCE QUALITY CONTROL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- B. ASME Compliance: Comply with ASME B31.9 for piping.
- C. UL Compliance for Packaged Pumping Systems:

1. UL 508, "Industrial Control Equipment."
 2. UL 508A, "Industrial Control Panels."
 3. UL 778, "Motor-Operated Water Pumps."
 4. UL 1995, "Heating and Cooling Equipment."
- D. Booster pumps shall be listed and labeled as packaged pumping systems by testing agency acceptable to authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for booster pumps to verify actual locations of piping connections before booster-pump installation.

3.2 INSTALLATION

- A. Booster-Pump Mounting:
1. Install booster pumps on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
 2. Comply with requirements for vibration isolation and seismic-control devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Support connected domestic-water piping so weight of piping is not supported by booster pumps.
- C. Install pipe and fittings in accordance with reference standards, manufacturer's recommendations and recognized industry practices.
- D. Field piping includes connections to suction and discharge headers, drain piping and piping to hydro-pneumatic pressure tank, when not skid mounted, with union ball valve, pressure gauge and drain.
- E. Field electrical connections include main power to the control panel and control wiring to remote pressure transducer if required.
- F. Flush and clean piping prior to testing.
- G. The manufacturer shall pressure test the system prior to shipment. Test piping with water to a pressure of (125 psi) for 1 hour. No decrease in pressure allowed. Inspect joints in system under test.
- H. Defective work or material shall be replaced or repaired as necessary and inspection and test repeated. Repairs shall be made with new materials. Test reports shall be included in the owner's manual.

- I. The manufacturer shall test the control panel including operating logic, safeties and wiring prior to shipment.
- J. Pressure test and control panel tests reports shall be signed by the manufacturer and included with the equipment O&M's.
- K. The manufacturer's representative shall provide a system check and start-up service for the system. The system shall be warranted (including parts and labor) for a period of 12 months from date of start-up for 18 months after shipment, whichever comes first.

3.3 PIPING CONNECTIONS

- A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Booster-Pump Piping Connections: Connect domestic-water piping to booster pumps. Install suction and discharge pipe equal to or greater than size of system suction and discharge piping.
 - 1. Install shutoff valves on piping connections to booster-pump suction and discharge piping. Install butterfly valves same size as suction and discharge piping. Comply with requirements for general-duty valves specified in Section 220523
 - 2. Install union, or flanged or joint connections on suction and discharge headers at connection to domestic-water piping. Comply with requirements for unions and flanges specified in Section 221116 "Domestic Water Piping."
 - 3. Install flexible connectors, same size as piping, on piping connections to booster-pump suction and discharge piping. Comply with requirements for flexible connectors specified in Section 221116 "Domestic Water Piping."
 - 4. Where installing piping adjacent to booster pumps, allow space for service and maintenance.

3.4 ELECTRICAL CONNECTIONS

- A. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

3.5 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring according to Section 260523 "Control-Voltage Electrical Power Cables."

3.6 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."
- B. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
 - 1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."

3.7 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
 - 1. Perform visual and mechanical inspection.
 - 2. Leak Test: After installation, charge booster pump and test for leaks. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: After electrical circuitry has been energized, start booster pumps to confirm proper motor rotation and booster-pump operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Pumps and controls will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.8 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.

3.9 ADJUSTING

- A. Adjust booster pumps to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust pressure set points.
- C. Occupancy Adjustments: When requested within twelve months of date of Substantial Completion, provide on-site assistance in adjusting booster pump to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.10 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain booster pumps.

END OF SECTION

SECTION 26 00 10

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section covers general work of all Sections under Division 26.
- B. Provide a complete working electrical installation with all equipment called for in proper operating condition. Documents do not undertake to show or list every item to be provided. When an item not shown or listed is clearly necessary for proper operation of equipment which is shown or listed, provide the item which will allow the system to function properly at no increase in Contract Price.
- C. The Division 26 Specifications and Drawings are complementary; what is called for by one is binding, as if called for by both. Items shown on the Drawings are not necessarily included in the Specifications and vice versa.
- D. Use the more stringent requirement when specified materials or methods exceed the applicable code standards.
- E. The Drawings that accompany the Division 26 Specifications are diagrammatic. They do not show every offset, bend, conduit body, elbow or junction box that may be required to install work in the space provided and avoid conflicts. Follow the Drawings as closely as is practical and install additional bends, offsets and elbows where needed by local job site conditions. Provide necessary junction boxes to meet code regulations for the allowed number conduit bends. The right is reserved to make minor field order changes in outlet location prior to roughing-in without additional cost to the Owner.
- F. Imperative language is frequently used in Division 26 Specifications. Except as otherwise specified, requirements expressed imperatively are to be performed by the Contractor.
- G. All Sections of Division 26, Electrical Specifications, are interrelated. Use Division 26, in its entirety, when interpreting any material, method or direction listed in any Section.
- H. When specified materials or methods exceed the applicable code standards, use the materials or methods specified. When materials or methods specified fall below applicable code standards, replace or modify materials or methods to meet applicable code standards. Do not provide materials or employ methods that do not conform to applicable codes and standards.
- I. The Drawings and Specifications, combined with the calculations, field data, notes, and reports, are the intellectual and real property of Mazzetti. This covers all forms of written and recorded or electronic media. The reuse of these documents without specific permission of the Engineer is prohibited. The Drawings may be employed by

the Owner and Contractor for the express use of constructing, commissioning and operating the facility.

1.2 REFERENCES

- A. The General Conditions, Supplementary Conditions, and applicable portions of Divisions 1 and 26 apply to the work of this Section as if printed herein.
 - B. Publications and standards listed below form a part of this specification to the extent referenced. The publications and standards are referred to in the text by basic designation only.
 - 1. California Electrical Code (CEC) 2019 Edition.
 - 2. California Building Code – (CBC) 2019 Edition.
 - 3. California Mechanical Code (CMC) 2019 Edition.
 - 4. California Fire Code (CFC) 2019 Edition.
 - 5. Insulated Cable Engineers Association (ICEA).
 - 6. National Fire Protection Association (NFPA).
 - 7. National Electrical Manufacturers Association (NEMA).
 - 8. National Electrical Contractors Association (NECA).
 - 9. American National Standards Institute (ANSI).
 - 10. Institute of Electrical and Electronic Engineers (IEEE).
 - 11. Underwriters Laboratories (UL).
 - 12. State of California Low-Voltage Electrical Safety Orders (CAL/OSHA).
 - 13. Codes and regulations noted in other Sections in Division 26, applicable State and Local Codes and Ordinances.
 - 14. American with Disabilities Act – 1994.
 - C. If any of the requirements of the above are in conflict with one another, or with the requirements of these specifications, the most stringent requirement shall govern.
 - D. If any of the requirements of the drawings or specifications are in conflict with one another, the most stringent requirement shall govern.
- 1.3 SUBMITTALS: Electronic Submittals shall be allowed provided they are acceptable per Division 1 and are formatted, organized and coordinated per this section. PDF format is acceptable.
- A. Comply with the provisions of Division 01 - SUBMITTALS.

- B. Forward all submittals in related groups. Individual or incomplete submittals are not acceptable.
- C. Identify each item by manufacturer, brand, trade name, number, size, rating, or whatever other data is necessary to properly identify and check materials and equipment.
- D. Identify each submittal item by reference to Specification Section paragraph in which item is specified or Drawing and Detail number.
- E. Organize submittals in same sequence as they appear in Specification Sections, articles or paragraphs.
- F. Shop Drawings shall show physical arrangement, construction details and finishes.
 - 1. Drawings shall be drawn to scale and dimensioned where applicable.
 - 2. Catalog cuts and published material may be included to supplement scale drawings.
- G. Internal wiring diagrams of equipment shall show wiring as actually furnished for this project with all optional items clearly identified as included or excluded. Clearly identify external wiring connections. Identify and obliterate superfluous material.
- H. Submittal literature, drawings and wiring diagrams shall be specifically applicable to this Project and shall not contain extraneous material or optional choices. Clearly mark literature to indicate the proposed item. Submittals shall include, but not be limited to those items listed in individual Sections.
 - 1. Include all physical and performance data, including materials, manufacturers names, model numbers, weights, sizes, capacities, performance curves, finishes, colors, accessories and all other data required to completely describe equipment and to indicate complete compliance with Specifications and Drawings.
 - 2. Include with complete submittals above, complete, large scale, dimensioned Shop Drawings, certified by manufacturer, of all major equipment and other equipment as directed by Architect.
 - 3. Include with electrical equipment submittal: to scale electrical room layout including architectural and structural components, electrical equipment proposed, working clearances about and above equipment.
- I. Substitutions: In accordance with Division 01 PRODUCT OPTIONS AND SUBSTITUTIONS.
- J. Re-submittals will be reviewed for compliance with comment made on the original submittal only and should be marked with a resubmittal number and dated. Contractor shall respond in writing to all comments made on submittal review and identify how comment was resolved.
- K. Shop drawings shall contain job title and reference to the applicable drawing and/or

specification article.

- L. Submit details and calculations for support and anchors that are not specifically detailed on the drawings. All calculations must meet 2019 CBC.
 - 1. Provide details and calculations for electrical equipment:
 - a. Having an operating weight over 400 pounds or more and mounted directly to the floor.
 - b. Having an operating weight over 20 pounds and suspended from the roof, floor, or wall or supported by vibration isolation devices.
 - 2. Where pre-approved bracing systems will be employed, submit:
 - (1) System component brochure describing components used and detailed installation instructions.
 - (2) Loads to be transmitted to the structure at anchor points.
 - 3. Where anchorage, support, and bracing are not detailed on the drawings, and pre-approved systems are not used, submit details and calculations of proposed systems. Include:
 - a. Detailed drawings showing system to be installed, stamped by a Structural Engineer registered in the State of California.
 - (1) Calculations, stamped by a Structural Engineer registered in the State of California.
 - (2) A certification on the calculation sheet stating, "These calculations demonstrate that the system detailed complies with the requirements of Chapter 16 of the California Building Code. The system on which this bracing will be applied is rigid as defined in Chapter 16."
 - b. Anchorage and Supports
 - (1) Where equipment substitutions change the weight, size, configuration, or other aspects of systems and equipment that will affect the performance of anchorages and/or supports, submit calculations for proposed anchors and supports, and install them as shown in these calculations.
 - (2) Where substitutions will have no effect on anchors and supports detailed on Contract Documents, submit information on sizes, weights, center of gravity and other relevant information to demonstrate this fact.

1.4 RECORD DRAWINGS

- A. Coordinate with the requirements of Division 01 SUBSTANTIAL AND FINAL COMPLETION.
- B. Provide record Drawings that fully represent installed conditions including actual location of outlets, true panelboard connections following phase balancing routines,

correct conduit and wire sizing as well as routing, revised fixture schedule listing actual manufacturer and products installed, and revised panelboard schedules.

- C. Maintain up to date record set of electrical prints during the course of construction. The prints are subject to monthly review by the Owners representative to ascertain that they are current. If not current, monthly payments may be withheld.
- D. Prior to Substantial Completion, obtain from the Architect a complete set of electronic CAD drawings. Record all revisions to these drawings to indicate as-built conditions. Indicate all changes, including RFIs, on this set of documents. Submit one set of PDF drawings or blueprints of these revised drawings for review with all changes clouded. Make necessary changes and deliver to Architect one set of reproducible and one electronic copy prior to Final Completion.

1.5 QUALITY ASSURANCE

- A. Materials and Systems
 - 1. Labels: Provide materials listed and labeled by Underwriters Laboratories or testing firm acceptable to authority having jurisdiction, where listing service is normally provided for product.
 - 2. Materials: Provide new and ship to jobsite in original manufacturer's containers or bundles.
 - 3. Provide materials and equipment that comply with CEC, NEMA and ANSI standards.
- B. Workmanship: Arrange Work to obtain coordinated installation.
- C. Code Compliance: Comply with applicable codes, laws, rules, regulations, and standards of applicable code-enforcing authorities.
- D. All major equipment including but not limited to the following items shall be inspected for compliance with the reviewed shop drawings and requirements of the contract documents. Contractor shall notify the Owner's Representative upon arrival of the equipment to the job site and provide all assistance for such inspection prior to the equipment installation.
 - 1. Grounding.
 - 2. Conductors and cables
- E. Provide quality assurance and quality control plans and procedures for review.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Coordinate with the requirements to Division 01 - PRODUCT OPTIONS AND SUBSTITUTIONS.
- B. Protect from loss or damage. Replace lost or damaged materials and equipment with

new at no increase in Contract Sum.

- C. Protect equipment from weather, moisture and dust by appropriate covering. Provide and maintain heating within equipment environment to prevent condensation.

1.7 DRAWINGS AND COORDINATION WITH OTHER WORK

A. Drawings

1. For purposes of clarity, legibility, Drawings are essentially diagrammatic.
2. Exact routing of wiring and locations of outlets, panels, etc., shall be governed by structural conditions, obstructions and existing conditions. Architect reserves right, at no increase in price, to make any reasonable change in locations of electrical items, exposed at ceiling and/or on walls, to group them into orderly relationships and/or increase their utility. Contractor shall verify Architects requirements in this regard prior to roughing-in.
3. Dimensions, location of doors, partitions, and similar physical features shall be taken from architectural Drawings for exact location of outlets to center with Architectural features, panels, etc., at the approximate location shown on Electrical Drawings.
4. Locations shown on Architectural Ceiling Drawings or on wall elevations shall take precedence over electrical plan locations.
5. Verify dimensions and the correct location of equipment and coordinate with other trades for any requirement before proceeding with the roughing-in of connection.
6. Mounting heights of brackets, outlets, etc., shall be as required to suit equipment served.
7. Drawings indicate, generally, routes of all branch circuits. All runs to panels are indicated as starting from nearest outlet, pointing in direction of panel. Continue all such circuits to panel as though routes were indicated in their entirety.
8. All scaled and figured dimensions are approximate of typical equipment of the class indicated. Before proceeding with any Work, carefully check and verify all dimensions, sizes, etc., with the Drawings to see that the equipment being installed will fit into the spaces provided.
9. Locations of Openings: Locate all chases, shafts and openings required for the installation of the electrical Work during framing of the structure. Do any cutting and patching required due to improperly located or omitted openings with the approval of the Owner's Representative, who must also approve any additional changes resulting from relocation or omission of openings. Cutting or drilling in any structural member is prohibited without prior written approval of the Owner.
10. Access to Equipment: Locate starters, switches, receptacles, cable tray and

pullboxes to provide easy access for operation, repair, and maintenance, and if concealed, provide layout of access doors. Access doors shall be furnished and installed by the framer.

11. The Contractor shall be responsible for verifying that equipment being provided by him will fit dimensionally in locations shown on Drawings.
12. Circuit "tags" on the Electrical Drawings in the form of arrows are used to indicate home runs of raceways to electrical distribution points. These tags show the circuits in each home run and the panel designation. Do not combine circuits other than those shown on the Drawings. Show the actual circuit numbers on the finished record drawing, and on the panel directory card. Provide an insulated grounding conductor in every power circuit.
13. The Drawings do not indicate the exact number of wires in each conduit for the branch circuit wiring. Provide the correct quantity of wires as indicated by: the circuit numbers indicated, wiring diagrams, and by applicable requirements of the CEC. Provide a grounding conductor in every power circuit.
14. Electrical Drawings are diagrammatic and shall not be scaled for exact sizes. Adjust location of conduits, panels, equipment, pull boxes and fixtures to accommodate the work and to prevent interferences.
 - a. Lines which pitch have right-of-way over those that do not. Lines whose elevation cannot be changed have right-of-way over lines whose elevations can.
 - b. Make offsets, transitions, and changes in direction in raceways as required to maintain proper headroom pitch of sloping lines.

B. Coordination

1. Work out all tight conditions involving Work under this Division and Work in other Divisions in advance of installation. If necessary, and before Work proceeds in these areas, prepare supplementary 3D Drawings under this Division for review, showing all Work in tight area. Provide supplementary Drawings and additional Work necessary to overcome tight conditions.
2. Differences or disputes concerning coordination, interference or extent of Work between Divisions shall be decided by Contractor. His decision, if consistent with Contract Documents requirements, shall be final.
3. Coordinate electrical power and line voltage control wiring requirements of mechanical equipment with requirements in Division 25. Low voltage wiring that is not shown as by electrical contractor shall be the responsibility of the low voltage controls contractor including all conduit if not shown specifically in drawings as by Electrical Contractor.
4. Coordinate electrical power and line voltage power supply wiring requirements of other low voltage system requirements with respective specifications section. Including but not limited to: Low voltage wiring that is not shown as by electrical contractor shall be the responsibility of the low voltage system awarded contractor including all conduit if not shown

- specifically in the low voltage system drawings as by Electrical Contractor.
5. Where conflict exists between rough-in shown on drawings and that shown or required by equipment to be installed, obtain clarification from Architect and provide rough-in as directed.
 6. Provide templates, information and instructions to other Divisions to properly locate holes and openings to be cut or provided for Electrical Work.
- C. Large Scale Layout Drawings: In accordance with requirements of Division 01, prepare large scale detailed layout Drawings showing locations of equipment, conduit runs, panels, and all other elements of electrical systems where required by other Sections of this Division, plus sections of all congested areas to show relative position and spacing of affected elements. All symbols and designations used in preparing record Drawings shall match those used in Contract Drawings.
- D. Equipment Rough-In
1. Rough-in locations shown on Electrical Drawings for equipment furnished by Owner and for equipment furnished under other Divisions are approximate only.
 - a. Obtain exact rough-in locations from following sources:
 - (1) From shop drawings for Contractor-furnished and installed equipment.
 - (2) From Architect for Owner-furnished Contractor-installed equipment.
 2. Verify electrical characteristics of equipment before starting rough-in. Where conflict exists between equipment and rough-in shown on Drawings obtain clarification from Architect and provide as directed.
 3. Unless otherwise shown or specified, provide direct raceway and conductor connections from building wiring system to equipment terminals for direct connected equipment which is Contractor furnished and Contractor installed, Owner furnished and Contractor installed.
 4. Provide plug-in receptacle cap for cord-connected equipment, which is Contractor furnished and Contractor installed, Owner furnished and Contractor installed. Provide new cord and cap if required on Owner furnished and Contractor installed equipment.
 5. Provide disconnect switches, flush type in finished spaces, where shown or required by code for direct connected equipment.

1.8 SITE VISITATION

- A. Coordinate with the requirements of Bidding and Contract Requirements, Instruction To Bidders.
- B. Visit the site prior to bidding and become familiar with existing conditions and other factors that may affect the execution of work. Include all related costs in the initial bid proposal.

1.9 SCHEDULE OF WORK

- A. Coordinate with the requirements of Division 01 — CONSTRUCTION PLANNING AND SCHEDULING.
- B. Provide full-time supervisory staff to coordinate and maintain work force for project work sequencing requirements.
- C. Arrange work to comply with schedule of construction requirements.

1.10 WARRANTY

- A. Coordinate with the requirements of Division 01 — SUBSTANTIAL AND FINAL COMPLETION.
- B. Provide at least one-year guarantee (or more as indicated elsewhere) for installed project materials and equipment unless otherwise indicated in other Division 26 Sections. Guarantee period shall be effective from time of work acceptance as defined in Division 1.
 - 1. Any Electrical gear that is set early and used during construction shall not reduce the warranty in any form. The warranty shall begin when the equipment is turned over to owner at substantial completion.

1.11 DEFINITION OF TERMS

- A. The following list of terms as used in the Division 26 documents shall be defined as follows:
 - 1. Provide: Shall mean furnish, install and connect unless otherwise indicated.
 - 2. Furnish: Shall mean purchase and deliver to project site.
 - 3. Install: Shall mean to physically install the items in-place.
 - 4. Connect: Shall mean make final electrical connections for a complete operating piece of equipment.
 - 5. Equal: Shall be of the same quality, appearance and utility to that specified, as determined by the Owner's Representative. The Contractor bears the burden of proof of equality.
 - 6. Exposed: Shall mean exposed to view after construction is completed.
 - 7. Utility Area: Shall mean electrical, mechanical and communications equipment rooms, elevator machine room and equipment yards.
 - 8. As directed: Shall be as directed by the Owner's Representative.
 - 9. As required: Shall be as required by applicable code requirements, good building practice, the conditions prevailing, the Bid Documents, the Owner, or the Owner's Representative.

10. As selected: Shall be as selected by the Owner's Representative.

11. Owner's Representative: Shall mean Architect.

1.12 TRAINING

- A. Provide a period of 40 hours for the necessary training program and instructions to the selected Owner's employees for the electrical system for the entire building in addition to what is specified in each section.

1.13 FEES AND PERMITS

- A. Obtain and pay for all necessary permits and inspection fees required for electrical installation.
- B. Coordinate work with local utility companies. Costs incurred relative to power service and telephone service shall be paid by the Owner.

PART 2 - PRODUCT

2.1 GENERAL

- A. Refer to applicable Division 26 Sections for complete product specifications.
- B. All switchgear, switchboards, motor control centers, transformers, panelboards and circuit breakers shall be of the same manufacturer.
- C. All wiring devices such as switches, receptacles, etc. shall be of the same manufacturer.

2.2 ACCEPTABLE MANUFACTURERS

- A. Manufacturers' names and model numbers used for materials, processes or equipment in Division 26 provide the standards of quality, utility and appearance.

2.3 SUBSTITUTIONS

- A. Coordinate with the requirements of Division 01 - PRODUCT OPTIONS AND SUBSTITUTIONS.
- B. Products or systems listed as "no substitutions!": Provide as specified.
- C. Products or systems noted as "or equal": A product or system of equivalent design, construction and performance will be considered. Submit all pertinent data and product information for review. Provide the specified products or systems if proposed substitution is found unacceptable.

2.4 MATERIALS FURNISHED

- A. New, bearing label of Underwriters Laboratories, or other testing laboratory acceptable to authority having jurisdiction, where labeling exists for the class of equipment.
- B. Provide equipment of one manufacturer, alike in appearance and function.
- C. For equipment specified by manufacturer's number, include all accessories, controls, etc., listed in catalogue as standard with equipment. Furnish optional or additional accessories as specified.
- D. Where no specific make of material or equipment is mentioned, use any product of reputable manufacturer that conforms to requirements of system and other applicable specification sections.
- E. Equipment and material damaged during transportation, installation, or operation is considered as totally damaged. Replace with new. Variance from this permitted only with written approval.
- F. Provide an authorized representative to constantly supervise work specified in this Division, check all materials prior to installation for conformance with Drawings, Specifications, and reviewed Shop Drawings.
- G. Manufacture: Company specializing in manufacturing specified products for at least three years.

PART 3 - EXECUTION

3.1 GENERAL METHODS

- A. Examine site related work and surfaces before starting work of any Section.
- B. Report to Architect, in writing, conditions which will prevent proper execution of this work.
- C. Beginning work of any Section without reporting unsuitable conditions to Architect constitutes acceptance of conditions by Contractor.
- D. Perform any required removal, repair or replacement of this work caused by unsuitable conditions at no additional cost to Owner.

3.2 CONNECTIONS TO EXISTING WORK

- A. Install new work and connect to existing work with minimum interference to existing facilities.
- B. Provide temporary shutdowns of existing services only with written consent of Owner. Perform this work at no additional charges and at times that do not interfere with

normal operation of existing facilities.

- C. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
- D. Do not interrupt alarm and emergency systems without consent of Owner.
- E. Connect new work to existing work in neat and acceptable manner.
- F. Restore existing disturbed work to original condition including maintenance of wiring and continuity as required.

3.3 INSTALLATION

- A. Provide a complete properly operating system for each item of equipment called for under this work. Installation shall be in accordance to equipment manufacturer's instructions, the best industry practices and the contract documents.
- B. Make installation in a neat, finished and safe manner, according to the latest published NECA Standard of Installation under competent supervision.
- C. Manufacturer's Directions: Follow in all cases where manufacturers of articles used furnish directions covering points not specified or shown.
- D. Review Shop Drawings for work done by other trades.
- E. Verify all dimensions by field measurements.
- F. Arrange for inserts, chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
- G. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components as they are constructed. Sleeves and chases in structural members shall follow the requirement of Division 3.
- H. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the work. Give particular attention to large equipment requiring positioning prior to closing in the building.
- I. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
- J. Install systems, materials, and equipment to comply with approved submittal data, including coordination drawings, to greatest extent possible. Comply with arrangements indicated by the Contract Documents, recognizing that portions of the work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
- K. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.

- L. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Rearrangement or relocation of electrical work that block access to mechanical duct inspection or servicing panels, valves, fire damper actuators and similar apparatus shall be done at Contractor's own expense.
- M. Coordinate electrical systems, equipment, and materials installations with other building components.
- N. Provide layout for all access panels required for the electrical installation. Access panels shall be provided by the framer. Electrical contractor shall coordinate the installation where devices or equipment are concealed behind finished surfaces.
- O. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.
- P. Coordinate the exact placement of all concrete foundations or related concrete pads with concrete contractor that relate to electrical equipment.
- Q. Provide minimum 4" concrete housekeeping pads for all floor mounted electrical equipment. Pad shall be level with zero bubble throughout.
- R. Conduit Systems
 - 1. Worked into complete, integrated arrangement with like elements to make Work neat appearing, finished.
 - 2. Run concealed, except as shown or noted otherwise. Where exposed, install parallel with walls or structural elements: vertical runs plumb; horizontal runs level or parallel with structure as appropriate: groups racked together neatly with straight runs and bends both parallel and uniformly spaced.
 - 3. Install as high as practicable to maintain adequate head room shown or required. Coordinate with Work of other Divisions to achieve proper headroom.
 - 4. Flash and counter-flash all conduits through roof in accordance with requirements of Section 07 62 00. Roof jacks furnished by electrical contractor, installed by roofing contractor. Counter flashing provided by others.
 - 5. Clearance: Do not obstruct spaces required by code in front of electrical equipment, access doors, etc.
- S. Penetrations
 - 1. Pack space between conduit, sleeve in walls with non-combustible materials.
 - 2. Make penetrations through floors water-tight with non-hardening sealant even though concealed within wall or furred space when not using a fire stopping assembly.

3. Make penetrations through any damp-proofed/water-proofed surfaces damp-proof/waterproof by appropriate means to maintain integrity of system penetrated.
 4. Seal around penetrations with fireproofing material to maintain integrity of fire rating where occurs.
 5. Seal around penetration with acoustical material to maintain the integrity of acoustical rating where occurs.
- T. Coordinate and locate light fixtures located in rated ceilings. Assist in supplying dimensions for each light fixture to framing contractor for a complete installation. Coordinate all wall openings required for electrical panelboards and like items to maintain integrity of rated wall or ceiling construction.

3.4 NOISE CONTROL

- A. Electrical contractor to provide sound pads, all other acoustical sealants to maintain the sound rating of the wall is provided by others.
- B. Back to back or straight through boxes are not permitted unless specifically noted on the drawings.
- C. Seal raceway penetrations through sound rated walls.
- D. Do not install contactors, transformers, starters and similar noise producing devices on walls common to occupied spaces unless specifically noted on the drawings. Where such devices must be mounted on common walls, install using shock mounted or isolated methods to prevent the transmission of device inherent noise to the occupied space.
- E. Ballasts, contactors, starters, transformers and like equipment which are found to be noticeably noisier than other similar equipment on the project will be deemed defective and shall be replaced.

3.5 FIRE WALL PENETRATIONS

- A. Perform necessary fire rated wall sealing for the electrical work in compliance with the California Building Code and instructions in Division 7.
- B. Coordinate the installation of all electrical equipment installed in all fire wall rating assemblies. Provide framer with all opening sizes and coordinate drywall placement with framer to maintain fire rated assembly integrity.
- C. Where raceways penetrate floors, ceilings, ducts, chases and fire walls, provide fire stopping to maintain integrity of the fire assembly. Fire stopping method shall be approved by the authority having jurisdiction.
- D. Where electrical boxes with total area exceeding 16 square inches are located in fire resistive walls, fire stopping shall be provided to maintain integrity of the fire assembly.

- E. Where electrical boxes are installed on opposite sides of a rated wall, horizontal separation between the boxes shall be a minimum of 24-inches. Horizontal separation of these boxes may be less than 24-inches if a UL approved protective material is utilized.
- F. Electrical boxes shall not be installed back to back in rated walls.
- G. The aggregate surface area of the boxes shall not exceed 100 sq in per 100 sq ft of wall surface.

3.6 EQUIPMENT CONNECTIONS

- A. Provide complete electrical connections for all items of equipment requiring such connections, including incidental wiring, materials, devices and labor necessary for a finished working installation.
- B. Verify the location and method for connecting to each item of equipment prior to roughing-in. Check voltage and phase of each item of equipment before connection.
- C. Make motor connections for the proper direction of rotation.
- D. Furnish all code required disconnects under this work, whether specifically shown or not.

3.7 EQUIPMENT SUPPORT

- A. Perform necessary equipment seismic anchorage in compliance with the 2019 CBC as well as any requirements from the local agency having jurisdiction.
- B. Securely fasten to the structural floor all freestanding electrical equipment such as transformers, switchboards, distribution boards, transfer switches and so forth.
- C. Securely support fixtures installed under this work from the building structure via ceiling wires. Ceiling wires installed by ceiling contractor.
- D. Support all junction boxes, pull boxes or other raceway terminating housings located above the suspended ceiling from the floor above, roof or penthouse floor structure to prevent sagging or swaying.
- E. SMACNA guidelines may be applied for suspended conduits and equipment. Prove the systems and details meet the requirements of CBC 1632A.6.
- F. Minimum support capacity: Not less than four times the ultimate weight of the object being supported from the building structure or anchored to the structural floor.
- G. Seismic Protection Criteria: Electrical equipment installations in any Seismic Risk Zone of the 2018 International Building Code Seismic Risk Map shall be protected from earthquakes. Protection criteria for these zones shall be a Horizontal Force Factor as prescribed by the CBC multiplied by the equipment weight considered passing through the machinery center of gravity in any horizontal direction.

1. Unless vibration isolation is required to protect equipment against unacceptable structure transmitted noise and/or vibration, equipment shall be protected from earthquakes by rigid structurally sound attachment to the load supporting structure. The force factor and anchorage shall be determined by calculations performed by a registered California Structural engineer whether the isolators are present or not and shall be verified by the seismic restraint vendor.
 2. Vibration isolated equipment shall be protected by protected spring isolators or separate seismic restraint vendor. Seismic snubbers and protected spring isolators shall be seismic protection rated in three principal axes by independent laboratory testing or analysis by an independent licensed structural engineer.
 3. The Contractor shall be responsible for the design of his own seismic restraint systems. He shall supply to the Architect details of the forces exerted by his restraints, anchorages, and other points of attachment.
 4. Seismic protection, labor, materials and design shall be included in the Contract Sum.
- H. Contractor shall provide structural calculation and shop drawings for electrical equipment support. These drawing and calculations shall be prepared, sealed and signed by a Registered California Structural Engineer, and submitted for review and approval.
- I. Construction of all electrical gear, and equipment such as switchgear, switchboard, motor control center, panelboard, transformer and similar equipment shall meet seismic requirements per the CBC Section 1705A.12.4, Special Seismic Certification.

3.8 ALIGNMENT

- A. Install panels, cabinets and equipment level and plumb, parallel with structural building lines. Join switchgear, panels and electrical enclosures so that they fit neatly together without gaps, openings or distortion.
- B. Fit surface panels, devices and outlets with neat, appropriate trims, plates or covers, without over-hanging edges, protruding corners or raw edges, to leave a finished appearance.

3.9 CUTTING, PATCHING, EXCAVATING, AND CORE DRILLING

- A. Coordinate necessary cutting and patching for the electrical work in compliance with Division 01 - COORDINATION.
- B. Neatly patch and finish any surface damaged by this work to match adjacent construction surface conditions; for instance, repair surfaces where raceways pass through finished floors or walls. Clean and remove all dirt and debris. Perform this work to the satisfaction of the Architect.

- C. Where equipment installations or connections require the installation of an access panel, provide a properly sized and installed access panel similar to those used for mechanical equipment access. Access panels shall be provided and installed by the framer.
- D. Do not cut or break any steel or wood framing, concrete, masonry, or partitions, etc., without permission from the Architect or as shown on the Drawings.
- E. Cut, channel, chase and drill floors, walls, partitions and ceilings as necessary for the proper installation, support and anchorage of raceway, boxes, and other equipment.
 - 1. Repair any damage to the building, piping, equipment, or finish.
 - a. Perform repairs with materials matching the original, and install in accordance with appropriate sections of these Specifications.
- F. All cuts and penetrations of existing structural walls and floors that do not appear on the Structural Drawings must be x-rayed prior to beginning work. Assure that all conduit penetrations pass through the center of all rear "windows" or avoid structural members by a minimum of 12". All cuts that are not covered by detail on the Drawings must be pre-approved by the Structural Engineer prior to proceeding.
- G. All concrete work shall be in accordance with Division 03.

3.10 WATERPROOFING

- A. Avoid, if possible, penetrations of waterproof membranes.
- B. Where such penetration is required, perform it prior to waterproofing and in accordance with Architectural details.
- C. Where penetrations are not detailed, provide a detail of the penetrations for approval of the Architect.

3.11 COORDINATION OF WORK

- A. ELECTRICAL WIRING AND COORDINATION
 - a. In general, power wiring will be provided under Division 26 – Electrical, and control wiring will be provided under Division 23 – Heating Ventilating and Air Conditioning, unless otherwise specified.
 - b. The following schedule summarizes the Division or work and material responsibilities.

ITEM	FURNISHED UNDER	SET IN PLACE OR MOUNTED UNDER	WIRED AND CONNECTED UNDER
Equipment motors	MD 1	MD 1	ED 2

ITEM	FURNISHED UNDER	SET IN PLACE OR MOUNTED UNDER	WIRED AND CONNECTED UNDER
Resistance heaters	MD	MD	ED
Fire protection controls, including remote switches, flow switches	MD	MD	ED
Motor controls where specified as an integral package	MD	MD	ED
Motor controllers	ED 4	ED 4	ED
Resistance type heater controllers	MD 6	ED 4	ED
Magnetic contactors and magnetic starters with overload trip assembly	ED 4	ED 4	ED
Integral control transformers	MD 6	ED 4	ED
Cover-mounted control devices	MD 6	ED 4	ED
Manual motor starters with overload trip assembly	ED 4	ED 4	ED
Motor starter switches	ED 4	ED 4	D
Disconnect switches fused and unfused	ED 4	ED 4	ED
Thermal or thermal-magnetic circuit breakers	ED 4	ED 4	ED
Fuses	ED 4	ED 4	ED
Control power source for temperature and equipment control panels	ED	ED	ED
Electric temperature control relays and miscellaneous devices	MD	MD 5	MD 5
Level and float switches	MD	MD 5	MD 5
Pipe mounted control devices such as flow switches, flow sensors, valves, and wells.	MD	MD 5	MD 5
Thermostats and space sensors.	MD	MD 5	MD 5
Duct mounted control devices such as temperature, humidity, flow and pressure sensors.	MD	MD 5	MD 5
Damper actuators.	MD	MD 5	MD 5

ITEM	FURNISHED UNDER	SET IN PLACE OR MOUNTED UNDER	WIRED AND CONNECTED UNDER
Control dampers.	MD	MD	--
Variable frequency drives (VFD) specified to be mounted on or in the mechanical equipment.	MD	MD	ED
VFD specified to be mounted separately from the mechanical equipment	MD	ED	ED

c. Notes: (1) MD: Mechanical Divisions 21, 22, 23. (2) ED: Electrical Division 26. (3) Fire Alarm related and power wiring provided under Division 26; Control-related wiring and relays provided under Divisions 21, 22, 23. (4) If furnished as part of factory equipment under Divisions 21, 22, 23, wiring and connections only by Electrical Division 26. (5) If any control devices carry the Full Load Current to any motor, they shall be furnished under Divisions 21, 22, 23, but shall be set in place and connected under Division 26. (6) Except where indicated as part of a motor control center on the Electrical Drawings. (7) Division 26 shall provide the logic contact closure and the wiring to the local DDC temperature control panel. Division 26 shall also provide interface with the fire alarm system, proof of flow devices (duct/fan air flow switches), connecting wiring, smoke control logic, panel, relays, damper monitoring, and associated devices for a complete smoke control system.

- B. Coordinate all aspects of the electrical services with the appropriate serving utility.
- C. Coordinate underground work with other contractors working on the site. Perform coordination with contractors installing storm sewer, sanitary sewer, water and irrigation lines, to avoid conflicts. Common trenches may be used with other trades, providing clearances required by codes and ordinances are maintained.

3.12 PROTECTION OF WORK

- A. Coordinate with the requirements of Division 01 - PRODUCT OPTIONS AND SUBSTITUTIONS.
- B. Protect all electrical work and equipment against damage by other trades, weather conditions or any other causes. Equipment found damaged or in other than new condition will be rejected as defective.
- C. Keep switchgear, transformers, panels, luminaires and all electrical equipment covered or closed to exclude dust, dirt and splashes of plaster, cement or paint and shall be free of all such contamination before acceptance. Keep enclosures and trims in new condition, free of rust, scratches and other finish defects. If damaged, properly

refinish in a manner acceptable to the Architect.

3.13 ADJUSTING

- A. Coordinate with the requirements of Division 01 - QUALITY CONTROL.
- B. Voltage Check:
 - 1. At job completion, check voltage at several points of utilization for power equipment installed under this work. During voltage check, energize installed loads.
 - 2. Adjust transformers taps for acceptable voltage level; 118 to 122 volts for 120 volt nominal systems and proportionately equivalent for higher voltage systems. If proper voltage cannot be obtained, inform the owner's representative and the serving utility company.

3.14 CLEANING AND PAINTING

- A. Finish painting under Section 09 91 00. Including surface preparations, priming, and finish coating for electrical cabinets, exposed conduit, pull and junction boxes.
- B. Refinish Work supplied with final finish under this Division if damaged under this Division to satisfaction of Architect.
- C. After other Work is accomplished, panels (interiors and exteriors), fixtures, equipment and leave in satisfactory condition.

3.15 EQUIPMENT IDENTIFICATION

- A. Refer to Section 26 05 53 for equipment identification requirements.

3.16 COMMISSIONING AND TESTING

- A. Upon job completion, test systems and show that the equipment installed operates as designed and specified, free of faults and unintentional grounds. The system tests may be set up and done for coordination with construction phasing. Perform testing or system operational functions in the presence of the Architect or his representatives. Schedule work in advance and as directed by the Architect or his representatives.
- B. Provide a minimum of 1 journeyman electrician with required tools during testing or system commissioning work. Provide equipment factory representative for this work when needed.
- C. Provide testing and commissioning work for equipment and systems noted in Division 26 specifications and drawings, including but not limited to:
 - 1. Low voltage distribution system.

2. Grounding system

3.17 PROJECT CLOSEOUT

- A. Coordinate with the requirements of Division 01- SUBSTANTIAL AND FINAL COMPLETION.
- B. Special tools or safety equipment: Provide one of each tool or piece of safety equipment required for proper operation and maintenance of equipment installed under this work. Coordinate equipment required with equipment manufacturer and O'Connor Facility Engineer.
- C. Keying: Provide two keys for each lock furnished under this work.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 V AND LESS)

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
1. General building wire.
 2. Armored cable (Type HCF-MC^{AP}) shall not be used except where pre-approved by the EEOR.
 3. Flexible cord/cable (Type "S")
 4. RHW Two-Hour Fire Rated Cable Assembly
 5. Pull cord.
 6. Wire connectors and connections.
- B. Related Work: Consult all other Sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.
1. Division 01 for recycling requirements.
 2. Division 01 for dust and pollutant control requirements.
 3. Division 01 for VOC limits, recycled content, regional materials, and other sustainable design requirements.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified.
1. UL-83, UL-44 - Thermoplastic-Insulated Wire and Cables.
 2. UL-4 - Armored Cable.
 3. UL-486A - Copper Connectors and Lugs
 4. UL-486BC - Aluminum Connectors and Lugs

5. California Electrical Code (CEC) 2019 Edition
6. California Building Code (CBC) 2019 Edition

1.3 SUBMITTALS

- A. Submit under provisions of Division 01 SUBMITTALS.
- B. Product Data: Product data for each conductor type on:
 1. Insulation
 2. Conductor material and dimensions
- C. Test Reports: Indicate procedures and values obtained.
- D. Design Data: Indicate voltage drop and capacity calculations for aluminum conductors for conductors substituted for copper conductors.
- E. Manufacturers Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

1.4 QUALITY ASSURANCE

- A. Provide materials that are new and unused.
- B. Manufacturer: Company specializing in manufacturing products specified in this Section with 3 years experience.
- C. No aluminum cable.
- D. The Contractor shall provide a "Megger" test report from the Testing Agency to the Owner's Representative for approval of the Work.

1.5 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on the Drawings.
- B. Conductor sizes are based on copper.
- C. Wire and cable routing shown on the Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.
- D. When wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.6 COORDINATION

- A. Coordinate Work under provisions of Division 01.
- B. Determine required separation between cable and other work.
- C. Determine cable routing to avoid interference with other work.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Marking: Insulation type, voltage rating, size and listing label shall be printed with permanent markings repeating along entire length of conductor.
- B. Provide all new wire and cable, manufactured within 12 months of delivery to site and continuously stored where protected from heat and weather.
- C. Conductor packaging and reels: Plainly marked or tagged with Manufacturers name, AWG, size, voltage rating, insulation type, agency listing and date of manufacture.

2.2 BUILDING WIRE AND CABLE

- A. Manufacturers: Alcan, General Cable, Kerite, Okonite, CME, Aetna, AIW, Southwire, Rome, Encore, AFC or equal
- B. Description: Single conductor insulated wire, UL listed for 600 volts insulation.
- C. Feeders: Copper Type XHHW or dual rated THWN/THHN.
- D. Branch Circuits: Power
 - 1. #12 AWG minimum, stranded copper wire type THHN, THW or dual rated THHN/THWN, THHW (THHN for dry location only).
 - 2. #10 AWG and larger, stranded copper type THW or dual rated THHN/THHW
- E. For conductors installed in exposed conduit outside of Buildings, in exposed conduit in tunnel and conduit within or just under roofing material, provide type THWN or XHHW.
- F. Control Circuits: Use 600 volts U.L. type THHN/THWN or THWN conductors except where subject to abnormally high temperatures such as on or near boilers. Under these conditions, use UL type RHW-2.
- G. Color Coding:
 - 1. All power conductors identified as to phase and voltage by means of color impregnated insulation, as follows:

Voltage	ØA	ØB	ØC	Neutral	Ground	Isolated Ground
120/208V	Black	Red	Blue	White	Green	Green yellow tracer
277/480V	Brown	Orange	Yellow	Gray	Green	

2. Switch Legs: Use same branch circuit phase color-coding except with white stripe.
3. Switch Traveler: Purple with white stripe for 277 V. Purple with black stripe for 120 V.

H. All conductors shall be color insulated.

2.3 ARMORED CABLE (MC) (SOUTHWIRE TYPE HCF-MC^{AP}) (where approved by the EEOR)

- A. Manufacturers: AFC, Alflec, Southwire or equal
- B. Description: ANSI/NFPA 70, Type MC. Manufactured in accordance to CEC Article 333. Southwire Type HCF-MC^{AP} or equal.
- C. Conductor: Copper
- D. Insulation Voltage Rating: 600 volts.
- E. Insulation Temperature Rating: 90 degrees C.
- F. Insulation Material: Thermoplastic
- G. Armor Material: Steel
- H. Armor Design: Interlocked metal tape, corrugated tube or smooth tube.
- I. Number of conductors: Provide cable having a maximum of 7 conductors; 6 current carrying conductors, 1 ground conductor and 1 bare jacket bond strip or bare copper conductor.
- J. Ground: Internal insulated green copper conductor; 16 AWG uninsulated aluminum jacket bonding strip.

2.4 FLEXIBLE CORDS AND CABLE (TYPE SO)

- A. Provide Type 3 flexible cords and cables manufactured in accordance with CEC Article 400.
- B. Composed of two or more conductors and a full size green insulated ground wire with an outer jacket of rubber or neoprene.
- C. Equip flexible cords and cables with wire mesh strain relief grips either as an integral component of the connector or as an independently supported unit.

- D. Suspended flexible cords and cables using safety spring(s) unless otherwise noted on the Drawings.

2.5 PULL CORD

- A. Empty branch circuit or system conduits: Provide mildew resistant polypropylene line, minimum 210 pound tensile strength. Greenlee Poly-Line or equal.
- B. Empty feeder conduits or ducts: Provide mildew resistant polypropylene rope, minimum 1/4 inch diameter. Durlaine or equal.

2.6 MULTI-CONDUCTOR CONTROL CABLE

- A. Manufacturers: Alpha, Belden, or equal.
- B. Description: Multi-conductor insulated cable with color-coded PVC insulation over each conductor and an overall PVC jacket.
 - 1. Alternate material: PVC-free jacket.
- C. Conductor: Copper, stranded.
- D. Insulation Voltage Rating: 600V.
- E. Temperature Rating: -20 degrees C to +80 degrees C.
- F. Agency Certification: UL recognized, passes VW-1 flame test.

2.7 WIRING CONNECTORS

- A. Split Bolt Connectors:
 - 1. Burndy, "Servit" K series.
 - 2. Thomas & Betts "Locktite" T series.
 - 3. Or equal.
- B. Solderless Pressure Connectors:
 - 1. Burndy, "Qiklink" or "Qiklug" Q2 series.
 - 2. Thomas & Betts "Locktite" 32000 series.
 - 3. Or equal.
- C. Spring Wire Connectors:
 - 1. Ideal "Wingnut"

2. WAGO's may be used in light fixtures or as specifically approved by the EEOR.
 3. Ideal twister
 4. Self-stripping pigtail and connectors are not permitted.
 5. Or equal.
- D. Compression Connectors:
1. Burndy "Hylink" YS Long Barrel Series
 2. Thomas & Betts "Color-Keyed" 54500 Series
 3. Or equal.
- E. Compression Type Terminating Lugs:
1. Copper wire and cable connections. Use long barrel type, tin plated copper/aluminum compression lugs having color-keyed tool die index marking. Provide 1-hole lugs for 8 AWG through 4/0 AWG. Provide 2-hole lugs for 1/0 AWG and larger. 2 hole compression lugs to be used in Metal Clad Switchgear at secondary switchboards, 1 hole compression lugs to be used at incoming Metal Enclosed switchgear. Use minimum of three crimps per lug or as recommended by the manufacturer. T & B Series 54800/54900 or equivalent.
 2. Notch or single point type crimping is not permitted.
 3. Mechanical type lugs are acceptable for all other lugs. Where mechanical lugs or connectors are used, access to the lug or connector shall be maintained to allow periodic tightening.
- F. Terminal Strips
1. Provide box type rail mounted terminal block system. Furnish required quantity plus 25 percent spare. Install using continuous rows method in terminal cabinets. Provide ampere ratings as required. T & S Series HR, GR, or equivalent
 2. Identify all terminals with same numbering sequence being used for a particular system. Use marking strips to identify terminals.
- G. Crimp Type Connectors:
1. Provide insulated fork or ring crimp terminals with tinned electrolytic copper-brazed barrel, funnel wire entry and insulation support. T & B RA Series or equivalent
 2. Fasten crimp type connectors or terminals using a crimping tool recommended by the connector manufacturer.

3. Provide insulated overlap splices with tinned seamless electrolytic copper barrel with funnel wire entry and insulation support. T & B Series R or equivalent.
 4. Provide insulated butt splices with tinned seamless electrolytic copper barrel with center stop, funnel wire entry and insulation support. T & B Series R or equivalent.
- H. Cable Ties: Provide harnessing and point-to-point wire bundling using nylon cable ties, T & B Series TY, Panduit Pan-Rap or equivalent. Install ties using tool supplied or recommended by the manufacturer of ties.
- I. Wire Lubricating Compound
1. UL listed for the wire insulation and conduit type. "Polywater J", Aquagel, yellow 77 or equivalent.
 2. Use on wire for isolated type electrical power systems is not permitted.
 3. No oil, grease, graphite, or similar substances may be used for pulling conductors in raceways.
 4. Pulling of size #1/0 or larger conductors shall be done with an approved cable pull machine. Other methods; e.g. using vehicles, and block and tackle to install conductors shall not be acceptable.
- J. Bolt Termination Hardware
1. Bolts: Plated, medium carbon steel heat treated, quenched and tempered conforming to ASTM A-325 or SAE grade 5; or silicon bronze alloy ASTM B-9954 Type B.
 2. Nuts: Heavy semi-finished hexagon, conforming to ANSI Bi 8.2.2, threads to be unified coarse series (UNC), class 2B steel or silicon bronze alloy.
 3. Flat washers: Steel or silicon bronze, Type A plain standard wide series, confirming to ANSI B27.2. SAE or narrow series are not permitted.
 4. Conical spring washers: Hardened steel, cadmium plated or silicon bronze.
 5. Maximum current capacity for bolt sizes:
 - a. 1/4" bolt - 125 amps
 - b. 5/16" bolt - 175 amps
 - c. 3/8" bolt - 225 amps
 - d. 1/2" bolt - 300 amps
 - e. 5/8" bolt - 375 amps
 - f. 3/4" bolt - 450 amps

2.8 INSULATION

- A. Insulating Tape (600 volts and below):
 - 1. Black, ultraviolet proof, self-extinguishing, 7 mil thick vinyl general purpose electrical type. Suitable for temperature from minus 18°C to 105°C. 3M “Scotch” #33 Plus or equal.

- B. Cold-Shrink Tubing:
 - 1. Raychem.
 - 2. 3M
 - 3. Cold Shrink
 - 4. Or equal.

- C. Insulating Compound (600 Volts and Below):
 - 1. Vinyl Mastic: Self-fusing, rubber-based insulating compound, laminated to an all-weather grade vinyl (PVC) backing. 3M/Scotch 2200 Series or equal.
 - a. Alternate material: PVC-free jacket.
 - 2. Insulation Putty: Electrical grade, rubber-based, elastic-type puffy in tape form. 3M Scotchfil or equal.

- D. Insulating Resin:
 - 1. Use two part liquid epoxy resin with resin and catalyst in premeasured, sealed mixing pouch. Scotchcast 4 or equal.
 - 2. Use with thermal and dielectric properties equal to the insulating properties of the cables immersed in the resin.

2.9 ACCESSORIES

- A. Vertical Cable Supports:
 - 1. O-Z/Gedney, Type “M”
 - 2. Adalet, “SVM” series
 - 3. Or equal.

- B. Conductor Ties:
 - 1. Panduit, “Pan-ty”
 - 2. Thomas & Betts, “Ty-rap”
 - 3. Or equal.

- C. Conductor Sealant:
 - 1. Dow-Corning, #795 silicone
 - 2. General Electric, #SCS1000 silicone
 - 3. Or equal.
- D. Adhesives and sealants shall comply with VOC limits in Division 1.

PART 3 - EXECUTION

3.1 GENERAL WIRING METHODS

- A. Install products in accordance with manufacturer's instructions.
- B. Concealed dry interior locations; normal power systems: Use Type THHN wire in conduit. Use Type XHHW or dual rated THHN/THWN insulation for feeders. Use stranded conductors for control circuits, connection to motors and vibrating equipment.
- C. Use conductor not smaller than 12 AWG for power and circuits.
- D. Use conductor not smaller than 16 AWG for control circuits.
- E. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- F. Minimum conductor size for 20 ampere power branch circuits:
 - 1. Use 10 AWG conductors for 120 volt branch circuits longer than 75 feet to first outlet.
 - 2. Use 10 AWG conductors for 277 volt branch circuits longer than 200 feet to first outlet.
- G. Provide 10 AWG pig tails on all 20A and 30A wiring devices served by 8 AWG conductors and larger.
- H. Splice cables and wires only in outlet boxes, junction boxes, pull boxes, manholes, or handholes. When more than one neutral is present, group and bundle each neutral with its associated phase conductors.
- I. Install cable supports for all vertical feeders in accordance with the CEC.
- J. Panelboards, cabinets, wireways, switches, and equipment assemblies. Neatly form, train, and tie the cables. Use nylon ties for securing cable/wire bundles.
- K. Seal cable or wire, entering a building horizontally from underground or exiting walk-in cold box or freezer, using nonhardening approved compound, duct seal or equivalent. Seal at nearest box or panelboard raceway termination.

- L. Terminate stranded wire using fittings, lugs or devices listed for the application. Do not terminate stranded wire by wrapping it around a screw or bolt.
- M. Flexible cords and cables supplied as part of a premanufactured fixture or unit assembly: Install according to manufacturers published installation instructions.
- N. Use connectors with ampacity and temperature ratings equal to or greater than the wires that are being terminated.
- O. Exposed dry interior locations: Use Type THHN insulation for branch circuit wiring. Use Type XHHW or dual rated THHN/THWN insulation for feeders.
- P. Wet or damp locations: Use Type XHHW insulation for feeder and branch circuit wiring.
- Q. Use Type RHH or THHN insulation for wire installed in fixture channels.
- R. Parallel feeders: Install phase conductors and neutral conductors so that they are equal in length and identical in all ways.
- S. Provide adequate length of conductors within electrical enclosures and train the conductors to terminal points with no excess. Bundle multiple conductors; conductors larger than 10 AWG, bundle in individual circuits. Make terminations so there is no bare conductor visible at the terminal.
- T. Where circuits require a neutral conductor, provide a dedicated neutral conductor for each circuit.

3.2 WIRING INSTALLATION IN RACEWAYS

- A. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.
- B. Pull all conductors into a raceway at the same time. Exercise care in pulling conductors so that insulation is not damaged.
- C. Use UL listed, non-petroleum base and insulating type pulling compound as needed.
- D. Completely mandrel all underground or concrete encased conduits prior to installing conductors.
- E. Completely and thoroughly swab underground raceway system before installing conductors.
- F. Do not use block and tackle, power driven winch or other mechanical means for pulling conductors smaller than 2 AWG.
- G. Wire Pulling:
 - 1. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling of cables.

2. Use rope made of nonmetallic material for pulling feeders.
 3. Attach pulling lines for feeders by means of either woven basket grips or pulling eyes attached directly to the conductors.
 4. Pull in together multiple conductors or cables in a single conduit.
 5. Use wire-pulling compound as lubricant for installing wires and cables in raceways. Use of oil, grease, graphite, or similar substances is not permitted.
- H. Install and test all cables in accordance with manufacturer's instructions and warranty.

3.3 INSTALLATION IN MANHOLES

- A. Install and support cables in manhole on Heavy Duty non metallic racking with porcelain or equivalent insulators, unless otherwise noted. Train the cables around the manhole walls, but do not bend to a radius less than six times the overall cable diameter or as recommended by the cable manufacturer.

3.4 CABLE INSTALLATION

- A. Where approved by the EEOR install HCF-MC^{AP} cable in accordance with manufacturer's instructions and in accordance with CEC Article 333. Follow manufacturer's instructions when connecting the cable to fittings and boxes. Secure connectors to the cable, but not overtightened. Firmly attach connector to the metal boxes.
- B. Support cables every 4.5 feet and within 12 inches of box or fitting using separate metal strap or spring metal clip for each cable. Do not bundle cables together.
- C. Do not support cables from raceways or mechanical piping.
- D. Do not rest cables on ceiling tiles or allow contact with mechanical piping systems.
- E. Cable connection to light fixtures: Acceptable to attach cable to fixture support wire using spring metal clip.
- F. Use UL approved cable connectors.
- G. Use cable having color code conductors.
- H. Provide separate sleeves and/or fire barriers for cable fire wall penetration, unless cable is UL listed for the application.
- I. HCF-MC^{AP} cable is not permitted for homerun use. Extend cable from junction/wireway box having branch circuits for the immediate area. Use conduit for routing branch circuit conductors from junction or wireway box to the panelboard.
- J. Use steel insulated throat cable connectors. OZ Gedney AMC Series or equivalent. Die cast or pressure cast fittings are not permitted.

- K. Provide ¼ inch threaded or solid rod, or ceiling wire above ceiling spaces for cable support, 4' on center. Use spring metal clip for cable attachment to rod.

3.5 WIRE SPLICES, JOINTS, AND TERMINATION

- A. Join and terminate wire, conductors, and cables in accordance with UL 486A, B, C, CEC and manufacturer's instructions.
- B. Thoroughly clean wires before installing lugs and connectors.
- C. Make splices, taps and terminations to carry full ampacity of conductors, without noticeable temperature rise.
- D. Make splices and termination mechanically and electrically secure.
- E. Where determined that unsatisfactory splices or terminations have been installed, remove the devices and install approved devices at no additional cost.
- F. Terminate wires in terminal cabinets, relay and contactor panels using terminal strip connectors.
- G. Bundle spare conductors using nylon ties. Leave sufficient length to terminate anywhere in the panel or cabinet.
- H. Use nylon cable ties for bundling and securing wire and cable as required to maintain harnessing.
- I. Encapsulate below grade splices at outlet, pull and junction boxes using specified insulating resin kits. Make all splices watertight for exterior equipment and equipment in pump rooms.
- J. Make up all splices and taps in accessible junction or outlet boxes with specified connectors. Use same color pigtails and wire tap as the feed conductor. Form conductor prior to cutting. Provide at least 6 inches of tail and neatly packed in box after splice is made up. P&S factory pig tails are acceptable to use for receptacles.
- K. 8 AWG and smaller conductor connections:
 - 1. Connectors: Solderless, screw on, reusable spring pressure cable type, 600 volt, 105 degree C, with integral insulation, approved for copper conductors.
 - 2. The integral insulator shall completely cover the stripped wires.
 - 3. The number, size, and combination of conductors, as listed on the manufacturers packaging shall be strictly complied with.
- L. 6 AWG and larger conductor connections:
 - 1. Join or tap two conductors using compression (hi-press) taps specified. Cover using cold shrink insulation. Where more than two conductors are joined use a terminal block or Polaris type termination. Where terminating

conductors in a motor connection use a split bolt connector wrapped with one layer of Scotch 2520 cambric tape, followed by two layers of Scotch 130C rubber splice tape and followed by two layers of Scotch 33 vinyl electric tape.

2. Terminate conductors from size 6 AWG to 750 MCM copper using mechanical compression lugs in accordance with manufacturer's instructions.
3. Cable sizes 250 MCM and larger: Use not less than two clamping elements or compression indents per wire for connectors.
4. Aluminum conductors: Join conductors using compression splice barrels or bolted compression lugs. Terminate conductors using compression lugs. Apply number of compression indents as directed by the manufacturer instructions.
5. Insulate splices and joints with materials approved for the particular use, location, voltage and temperature. Insulate with not less and that of the conductor level that is being joined.
6. Use hydraulic crimping tool for making compression indents. Burndy Series Y35 Hypress or equivalent.
7. Apply oxide inhibiting compound to conductors before joining, installing compression lugs or making aluminum terminations.

M. Termination Hardware Assemblies:

1. AL/CU lugs connected to aluminum plated or copper bus: Secured using a steel bolt, flat washer (two per bolt), lock washer, and nut.
2. Copper lugs connected to copper bus: Secured using steel bolt, flat washer (two per bolt), lock washer, and nut.
3. Torque bolted assemblies using the manufacturer's recommendations. In the absence of such recommendations, use torque values listed in UL 486 Standards.
4. Apply silicon spray or other suitable lubricant before torquing bolts. Clean bolt surface after torquing. Mark torqued bolt heads using red or pink lacquer paint Torque Seal or equivalent.

3.6 TYPE MI CABLE INSTALLATION

- A. Install MI cable in accordance with manufacturer instructions and in accordance with CEC Article 330.
- B. Use fitting recommended by the manufacturer.
- C. Support cable every 6 feet using straps or hangers.
- D. Seal cable after stripping to prevent moisture from entering the insulation.

3.7 IDENTIFICATION

- A. Refer to Section 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS for additional requirements.
- B. Securely tag all branch circuits, noting the purpose of each. Mark conductors with specified vinyl wrap-around markers. Where more than two conductors run through a single outlet, mark each conductor with the corresponding circuit number.
- C. All conductors shall be color insulated.
- D. Provide terminal strips with write on marking strips.
- E. In manholes, Christy boxes and handholes, provide phenolic tags. Show the cable type and voltage rating. Attach the tags to the cables with slip-free plastic cable lacing units.

3.8 HOMERUNS

- A. Permissible to combine up to 4#10 current carrying conductors for an individual homerun in 1/2 inch conduit. Permissible to combine up to 8#10 current carrying conductors for an individual homerun in 3/4 inch conduit. Permissible to combine up to 14 # 10 current carrying conductors of an individual homerun in 1 inch conduit. Permissible to combine up to 20#10 current carrying conductors for an individual homerun in 1-1/4 inch conduit.
- B. Permissible to combine up to nine current carrying conductors for circuits feeding mechanical equipment as long as the conductor has the same ampacity.
- C. Homeruns containing more current carrying conductors than not in paragraph 3.8A and 3.8B are not permitted without approval of electrical engineer of record and derating per CEC article 310.
- D. Adjust branch circuit conductor ampacity in accordance to CEC article 310. Provide higher ampacity conductor sizes as needed.

3.9 VOLTAGE DROP

- A. Maximum length of cable for each department shall not exceed the length provided in the following table. Refer to the table in 3.9B for specific maximum lengths unless specifically noted on drawings.
- B. Where required conductor length not to exceed the following distance unless specifically noted on drawings, or by vendor specific requirements.

Voltage Drop				
Single Phase, copper conductor, conduit installation				
VOLTAGE	FEEDER SIZE	DISTANCE	AMPACITY	VD%

120V	#12	45ft	20A	3.00%
220V	#12	90ft	20A	3.00%
277V	#12	115ft	20A	3.00%
120V	#10	80ft	20A	3.00%
220V	#10	140ft	20A	3.00%
277V	#10	190ft	20A	3.00%
120V	#8	120ft	20A	3.00%
220V	#8	220ft	20A	3.00%
277V	#8	280ft	20A	3.00%
120V	#6	190 ft	20A	3.00%
220V	#6	360 ft	20A	3.00%
277V	#6	440 ft	20A	3.00%

Voltage Drop				
Three Phase, copper conductor, conduit installation				
VOLTAGE	FEEDER SIZE	DISTANCE	AMPACITY	VD%
208V	#12	100ft	20A	3.00%
480V	#12	225ft	20A	3.00%
208V	#10	160ft	20A	3.00%
480V	#10	380ft	20A	3.00%
208V	#8	240ft	20A	3.00%
480V	#8	580ft	20A	3.00%
208V	#6	400 ft	20A	3.00%
480V	#6	920 ft	20A	3.00%

3.10 TESTING

- A. "Megger" tests shall be taken on all feeder conductors and on all conductors for motors over 15 HP. Tests shall be made prior to connection of equipment. Conductors tested to be below manufacturers' standard, shall be replaced at the Contractors expense.

3.11 INTERFACE WITH OTHER PRODUCTS

- A. Identify wire and cable under provisions of Section 26 05 53.

- B. At each junction or pullbox, identify each conductor with its circuit number or other designation indicated on Drawings.

3.12 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 26 00 80.
- B. Inspect wire and cable for physical damage and proper connection.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturers recommended values.
- D. Verify continuity of each branch circuit conductor.

END OF SECTION

SECTION 26 05 26**GROUNDING AND BONDING****PART 1 - GENERAL****1.1 SUMMARY**

- A. This section includes labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
1. Power system grounding.
 2. Electrical equipment grounding and bonding.
 3. Miscellaneous bonding and grounding.
- B. System Description
1. The entire electrical installation (non-current carrying metal parts), including but not limited to, metallic conduits and raceways, cable trays, junction and pull boxes, enclosures, fixtures, service equipment, distribution boards and panels, transformers, grounding type receptacles, switches, motor frames, cabinets and equipment shall be completely and effectively grounded in accordance with all code requirements, whether or not such connections are specifically shown or specified.
 2. Resistance
 - a. Resistance from the farthest panelboard, switchboard, and etc. ground bus through the ground electrode to earth shall not exceed 20 OHMS.
 3. Ground each separately derived system neutral as described herein except as otherwise shown or specified.
 4. Electrical continuity to ground metal raceways and enclosures, isolated from the equipment ground by use of non-metallic conduit or fittings, shall be provided by a green insulated grounding conductor of approved size within each raceway connected to the isolated metallic raceways or enclosures at each end.
- C. Furnish Products listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

1.2 RELATED SECTIONS

- A. Section 03 21 00 - Concrete Reinforcement.
- B. Section 03 31 00 - Cast-In-Place Concrete.
- C. Division 01 for recycling requirements.
- D. Division 01 for dust and pollutant control requirements.
- E. Division 01 for VOC limits, recycled content, regional materials, and other sustainable design requirements.

1.3 REFERENCES

- A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified:
1. IEEE Standard 80 - Guide for Safety in AC Substation Grounding.
 2. IEEE Standard 81 - Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System (Parts 1 & 2).
 3. IEEE Standard 141 - Recommended Practice for Electrical Power Distribution for Industrial Plants.
 4. IEEE Standard 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
 5. IEEE Standard 110 - Recommended Practice for Powering and Grounding Electronic Equipment.
 6. UL 467 - Electrical Grounding and Bonding Equipment.
 7. UL 869 - Electrical Service Equipment.
 8. California Electrical Code (CEC) 2019 Edition
 9. California Building Code (CBC) 2019 Edition

1.4 SUBMITTALS

- A. Submit under provisions of Sections 26 00 10 and Division 01 – SUBMITTALS.
1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
 2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
 3. Submit manufacturer's installation instructions.
 4. Bill of materials, listing all components
 5. Field test reports
- B. Record Drawings
1. Record drawings shall indicate the location of all ground rods and supplementary grounding electrodes connected to the grounding system.
 2. The location of each ground rod, ground-rod assembly, and other grounding electrodes shall be identified by letter in alphabetical order and keyed to the record of ground-resistance tests.

- C. Typewritten records of measured resistance values shall be submitted for review and included with the operation and maintenance manual furnished to the Owner at the time of project closeout.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum ten years documented experience.

PART 2 - PRODUCTS

2.1 ROD ELECTRODE

- A. Manufacturers:
 - 1. Blackburn
 - 2. Erico
 - 3. Or equal.
- B. Material: Copper-clad steel with heavy uniform copper coating.
- C. Diameter: 3/4-inch.
- D. Length: 10 feet

2.2 MECHANICAL CONNECTORS

- A. Manufacturers:
 - 1. Burndy
 - 2. OZ/Gedney
 - 3. Thomas & Betts/Blackburn
 - 4. 3M
 - 5. IlSCO
 - 6. Or equal.
- B. Material: Bronze.
- C. For use only above ground.
- D. Water pipe connectors: OZ/Gedney G-200B series or equal.
- E. Bonding Jumpers: OZ/Gedney BJ series or equal.
- F. Ground rod connection: U-bolt clamps by T&B/Blackburn "GUV" or Burndy "GAR" series or equal.

2.3 COMPRESSION CONNECTIONS

- A. Manufacturers:
 - 1. Thomas & Betts compression system.

2. Burndy "Hyground" compression system.
 3. Or equal.
- B. Material: Copper.

2.4 EXOTHERMIC CONNECTIONS

- A. Manufacturers:
1. Cadweld
 2. Thermoweld
 3. Or equal.

2.5 WIRE

- A. Material: Stranded copper.
- B. Grounding Electrode conductor: Size to meet CEC requirements.
- C. Equipment grounding conductor: Use green THW / THWN insulated copper wire. For conductors that are not commercially available with green insulation; identify using green plastic tape in accordance with Section 26 05 53 — ELECTRICAL IDENTIFICATION and CEC.

2.6 GROUNDING WELL COMPONENTS

- A. Wells/Yard boxes: Boxes shall be precast concrete and shall be approximately 14" wide, 19" long and 12" deep (outside dimensions), or larger, if necessary to obtain the required clearances.
- B. Well Cover: shall be bolt down, checkered, cast iron covers with a cast iron frame cast into the box. Cover shall be labeled "GROUND".

2.7 INSULATED GROUNDING BUSHINGS

- A. Plated malleable iron body with molded plastic insulating throat (150°C rated) and lay-in grounding lug. Manufactured by OZ/Gedney "BLG" series, Thomas & Betts, Appleton or equal. Any wiring jacketing (insulation) shall be 100% lead-free. Provide lead-free cable as per Division 1 as an add alternate for team evaluation.
1. Alternate material: PVC-free.

2.8 GROUND BARS

- A. Provide 36-inch wide by 4-inch high by ¼ -inch thick copper bus bar minimum, or size larger as necessary. Mount on walls in locations shown, on insulating standoffs, 18-inches above finished floor unless otherwise indicated.
- B. Provide U.L approved lugs for connecting grounding system cables. Attach lugs to bus with appropriate Grade 5. Bolt, lock washers and nuts. Torque all connections. All holes shall be drilled and tapped for two hole lugs. (single hole lugs may be acceptable where two hole lugs are unavailable) Provide 6 spare lugs and lug spaces unless otherwise noted.
- C. Ground Bars shall be manufactured by Erico Products, Inc., Chatsworth, or equal.
- D. Lugs shall be manufactured by Burndy, Thomas & Betts, IlSCO or equal.

2.9 GROUNDING CONDUCTORS

- A. System grounding conductors shall be a minimum of #4/0 AWG unless otherwise indicated, and shall be continuous without joints or splices.
- B. Bare conductors in direct contact with earth or encased in concrete: #4/0 AWG copper minimum unless otherwise noted.
- C. Ground conductors shall have green insulation. Where continuous color-coded conductors are not commercially available, provide a minimum 4" long color band with green, non aging, plastic tape in accordance with CEC.
- D. Bonding Pigtails: Insulated copper conductor, identified green, sized per code, and provided with termination screw or lug. Provide solid conductors for #12 AWG or smaller and stranded conductors for #10 AWG or larger.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Thoroughly examine site conditions for acceptance of grounding system installation to verify conformance with manufacturer and specification tolerances. Do not commence with installation until all conditions are made satisfactory.
- B. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.2 INSTALLATION

- A. Grounding conductors: Provide grounding electrode conductor and grounding equipment conductors as indicated on the drawings or sized per CEC Tables, whichever is greater.
- B. All metallic conduit stub-ups shall be grounded and where multiple stub-ups are made within an equipment enclosure, such as a switchboard, they shall be equipped with grounding bushings and bonded together and to the enclosure and the enclosure ground bus.
- C. Use exothermic weld kits or burndy hyground compression connectors for below grade conductor splices and foundation steel connections. Use bolted connectors for above grade terminations. Use compression connectors or exothermic weld kits for above grade splices.
- D. Apply corrosion-resistant finish to field connections, buried metallic grounding and bonding products, and places where factory applied protective coating has been destroyed, which are subjected to corrosive action. Manufactured by Burndy "Penetrox" or equal.
- E. Power System Grounding: Provide, unless otherwise indicated, a main building reference ground bus at location shown on drawings. Connect the following items using CEC sized copper grounding conductors to lugs on the main building ground bus:
 - 1. Grounding electrode conductor from driven ground rods, concrete encased electrode, and supplementary grounding electrodes.
 - 2. Bonding conductor to metallic cold water piping system.
 - 3. Bonding conductor to building structural steel.
- F. Separately derived electrical system grounding:
 - 1. Ground each separately derived system per requirements in CEC as a minimum, unless greater requirements are stated elsewhere in the contract documents.

2. Transformers: Provide a dual rated four or six-barrel grounding lug with a 5/8-11 threaded hole. Drill enclosure with 11/16" bit and attach lug to enclosure utilizing a torque bolt and a dragon tooth transition washer or equal. Connect the following when present:
 - a. Grounding electrode conductor.
 - b. Primary feeder ground.
 - c. Secondary feeder ground.
 - d. Main bonding jumper.
 - e. Isolated ground conductor (where applicable).

G. Equipment Bonding / Grounding

1. Provide an insulated copper ground conductor sized in accordance with CEC requirements in all 120VAC through 600 VAC feeder and branch circuit distribution conduits and cables.
2. Provide a separate grounding bus at panelboards, switchboards, and motor control centers. Connect all metallic enclosed equipment so that with maximum fault current flowing, shall be maintained at not more than 35 volts above ground.
3. Conduit terminating in concentric, eccentric or oversized knockouts at panelboards, cabinets, gutters, etc. shall have grounding bushings and bonding jumpers installed interconnecting all such conduits.
4. Conduit feeders terminating at all switchboards, distribution enclosures, panelboards, cabinets and gutters, etc. shall have grounding bushings and bonding jumpers installed interconnecting all such conduits.
5. All conduit 1 ¼" and larger should have grounding bushings.
6. Bond all receptacles to the boxes, raceways and grounding conductor.
7. Provide grounding pigtailed for bonding metal boxes to the ground system.
8. Provide bonding jumpers across expansion and deflection couplings in conduit runs, pipe connections to water meters, dielectric couplings in metallic cold water piping system.
9. Provide grounding and bonding conductors with sufficient slack to avoid breaking due to settlement and movement of conductors at attached points.
10. Provide ground bars in all electrical rooms, sized as required, wall mounted at main and each electrical room with insulated standoffs.
11. Provide bonding of the ground busses that belong to the normal and critical system panelboards serving the same patient vicinity in accordance with CEC 517-14.
12. Provide grounding and bonding in patient care areas to meet requirements of NFPA 99 and ANSI/NFPA 70. Ground all outlets and equipment in accordance with CEC 517-13.

H. Exothermic welding, Thomas & Betts non reversible I beam ground clamp connectors or Burndy Hyground compression connectors.

1. Exothermic welds or Burndy Hyground compression connectors shall be used for buried or concealed joints, cable-to-cable and cable to structural steel surfaces. Each particular type of weld shall use a kit unique to that type of weld.
 - a. Connections made outdoors shall be suitable for exposure to the elements.
 - b. Connections made indoors shall use low smoke, low emissions "Cadweld Exolon" process.
 - c. All Buried or concealed joints shall be inspected and approved by the Inspector and the Owner's Representative before concealment.
 - d. All materials involved shall be from the same source to insure compatibility.
2. Connections made with this process shall meet requirements of IEEE Standard 837 and other applicable specifications.

3.3 FIELD QUALITY CONTROL

- A. Field inspection and testing shall be performed under provisions of Section 26 00 80.
- B. Independent Testing agency shall perform all quality control electrical testing required herein.
- C. Pre-functional Testing
 1. Provide testing agency with contract documents for their review prior to the commencement of ground testing.
 2. Visual and mechanical inspection:
 - a. The testing agency shall inspect the grounding electrode and connections prior to concrete encasement, burial, or concealment.
 - b. Check tightness and welds of all ground conductor terminations.
 - c. Verify installation complies with the intent of the contract documents.
- D. Testing
 1. The resistance to ground for all systems shall be measured by the "direct" method or "fall of potential method."
 - a. Perform "fall-of-potential" test per Institute of Electrical and Electronic Engineers (IEEE) Standard No. 81, Section 9.04 on the main grounding electrode or system.
 - b. Perform the 2 point method test per IEEE No. 81, Section 9.03 to determine the ground resistance between the main grounding system and all major electrical equipment frames, system neutral and derived neutral points.
 2. Obtain and record ground resistance measurements both from electrical equipment ground bus to the ground electrode and from the ground electrode to earth.

3.4 ADJUSTMENTS

- A. Furnish and install additional bonding and add grounding electrodes as required complying with resistance limits specified under this Section of the Specification.

END OF SECTION

SECTION 26 05 34**CONDUIT****PART 1 - GENERAL****1.1 SUMMARY**

- A. This section includes labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
1. Rigid steel conduit and fittings.
 2. Electrical metallic tubing and fittings.
 3. Flexible metallic conduit and fittings.
 4. Liquid tight flexible metallic conduit and fittings.
 5. Rigid non-metallic conduit and fittings.
 6. PVC insulated rigid steel conduit and fittings.
 7. Miscellaneous conduit fittings and products.
- B. Related Work: Consult all other Sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified.
1. ANSI C80.1 - Rigid Steel Conduit, Zinc-Coated.
 2. ANSI C80-3 - Electrical Metallic Tubing, Zinc-Coated.
 3. ANSI/NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
 4. California Electrical Code (CEC) 2019 Edition
 5. California Building Code (CBC) 2019 Edition
 6. FS WW-C-563A - Electrical Metallic Tubing.
 7. FS WW-C-566 - Specification for Flexible Metal Conduit.
 8. FS WW-C-581 - Specification for Galvanized Rigid Conduit.
 9. NEMA RN 1 - PVC Externally-Coated Galvanized Rigid Steel Conduit.
 10. NEMATC2 - Electrical Plastic Tubing and Conduit.

11. NEMATC3 - PVC Fittings for Use with Rigid PVC.
12. UL 1 - Flexible Metal Conduit.
13. UL4 - Armored Cable.
14. UL6 - Rigid Metal Conduit.
15. UL651 - Rigid Nonmetallic Electrical Conduit.
16. UL797 - Electrical Metallic Tubing.
17. UL 1242 - Intermediate Metal Conduit.

B. Related Sections:

1. Division 01 for recycling requirements.
2. Division 01 for dust and pollutant control requirements.
3. Division 01 for VOC limits, recycled content, regional materials, and other sustainable design requirements.

C. Submit cut sheets of product in accordance with 26 00 10.

D. Seismic Bracing: Submit seismic bracing and anchoring system including calculations that shall be used for the raceway installation for OSHPD review and approval. The calculations shall be stamped and signed by a Structural Engineer registered in the State of California. It is the contractor's responsibility to prove these systems comply with CBC section 1632A.6.

1.3 QUALITY ASSURANCE

- A. All materials, equipment and parts comprising the units specified herein shall be new.
- B. Only products and applications listed in this Section may be used on the project unless otherwise submitted and approved by the Owner's Representative.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site under provisions of Division 01 - PRODUCT OPTIONS AND SUBSTITUTIONS.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- D. Protect PVC conduit from sunlight.

1.5 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.

- C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 - PRODUCTS

2.1 CONDUIT AND FITTINGS

- A. General Requirements:

1. Conduit and wireways manufactured under supervision of UL Factory Inspection and Label Service, with UL label and manufacturer's name on each length of conduit over 1-1/2".
2. Fittings: Conform to same requirements as conduit, except as specified herein.

2.2 RIGID METAL CONDUIT AND FITTINGS

- A. Galvanized Rigid Conduit (GRC): ANSI C80.1, full weight steel, threaded, hot-dipped galvanized, or sherardized both inside and out after threading, with threaded connectors and couplings and approved compression connectors and couplings.

1. Manufacturers:
 - a. Allied
 - b. Western
 - c. Republic
 - d. Wheatland
 - e. Picoma
 - f. Triangle
 - g. Or equal.

- B. PVC Coated Conduit: NEMA RN 1; Rigid steel conduits and fittings with a half lap, 40 mil extruded PVC jacket. The jacket shall have high tensile strength, shall be highly resistant to corrosion and shall not oxidize or deteriorate or shrink when exposed to sunlight and weather. The jacket shall be flame retardant and shall not support combustion. The interior of conduit and fittings shall be coated with urethane coating (two mil thickness) for protection against corrosion.

1. Manufacturers:
 - a. Robroy Industries PLASTI-Bond Red"
 - b. Ocal Corporation Ocal-Blue"
 - c. Or equal.
2. Alternate material: PVC-free.

- C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; threaded type and threadless compression type.
1. Rigid steel fittings: Acceptable Manufacturers: Raco, Steel City/Thomas & Betts, Appleton, Crouse-Hinds/Midwest, O.Z., Bridgeport, EGS
 - a. Three-piece Couplings: Zinc-plated, malleable iron. OZ/Gedney "4-" series, Thomas & Betts "675" series or equal.
 - b. Hubs: Zinc-plated, malleable iron, with insulated throat. OZ/Gedney "CHM-T" series, Thomas & Betts "401" series or equal.
 - c. Insulated Bushings: Zinc-plated, malleable iron, with 150 degrees C rated, molded-on high impact phenolic thermosetting insulation. OZ/Gedney "B" series, Thomas & Betts "BIM" series, or equal.
 - d. Insulated Grounding Bushings: Zinc-plated, malleable iron, with 150 degrees C rated, molded-on phenolic insulation and tin plated copper saddle for grounding conductor. OZ/Gedney "BLG" series, Thomas & Betts "3870" series or equal.
 - e. Expansion Fittings: Up to 2 inches, OZ/Gedney "TX" series or equal in open areas and "TX" together with "DX" series or equal in cored openings. Above 2 inches, OZ Gedney "AXS" series or equal in open areas and "AXS" together with "DX" series or equal in cored openings. All fittings complete with bonding jumper.
 - f. Set screw fittings and die cast or pressure cast fitting are not permitted. Threadless compression fittings shall be heavy duty steel or malleable iron/zinc plated.
 2. Conduit bodies: Zinc plated, malleable iron with tapered threaded hubs. OZ/Gedney "LB-50" series, Appleton "LB-50" series or equal.
- D. Utilize aluminum raceways in 400 or 415 Hz systems, in areas subject to magnetic field in excess of .5 Gauss or as noted herein.

2.3 INTERMEDIATE METAL CONDUIT (IMC) AND FITTINGS

- A. Conduit: Galvanized steel.
1. Manufacturers:
 - a. Allied
 - b. Republic
 - c. Western
 - d. Wheatland
 - e. Picoma
 - f. National

- g. Triangle
 - h. Or equal.
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; Provide threaded type, steel or malleable iron fittings for conduits 2 1/2" and larger. Provide steel or galvanize iron set screw fittings for conduit 2" or smaller. KWIK-COUPLE conduit and elbows that meet all applicable codes and standards shall be permitted.
- C. Threaded intermediate metal conduit may be substituted for rigid steel conduit, unless specifically excluded in this specification or in the CEC.

2.4 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS

- A. Electric Metallic Tubing (EMT): ANSI C80.3, high-grade steel, formed of cold rolled strip steel, electrical resistance welded, hot dip galvanized, applied by the electro galvanized process. Interior of surface coated with aluminum lacquer or enamel. EMT shall be dipped in a chromic acid bath to chemically form a corrosion-resistant protective coating of zinc chromate over galvanized surface.
- 1. Manufacturers:
 - a. Allied
 - b. Wheatland
 - c. Western
 - d. National
 - e. Triangle
- B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; concrete tight, compression or set screw type for interior dry locations. KWIK-fit conduit and elbows that meet all applicable codes and standards shall be permitted.
- 1. Connectors: Zinc plated, steel body with malleable iron nut and insulated throat except that body of compression ring type fittings only may be pressure cast. Pressure cast materials for nuts of compression ring type fittings, or for any part of other types of fittings are not acceptable.
 - 2. Couplings: Zinc plated steel.
 - 3. Conduit Bodies: Die cast, copper-free aluminum with set-screw hubs. OZ/Gedney "LB-50A-TW" series, Appleton "LB-50T-A" series, Thomas & Betts or equal.

2.5 FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Conduit: Fabricated in continuous length from galvanized steel strip, spirally wound and formed to provide an interlocking design.
- 1. Manufacturers:

- a. AFC
 - b. Alflex
 - c. Or equal.
- B. Fittings: ANSI/NEMA FB 1, steel or malleable iron with insulated throat. Thomas & Betts "Tite-Bite 3110 series, OZ Gedney "KC-50T" series or equal.
- C. Provide flexible metallic conduit for termination at equipment subject to motion or vibration, and from outlet box to recessed light fixture and equipment from normal and emergency power.

2.6 LIQUIDTIGHT FLEXIBLE CONDUIT AND FITTINGS

- A. Conduit: Liquid-tight conduit shall be manufactured from interlocked steel construction with standard weight steel, hot dipped galvanized on all four sides prior to conduit fabrication, and shall be provided with an extruded polyvinyl chloride cover. Conduit and fittings shall provide positive ground continuity. Include a separate ground conductor for each circuit.
- 1. Manufacturers:
 - a. Sealtite Flexible, Type "UA"
 - b. Flex-Seal, Type "XL"
 - c. Alflex
 - d. AFC
 - e. Or equal.
 - 2. Alternate material: PVC-free.
- B. Fittings: ANSI/NEMA FB 1, steel or malleable iron with nylon insulated throat. Thomas & Betts "5330" series, OZ Gedney "4Q-50T" series or equal.

2.7 PLASTIC CONDUIT AND FITTINGS

- A. Conduit: Rigid polyvinyl chloride conduit, Schedule 40, conforming to NEMA TC 2 and listed for exposed and direct burial applications. With integral belied ends on straight sections and elbows.
- 1. Manufacturers:
 - a. Carlon
 - b. JM Manufacturing/Eagle
 - c. PW Pipe
 - d. Prime
 - e. Kraloy

- f. Canon Plus 40
 - g. Or equal.
2. Alternate material: PVC-free.
- B. Fittings and Conduit Bodies: NEMA TC 3.
- C. For any turns over 30°, use long radius elbow.

2.8 MISCELLANEOUS

- A. Sleeves shall be zinc coated galvanized steel pipe or Hilti type CB-680 or 3M type MCID or 16 gauge galvanized sheet metal.
- B. Sealant: Fire rated equal to wall or ceiling penetrated. Silicon foam Dow-Corning #2001, 3M, "Pensil #851, or approved equal. Sealant compound for exterior walls shall be moisture resistant material made by 3M, GE, Dow-Corning or equal.
- C. Conduit seals shall be Crouse-Hinds Type "EYS" or EZS," Appleton Type "ESUF" or "ESUM" or approved equal, with sealing compound as recommended by the manufacturer for hazardous or refrigerated areas.
- D. Expansion couplings shall be OZ Type "AX" or "DX" Crouse-Hinds Type "XJ" or "SD" or equal, complete with bonding jumper.
- E. Conduit unions shall be "Erickson" couplings manufactured by Thomas and Betts, Type 4-Series manufactured by O-Z/Gedney or equal.

2.9 CONDUIT SUPPORTS

- A. Conduit Clamps, Straps, and Supports: See Section 26 05 29- HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS.

2.10 WIREWAYS

- A. Provide sheet metal wireways with hinged covers as indicated on the drawings. Screw cover for wireways shall be allowed with approval of the EEOR.
- B. Wireways shall be NEMA type as indicated on Drawings, complete with couplings, off sets, elbows, expansion joints, adapters, hold down straps, end caps, and other fittings as required.

2.11 PULL LINE

- A. 1/8" diameter braided line of yellow polypropylene, or Jet-Line #332 or equal, line of continuous fiber polyolefin; minimum breaking strength, 200 lbs. Furnish and install pull line in all empty (unused) raceways.

2.12 OTHER FITTINGS

- A. Raintight Unions: Appleton or Crouse-Hinds Type UNF or equal.
- B. Concrete Tight Couplings: O.Z. Type SSP, T & B "Erickson" coupling or equal.

- C. Watertight Connectors:
 - 1. Meyers watertight hubs.
 - 2. Midwest or T&B watertight locknuts with O.Z./Gedney Type B bushings.
 - 3. Threaded fittings.
- D. Insulated Bushings for EMT: O.Z./Gedney Type SB, Arlington or equal.
- E. Insulated Compression Box Connector for EMT: O.Z./Gedney 7000 series or equal.
- F. Sealing Bushings: O.Z./Gedney Type CSMI Series sealing bushings or equal for rigid galvanized steel.
- G. Seal-off Fittings: Crouse-Hinds, Appleton or equal.

PART 3 - EXECUTION

3.1 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

- A. Size conduit per CEC for conductor type installed or for Type THWN/THNN conductors, whichever is larger; 3/4-inch minimum size.
- B. Arrange conduit to maintain headroom and present a neat appearance.
- C. Route exposed conduit parallel and perpendicular to walls and adjacent piping.
- D. Maintain minimum 2 inch clearance between conduit and non heat generating and insulated domestic hot water piping that runs parallel for more than 5'-0". Maintain at a minimum 6 inch clearance between conduit and steam piping that runs parallel for more than 5'-0". Maintain 12-inch clearance between conduit and heat sources such as flues and heating appliances.
- E. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, dedicated ceiling wires for conduit, bolted split stamped galvanized hangers, or approved means and methods allowed by code. Dedicated ceiling wires shall be identified in some fashion to distinguish them as different from ceiling support wires.
- F. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit for like type conduits on racks. Where space for 25 percent is not obtainable a reduction is acceptable with the approval of the EEOR.
- G. Do not fasten conduit with perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.

3.2 CONDUIT INSTALLATION

- A. Cut conduit square using a saw or pipe cutter; de-burr cut ends.
- B. Bring conduit to the shoulder of fittings and couplings, fully seat and fasten securely.

- C. Use conduit hubs for fastening threaded conduit to sheet metal boxes, and for fastening conduit to enclosures in damp or wet locations.
- D. Use conduit bodies to make sharp changes in direction, as around beams.
- E. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2 inch size.
- F. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.
- G. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.
- H. Provide 1/8" diameter braided line of yellow polypropylene, or Jet-Line #332 or equal, line of continuous fiber polyolefin, minimum breaking strength, 200 lbs. Furnish and install in ALL empty (unused) raceways, conduits.
- I. Install expansion-deflection joints or flexible conduit with junction box where conduit crosses building expansion or seismic joints.
- J. Where conduit penetrates fire-rated walls and floors, provide fire-stop assembly with UL listed fire rating equal to wall or floor rating.
- K. Route conduit through roof openings for piping and ductwork where possible; otherwise, route through roof jack or pitch pocket.
- L. Maximum Size Conduit in Slabs Above Grade: As allowed in Divisions 3 and 5.
- M. PVC schedule 80 elbows are acceptable to use for under slab conduit runs 70 feet or less with less than 270 degree (power), 180 degree (IT) total bends. Use PVC-coated rigid steel factory elbows for bends in conduit runs longer than 70 feet, or in plastic conduit runs which have more than three bends regardless of length. PVC schedule 80 elbows are acceptable for penetrating concrete slab under free standing switchgear provided PVC is flush with concrete surface and the electrical contractor uses proper fittings. This applies only to PVC conduits runs less than 70 feet and 270 degree bends or less. Use PVC coated rigid steel factory elbows for vertical bends and slab penetrations in all other plastic conduit runs.
- N. Wipe plastic conduit clean and dry before joining. Apply full even coat of cement to entire area that will be inserted into fitting. Let joint cure for 20 minutes minimum.
- O. Final connections to electric motors and other vibration isolated equipment: use steel flexible (in dry locations) and flexible liquid-tight (in damp or wet locations) conduit of sufficient length to provide right angle bend or 8 inch offset between motor or equipment and first rigid anchor point.
- P. Provide conduit for low voltage systems installed in exposed areas.
- Q. Install flexible conduit at all vibration isolated equipment as per the Division 26 Vibration and Seismic Controls or Electrical specification.

3.3 DUCTBANK

- A. Install top of duct bank minimum 30 inches below finished grade.
- B. Terminate conduit in end bell at manhole entries.
- C. Use suitable separators and chairs installed not greater than 5 feet on centers. Band conduit together with suitable separators and chairs. Securely anchor conduit to prevent movement during concrete placement.
- D. Provide minimum 3 inch concrete cover at bottom, top, and sides of duct bank for encasement outside of building footprint or under foundation elements.
- E. Branch power circuits and low voltage are not required to meet ductbank requirements when less than 6 conduits share a common trench.

3.4 CONDUIT INSTALLATION SCHEDULE

- A. Underground Installations within 5 feet of building: Schedule 40 plastic conduit encased in concrete or PVC coated rigid steel conduit.
- B. Installations In or Under Concrete Slab, or Underground more than 5 feet from building: Schedule 40 plastic conduit encased in 2 sack sand slurry or PVC coated rigid steel. No encasement is required under concrete slab if PVC schedule 80 is used. Non metallic raceway shall not be used for branch circuits that supply patient care areas.
- C. In Concrete (where allowed): Rigid steel conduit.
- D. Exposed Outdoor Locations: Rigid steel conduit, or Intermediate metal conduit.
- E. Wet or Damp Interior Locations: Rigid steel conduit or Intermediate metal conduit.
- F. Concealed Dry Interior Locations: EMT with set screw connectors.
- G. Crawl space location braced on the Floor: Rigid steel conduit or intermediate metal conduit.
- H. Crawl Space location hung from the deck above: EMT with set screw connectors.
- I. Exposed Dry Interior Locations below 8 feet: Rigid steel conduit *or* Intermediate metal conduit. EMT may be used in lieu of rigid conduit if not subject to physical damage as defined by the CEC.
- J. Conduit system mechanically and electrically continuous from outlet to outlet and to all cabinet junction or pull boxes. Secure conduits to all boxes and cabinets so all parts have electrical continuity.
- K. Where specific sizes required by Drawings or Specifications are larger than Code requires, larger size shall be installed.
- L. Do not use conduit bodies for conduits larger than 2 inches unless they are of the mogul design, and are supported within 36 inches of the conduit body.

- M. Provide four empty 3/4 inch conduit for spare circuits for each flush mounted panelboard. Terminate conduit in an accessible location (ceiling space above panelboard) for future extension.
- N. Minimum conduit sizes are as follows:
1. Power and Control: 3/4", unless otherwise noted on the drawings.
 2. Communication/Data: 1 1/4", unless otherwise noted on the drawings.
 3. Signal Systems: 3/4", unless otherwise noted on the drawings.
- O. Provide conduit bending and elbows as noted below:
1. Power Feeders (600V): At a minimum comply with Chapter 9 Table 2 of the CEC .
 2. Branch Circuits: At a minimum comply with Chapter 9 Table 2 of the CEC .
 3. Power Feeders (above 600V): At a minimum comply with Chapter 9 Table 2 of the CEC
 4. All 90° elbows for all conduits including and over 2" trade diameter shall be standard factory radius minimum.
 5. Power feeders, branch circuits, and signal circuits 600 V and below use UL listed factory elbows.
 6. All field bends for rigid conduit shall be made by either hickey-style benders for 1" and smaller conduits or by one-shot hydraulic benders for conduits larger than 1". Manufactured specifically for the purpose.
 7. Provide no more than 4 - 90° bends between pull or junction boxes for power wiring conduit run. Provide no more than 4 - 90° bends between pull or junction boxes for underground power wiring conduit run. Provide no more than 2 - 90° bends for underground low voltage data/telecom conduit run.
 8. Flexible steel conduit length shall not exceed 9 feet. Provide sufficient slack to reduce the effect of vibration.
- P. Run all exposed raceways parallel to and at right angles to building lines.
- Q. Do not regroup conduit runs and circuiting homeruns except by special permission.
- R. Group raceways as much as possible.
- S. Raceways Embedded in Floor Slabs.
1. Only where specifically shown on Drawings.
 2. Raceways shall not be installed in slab without the approval of the Structural Engineer.

3. Raceways shall not interfere with placement of floor slab reinforcement components.
 4. Install raceways between the upper and the lower layers of reinforcing steel.
 5. Space raceways not less than 8 inches on centers except where they converge at panels or junction boxes.
 6. Raceways running parallel to slab supports, such as beams, columns and structural walls, shall be installed no closer than 12 inches from such supporting elements.
- T. Raceway Above Suspended Ceiling: In general, install conduit 1'-0" minimum above top of ceiling.
- U. Rigid Steel Conduits Subject to Corrosion:
1. The following methods of installation will be accepted as meeting the requirements of NEC Section 300-6. Alternate methods will be considered in order to meet local building codes. The installation methods are as follows:
 - a. In Concrete: Rigid steel conduit and fittings may be used in concrete above grade and in concrete resting on the ground provided a minimum concrete cover of 2 inches is maintained. Aluminum conduit and fittings are not permitted in concrete.
 - b. In Earth: Rigid steel conduit installed in earth is to be protected from corrosion with a factory-applied coating or approved field coating. Aluminum conduit and fittings are not permitted.
 - c. In Corrosive and Wet Atmosphere: Rigid metal used is to withstand the exposure involved.
 2. Field wrapping requirements are as follows:
 - a. Install a double, half-lap tape wrap, each wrap in opposite direction. Start half laps at the middle.
 - b. Material approval is based on the mil gauge, film material, tensile strength, stretch, adhesion, chemical and physical resistance of film, dielectric strength and electrolytic corrosion. Materials listed in the IAPMO Directory are considered approved materials and include 20 mil polyvinyl or polyethylene tape.
 - c. Surface Preparation: Oil, grease, rust, scale, moisture, or other foreign material shall be removed by approved paint removers, caustic dips, hand tools, solvents, or other appropriate means. Oil-base solvents shall not be used. Hexane, Toluene, Toluene, Xylol, etc., are acceptable. After cleaning, the pipe is to be kept free of all oil, grease, dirt, and moisture.
 - d. Priming: A coat of primer adhesive is to be applied over cleaned pipe when specified in the manufacturer's directions.

- V. Install no more than one coupling or device between supports. Two couplings are permissible when an offset bend is required max 10' between supports
- W. Coordinate conduit openings in walls and floors. Install sleeves shown on the drawings when the concrete is poured. Any openings required after the concrete has set, may be core drilled. Do not cut any structural supports or rebar.
- X. Conduits crossing building expansion joints shall be provided with UL listed expansion fittings. In interiors above ceilings, flexible metal conduit is an acceptable substitute.
- Y. Install conduit seals at boundaries where ambient temperatures differ by 10°F or more as shown on the drawings. Install seals on warm side of partition.
- Z. Run conduit on any equipment in parallel with or perpendicular to the equipment and in such a manner as to:
 - 1. Not be exposed to damage.
 - 2. Not interfere with access to components of the equipment that will interfere with maintenance operation.
 - 3. Not be detrimental to the operation.
- AA. Provide metallic raceways with bushings, threaded or compression type, as follows:
 - 1. Stubups into switchboard or other floor mounted equipment: Insulated type with grounding lug.
 - 2. Feeder raceway connections at panels, transformers, etc.: Insulated type.
 - 3. Branch circuits, control raceways, etc., terminating at panels, motor control centers, backboards: Plastic insulated type. Except when insulated throat connectors are used.
 - 4. Provide grounding bushings as required by NEC (CEC) 517 on all feeder conduit in critical care areas and on conduit for feeders #8 AWG and larger.
- BB. Provide metal pipe sleeves for crossing at fire rated walls. Install UL listed fire-stop whenever a raceway penetrates a fire wall. See Architectural drawings for locations of rated assemblies and Architectural Drawings for penetration details.
- CC. Install conduit seals and drains to prevent accumulated moisture in conduits from entering electrical equipment enclosures.
- DD. Provide conduit routing and slope to prevent drainage into equipment for underground conduit.
- EE. Treat cut ends of conduit, scratches, tool marks, etc. on any metallic raceway installed in the ground or on the exterior of the building with two coats of CRC "Zinc-It", or equal.

- FF. Metallic conduit stubbed up into substations or switchgear shall terminate into a grounding bushing located a maximum of 3" above concrete pad and within the switchgear.
- GG. Seal raceways penetrating an exterior building wall to prevent moisture and vermin from entering into the electrical equipment.
- HH. Slope exterior raceways to manholes or pullboxes a minimum of 1" per 8'. Double slope long runs from center point.
- II. Cap ends of conduit to prevent entrance of water and other foreign material during construction.
- JJ. Complete and swab clean conduit systems before pulling conductors.
- KK. Provide cable supports in conduits rising vertically in accordance with CEC Article 300.
- LL. Seal conduits which pass through floor slabs (except ground floor) with intumescent materials to prevent the passage of fire and smoke. Use products specified in Part 2.
- MM. Install vertical runs for emergency system feeder conduits in 2 hour enclosures in accordance with applicable high rise codes.
- NN. Failure to route conduit through building without interfering with other equipment and construction shall not constitute a reason for an extra change. Equipment, conduit and fixtures shall fit into available space in the building and shall not be introduced into building at such times and manner as to cause damage to structure. Equipment requiring service shall be readily accessible.
- OO. Keep 277/480 volt wiring independent of 120/208 volt wiring, and all power wiring. Keep power wiring independent of communication system wiring. Keep emergency system wiring independent of other wiring systems.
- PP. Keep life safety, critical branch and equipment systems wiring independent of other systems.
- QQ. PVC Conduit Bending:
 - 1. Bends 30 degree and larger for PVC conduit systems shall be long radius bends.
 - 2. Field bending, not exceeding 30 degrees is allowed for PVC conduit 2" trade size or smaller. Use electric heat box or hot air blower specifically designed for bending PVC conduit; bending by means of open flame is not acceptable.
- RR. Flexible conduit shall be electrically continuous from outlet or conduit end to utilization equipment.
- SS. Provide liquid type flexible metal conduit for termination at equipment subject to motion and vibration, and where exposed to continuous or intermittent moisture.
- TT. Provide equipment grounding conductor and drip loop in all connections to vibrating equipment. Bond the grounding conductor to the outlet and to the device.

- UU. Duct banks shall be installed with factory made snap-lock spacing assembly installed a maximum of five feet on centers to maintain a uniform 3" spacing between ducts or the ground. Do not install spacers within 12" of joints. Duct banks are defined as two or more raceways in a common trench excluding branch circuit raceways where less than 6 conduits are routed in a common trench.
- VV. Provide dual orange, CAL-OSHA approved warning tapes stating "High Voltage" on top layer of duct bank.
- WW. Provide equipment grounding conductor in all PVC conduit runs containing power conductors.
- XX. No PVC shall emerge from the ground or the concrete slab or encasement. PVC shall convert to galvanized rigid metal prior to its emergence.
- YY. Stubups for underground PVC conduit or duct shall be rigid steel conduit.
- ZZ. Install sealing bushings in all conduit runs passing between existing and new building.
- AAA. Install expansion fittings in all conduit runs passing between existing and new building adjacent walls or across any building expansion joints.

END OF SECTION

SECTION 26 05 43

UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
1. Underground Conduit
 2. Manholes and Vaults
- B. Related Work: Consult all other Sections, determine the extent and character or related work and properly coordinate work specified herein with that specified elsewhere to produce a complete and operable installation.
1. Earthwork: Include trenching, backfilling, boring and soil compaction as required for the installation of underground conduit, in-grade pullboxes, vaults, lighting pole foundations, etc.
 2. Concrete Work: Concrete work is by other trades as well as steel bar reinforcing, cast-in-place concrete, finishing and grouting, electrical contractor shall coordinate with the trades and layout all work pertaining to electrical equipment, etc. Refer to Division 3 - Concrete.

1.2 REFERENCES

- A. Comply with the latest edition of the following applicable specifications and standards except as otherwise shown or specified.
1. AASHTO - Standard Specification for Highway Bridges.
 2. ANSI C80.1 - Rigid Steel Conduit, Zinc-Coated.
 3. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 4. ANSI/N FPA 70 - California Electrical Code (CEC).
 5. ASTM A48 - Gray Iron Castings.
 6. NEMA TC 2 - Electrical Plastic Tubing and Conduit.
 7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.
 8. NEMA TC 8 - Extra-Strength PVC Plastic Utilities Duct for Underground Installation.

9. NEMA TC 9 - Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation.
10. UL 6— Rigid Metal Conduit.
11. UL 51 4B — Fittings for Conduit.

B. NEMA RN1 — PVC Externally Coated Galvanized Rigid Steel Conduit.

1.3 DESIGN REQUIREMENTS

A. Conduit size: ANSI/NFPA 70.

1.4 SUBMITTALS

A. Comply with provisions of Section 01 33 00 - SUBMITTALS.

B. Submit under provisions of Section 26 00 10 – BASIC ELECTRICAL REQUIREMENTS, the following items:

1. Data/catalog cuts for each product and components specified herein, listing in physical characteristics and indicating compliance with all listed standards.
 - a. Ductbank materials, including separators and miscellaneous components.
 - b. Ducts and conduits and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
 - c. Accessories for manholes, handholes.
 - d. Thickness of all metals
 - e. Concrete dimensions
 - f. Dimension or pull irons and gases
 - g. Cable rack irons dimensions and mounting method
 - h. Interior dimensions
 - i. Method of construction
2. Clearly mark on each data sheet the specific items being submitted and the proposed application.

C. Shop Drawings: Indicate dimensions, reinforcement, size and locations of openings, and accessory locations for precast manholes and handholes.

D. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle Products to site under provisions of Section 01 620 - PRODUCT OPTIONS AND SUBSTITUTIONS.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.6 PROJECT CONDITIONS

- A. Verify routing and termination locations of duct bank prior to excavation for rough-in.
- B. Verify locations of manholes and vaults prior to excavating for installation.
- C. Duct bank routing is shown on Drawings in approximate locations unless dimensions are indicated. Route as required to complete duct system.
- D. Manhole and vault locations are shown on Drawings in approximate locations unless dimensions are indicated. Locate as required to complete ductbank system.
- E. Coordinate with work indicated on civil, landscape, and other consultants' drawings.

PART 2 - PRODUCTS**2.1 CONDUIT**

- A. As specified in Section 26 05 34 - CONDUIT.

2.2 PRECAST CONCRETE MANHOLES/VAULTS

- A. Manufacturer's:
 - 1. Oldcastle
 - 2. Brooks Products
 - 3. Jensen
 - 4. Utility Vault Company
 - 5. Or equal.
- B. Material: Reinforced precast concrete, air-entrained, minimum 2000 psi compressive strength at 28 days
- C. Construction: Modular sections with tongue-and-groove joints.
- D. Reinforcing: AASHTO Classification H-20 unless otherwise indicated.
- E. Size and Shape: As indicated on the Drawings.

- F. Base Section: Include 3 inch deep by 14 inch round sump with cast sleeve, and two 1 inch ground rod openings.
- G. Top Section: Include grooved opening for frame and cover.
- H. Riser Casting: 6 inch, with manhole step cast into frame 4.
- I. Frames and covers: ASTM A48; Class 30B gray cast iron, AASHO H-20 classification. Provide cover marked "ELECTRIC" as indicated.
- J. Duct Entry Provisions: Single duct knockouts.
- K. Duct Entry Locations: each end, each side.
- L. Duct Entry Size: 5 inch for power and 4 inch for communications manholes.
- M. Cable Pulling Irons: Use galvanized rod and hardware. Locate opposite each duct entry. Provide watertight seal.
- N. Cable Rack Inserts: Minimum load rating of 800 pounds. Locate at 4'-0" feet on center.
- O. Cable Rack Mounting Channel: Heavy Duty non metallic racking, 48 inch length. Provide cable rack arm mounting slots on 1-1/2 inch centers.
- P. Cable Racks: Steel channel, 1-1/2 by 3/4 by 14 inches, with fastener to match mounting channel.
- Q. Cable Supports: Use suitable non-metallic racking, saddles or hooks.
- R. Sump Covers: ASTM A48; Class 30B gray cast iron.
- S. Provide a ground rod at vaults per CEC and NFPA. Ground rod to meet requirements of 26 05 26 – Grounding and Bonding of Electrical Systems.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Thoroughly examine site conditions for acceptance of handhole or manhole installation to verify conformance with manufacturer and specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 APPLICATION

- A. Use Schedule 40 plastic conduit for power and communication systems run underground. Concrete encase all PVC when used for emergency power or medium voltage distribution.
- B. Use PVC Schedule 40 plastic factory elbows, encased in concrete, for bends in plastic conduit runs. When plastic conduit runs are not encased in concrete, use PVC-coated rigid steel factory elbows for bends in plastic conduit runs longer than 70 feet, or in plastic conduit runs which have more than three bends regardless of

length. Use RGS conduit for stub-ups through slabs unless otherwise specified in these specifications.

3.3 LAYOUT

- A. Plan locations of duct runs in advance of the installation. Coordinate with site utility systems and building foundation depths.

3.4 PREPARATION

- A. The contractor shall prepare and be responsible for the excavation in accordance with the manhole manufacturer's instruction and shop drawings.
- B. Prepare excavation in accordance with manhole manufacturer's instructions.

3.5 DUCT BANK INSTALLATION

- A. Install duct in accordance with manufacturers' instructions.
- B. Install power and communications conduits to locate top of ductbank minimum 30 inches below finished grade, U.O.N.
- C. Install ductbank with minimum slope of 4 inches per 100 feet Slope ductbank away from building entrances, unless noted on the drawings.
- D. See Section 26 05 34 - CONDUIT for conduit installation requirement.
- E. Number of equivalent 90-degree bends permitted between pull points: maximum of four bends for power and system duct banks; maximum of four bends for primary power duct banks; and maximum of two bends for communication duct banks.
- F. Provide suitable fittings to accommodate expansion and deflection where required.
- G. Terminate duct at manhole entries using end bell.
- H. Stagger duct joints vertically in concrete encasement 6 inches minimum;
- I. Use suitable separators and chairs installed not greater than 5 feet on centers.
- J. Band ducts together with suitable separators and chairs before backfilling or placing concrete
- K. Securely anchor duct to prevent movement during concrete placement.
- L. Encasement Concrete: Minimum 2,000 psi mix for encasement outside of building footprint or under foundation elements defined in Section 03 30 00, or 2 sack sand slurry mix for encasement under building footprint. Place concrete under provisions of Section 03 30 00-CAST-IN-PLACE CONCRETE.
 - 1. Apply red color additive at time of concrete placement to top of concrete for medium voltage duct encasement outside of building footprint.
 - 2. Red color additive: Apply red-oxide to maintain a consistent red color for identification.

- M. Provide minimum 3 inch concrete cover at bottom, top, and sides of ductbank for encasement outside of building footprint or under foundation elements.
- N. Connect to existing concrete encasement using dowels.
- O. Connect to manhole wall using dowels.
- P. Provide 1/4-inch polypropylene pull rope in each empty duct except sleeves and nipples.
- Q. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.
- R. Interface installation of underground warning tape with backfilling. Install tape 18 inches below finished surface for ductbanks that are not encased in concrete (direct burial) outside of the building footprint.

3.6 PRECAST MANHOLE/VAULT INSTALLATION

- A. Install and seal precast sections in accordance with manufacturers' instructions.
- B. Install manholes/vaults plumb.
- C. Use precast neck and shaft sections to bring manhole cover to finished elevation.
- D. Use precast extension rings to bring vault cover to finished elevation.
- E. Attach cable racks to inserts after manhole/vault installation is complete.
- F. Install drains in manholes for Site drainage contractor to connect to site drainage system.
- G. Dampproof exterior surfaces, joints, and interruptions of manholes after concrete has cured 28 days, under provisions of Section 07 14 00 - HOT, FLUID APPLIED WATERPROOFING or other suitable method applied by manufacturer at time of production.
- H. Install drains in manholes, for Site drainage contractor to connect to site drainage system in accordance with provisions of Specifications and drawings submitted as part of this package or as part of the civil and site packages related to the New Stanford Hospital package.

3.7 EXCAVATION AND BACKFILLING

- A. Perform all necessary excavation and backfill for the installation in compliance with Division 2.
- B. Direct Burial Conduit: Provide a minimum 3-inch cover of sand placement around nonmetal conduit on a leveled trench bottom. Remove water from trench during conduit installation.
- C. Place backfill in layers not exceeding 12 -18 inches deep and compact to 95 percent of maximum density. Use sand or pea gravel as backfill material. For non-paved exterior locations; use clean soil for final 8-inches of backfill.

END OF SECTION

SECTION 26 05 53**IDENTIFICATION FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.1 SUMMARY**

- A. This section includes labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
 - 1. Nameplates and labels
 - 2. Wire and cable identification
 - 3. Conduit color coding
 - 4. Junction box identification
 - 5. Panelboard Directories.
 - 6. Warning and caution signs
 - 7. Device coverplates
- B. Related Work: Consult all other Sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

1.2 SUBMITTALS

- A. Submit in accordance with the requirements of Section 26 00 10— BASIC ELECTRICAL REQUIREMENTS and under provisions of Division 01 — SUBMITTALS.
 - 1. Data/catalog cuts for each product and component specified herein.
 - 2. Submit a nameplate schedule to the Architect for review before the nameplates are installed.
 - 3. Submit samples of each color, lettering style and other graphics for identification materials

1.3 QUALITY ASSURANCE

- A. Provide new material supplied by a manufacturer producing identification systems.
- B. Comply with OSHA and CEC identification requirements for electrical systems.

PART 2 - PRODUCTS**2.1 NAMEPLATES**

- A. Type NP engraved, plastic-laminated labels, signs, and instruction plates: Engraved melamine plastic laminate 1/16-inch minimum thickness for signs up to 20 square inches, or 8 inches in length; 1/8-inch thick for larger sizes. Furnish nameplates with pre-punched mechanical fastener mounting holes.
- B. Color and letter height as specified in part 3, Execution.

2.2 LEGEND PLATES

- A. Type LP: Die-stamped metal legend plate with mounting hole and positioning key for motor control pilot devices, etc.
- B. Fill engraved characters, using black paint.

2.3 WIRE AND TERMINAL MARKERS

- A. Self-adhering, pre-printed, self-laminating vinyl wrap-around strips.
- B. Thomas & Betts WSL, Brady B191 series, or equal.

2.4 BRASS TAGS

- A. Metal tags with die-stamped legend punched for fastener. Dimensions: 2-inch diameter, 19 gauge.

2.5 UNDERGROUND CONDUIT MARKERS

- A. 6 inch wide, 4 mm yellow polyethylene tape, with continuous black imprinting reading "Buried Electric Line" or "Buried High Voltage Line".
- B. Griffolyn "Tera-Tape" Thomas & Betts "WBT Protect-A-Line or approved equal.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Degrease and clean surfaces to receive nameplates and labels.
- B. Install nameplates and labels parallel to equipment lines.
- C. Secure nameplates to equipment fronts using screws or rivets. Secure nameplate to inside face of recessed panelboard doors in finished locations.

3.2 WIRE IDENTIFICATION

- A. Provide wire markers on each conductor in panelboard gutters at load connection, and at all splice points. Identify with branch circuit or feeder number for power and lighting circuits, and with control wire number as indicated on equipment manufacturers shop drawings for control wiring.

- B. Provide conductor phase color coding as per Section 25 06 19 – LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.

3.3 NAMEPLATE ENGRAVING

- A. Provide type NP color coded nameplates as applicable, with the following information:

1. Equipment or device designation.
2. Amperage, KVA or horsepower rating, where applicable.
3. Voltage or signal system name.
4. "Served from" identification.
5. Miscellaneous information as shown in "Examples"
6. Examples:

- a. Disconnects or Individual Motor Starters:

EF-1

20PH

480V, 3PH, 3W

Served From: MCCNH-1

7. Additional tags for each panel shall read as follows:

- a. 480/277V

Phase A = Brown

Phase B = Orange

Phase C = Yellow

Neutral = Gray

- b. 120/208V

Phase A = Black

Phase B = Red

Phase C = Blue

Neutral = White

- B. Nameplates for power system distribution equipment and devices are to be colored as follows: (Unless otherwise noted)

1. Medium Voltage Normal - Black with white letters

2. Medium Voltage Emergency - Red with white letters
 3. 277/480 VAC Normal - Black with white letters
 4. 277/480 VAC Emergency/Battery - Red with white letters
 5. 120/208 VAC Normal - Black with white letters
 6. 120/208 VAC Emergency/Battery - Red with white letters
- C. Nameplates for signal systems equipment and devices are to be black except as follows:
1. Fire alarm and life safety - White with red letters
 2. Clock, Intercom, sound: Magenta with white letters
 3. Building management system (BMS): White with black letters
 4. Nurse call: Marlin or light blue with white letters
- D. Provide nameplates of minimum letter height as noted below:
1. Individual Circuit Breakers, Switches and Motor Starters in Panelboards, Switchboards, and Motor Control Centers: 3/8-inch to identify load served, and 1/8-inch letters to identify all others.
 2. Individual Circuit Breakers, Enclosed Switches, and Motor Starters: 3/8-inch to identify load served, 1/8-inch letters to identify all others.
 3. Equipment Cabinets, Terminal Cabinets, Control Panels and other Cabinets enclosing apparatus: 3/8-inch to identify equipment and designation.
- E. Provide type "LP" metal legend plates for attachment to panel mounted operators devices such as pilot lights, push buttons, selector switches, etc.

3.4 BRASS TAGS

- A. Provide brass tags for individual ground conductors to exposed ground bus indicating connection. For example: "Ufer", "Cold water bond".
- B. Provide tags for all feeder cables in underground vaults and pull boxes.
- C. Provide tags for empty conduits in underground vault, pull boxes, and stubs.

3.5 CONDUIT COLOR CODING SCHEDULE

- A. Primary Medium Voltage Distribution System: Provide yellow background with letters to be black stating 12kv-medium voltage system 25 feet.

3.6 PANELBOARD DIRECTORIES: (400 AMPERE OR LESS)

- A. Provide typewritten directories arranged in numerical order showing number of room in which each device served by each panelboard circuit is located. Identify type of load or equipment served. EEOR to provide update panel schedules to match permit

drawings that identify type of load and equipment served.

- B. Verify room numbers to be used with Owner. Room number will not necessarily be those used on the Drawings.
- C. Mount directories in a 6 inch by 8 inch metal frame under a clear plastic cover inside each panelboard door.

3.7 WIRE AND CABLE IDENTIFICATION

- A. Provide wire markers on each conductor in panelboard gutters and at load connection. Identify with branch circuit or feeder number for power and lighting circuits and with control wire number as indicated on equipment manufacturers shop drawings for control wiring.
- B. Provide colored phase markers for color coding noted in Section 26 05 19 - LOW VOLTAGE ELECTRICAL CONDUCTORS AND CABLES. Apply colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 3 inches from terminal points and in boxes where splices or taps are made. Apply the last two laps of tape with no tension to prevent possible unwinding. Do not cover cable identification markers by taping.

3.8 JUNCTION BOX IDENTIFICATION

- A. Paint junction, pull and connection box covers, located above suspended ceiling and below ceilings in non-public areas, using the color coding listed below.
- B. Use finish paint suitable for use on metal surfaces. Provide spray paint that complies with local VOC (Volatile Organic Compound) regulations. Acceptable paint manufacturers; OneShot, Sem or equal.
- C. Legibly mark the painted covers using black permanent ink felt pen, Sharpie or equal; identify circuit(s) contained in the box by circuit number(s) and panel designation.
- D. Color Coding
 - 1. Normal 277/480 volt, systems: unpainted.
 - 2. Emergency 277/480 volt, systems: unpainted.
 - 3. Normal 120/208 volt, systems: unpainted.
 - 4. Emergency 120/208 volt, systems: unpainted.
 - 5. life safety systems: red.

3.9 WARNING, CAUTION, AND INSTRUCTION SIGNS

- A. Provide warning, caution, or instruction signs where required by OSHA, where indicated, or where reasonably required to assure safe operation and maintenance of electrical systems and of the items to which they connect
 - 1. Install engraved plastic-laminated instruction signs with approved legend where instructions or explanations are needed for system or equipment

operation.

2. Provide polyester film (PPS) self-adhesive signs for indoor/outdoor equipment and door warning. Use rigid polyethylene (PRS) non-adhesive signs where adhesives will not work; for example, installing on a fence. Provide sign color and marking that meets OSHA regulations. For example, DANGER (red with white letters), HIGH VOLTAGE (white with black letters).
 - a. Use 2 by 4 inch signs for small equipment or enclosure doors.
 - b. Use 7 by 10 inch or 10 by 14 inch signs for large equipment or enclosure doors.
- B. Emergency Operating Signs: Install engraved laminate signs with white letters on red background with minimum 3/8 inch high lettering for emergency instructions on power transfer, load shedding, or other emergency operations.

END OF SECTION

SECTION 26 42 00

CATHODIC PROTECTION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section specifies complete galvanic sacrificial anode type cathodic protection systems for underground steel tanks and piping. The section also includes devices to electrically isolate the system being protected.
- B. The services required include planning, installation, adjusting and testing of a cathodic protection system, using sacrificial anodes for cathodic protection of the Water, Fire Protection and Natural Gas line piping and above-ground appurtenances. The cathodic protection system shall include anodes, cables, connectors, corrosion protection test stations, and any other equipment required for a complete operating system providing the NACE criteria of protection as specified. Insulators are required whenever needed to insulate the pipes from any other structure. Any pipe crossing the water or fire protection pipe shall have a test station.

1.02 RELATED WORK

- A. Section 33 10 00, WATER SYSTEMS
- B. Section 33 50 00, NATURAL GAS DISTRIBUTION PIPING

1.03 QUALITY ASSURANCE

- A. The Contractor shall be regularly engaged in the installation and testing of cathodic protection systems. Contractor's personnel shall be experienced and shall be supervised by an engineer who is accredited as a Corrosion Specialist or Cathodic Protection Specialist by the National Association of Corrosion Engineers (NACE) International.
- B. Cathodic protection for underground metal piping tanks shall be designed in accordance with NACE SP0169-2013.

1.04 SUBMITTALS

- A. In accordance with the following requirements:
 - 1. Design Submittal: For cathodic protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the corrosion engineer responsible for their preparation.
 - a. Conduct site tests necessary for design, including soil resistivity, close-interval potential surveys, testing during construction, interference testing, and training of District's personnel.
 - b. Provide system design calculations, stating the maximum recommended anode current output density, and the rate of gaseous production, if any, at that current density.

2. Furnish catalog cuts and shop drawings for the following items:
 - a. Anodes.
 - b. Cable and wire.
 - c. Test stations.
 - d. Terminal boxes.
 - e. Isolating flanges, unions, coatings, casing seals.
 - f. Exothermic welding devices.
 - g. Cable splice kits.
 - h. Layout drawings, wiring diagrams.
 - i. Test instruments.
 - j. Dielectric tape.
 - k. Test connection points.
3. Detail drawings consisting of a complete list of equipment and material and complete wiring and schematic diagrams, as well as any other details required to demonstrate that the system will function properly.
4. Designer's accreditation as a Corrosion Specialist or Cathodic Protection Specialist by NACE International.
5. Test reports in booklet form tabulating all field tests and measurements performed, upon completion and testing of the installed system and including close interval potential survey, casing and interference tests, final system test verifying protection, insulated joint and bond tests, and holiday coating test. A certified test report showing that the connecting method has passed a 120-day laboratory test without failure at the place of connection, wherein the anode is subjected to maximum recommended current output while immersed in a three percent sodium chloride solution.
6. Operation and Maintenance Manual:
 - a. Basic system operation.
 - b. Instructions for dielectric connections, interference and sacrificial-anode bonds; and precautions to ensure safe conditions during repair of pipe, tank or other metallic systems.
 - c. Locations of all anodes, test stations, and insulating joints.
 - d. Structure-to-reference cell potentials.
 - e. Recommendations for maintenance testing, including instructions for pipe-to-reference cell potential measurements and frequency of testing.

- f. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.
- 7. Certifications: Two weeks prior to final inspection, submit the following:
 - a. Certification by the manufacturer that the cathodic protection system conforms to the requirements of the drawings and specifications.
 - b. Certification by the Contractor that the Cathodic protection system has been properly installed and adjusted.

1.05 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
 - B8-11 Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
 - B843-13..... Magnesium Alloy Anodes for Cathodic Protection
 - D1248-12 Polyethylene Plastic Extrusion Materials for Wire and Cable
 - F1182-13..... Anodes, Sacrificial Zinc Alloy
 - G57-06 Field Measurement of Soil Resistivity Using the Wenner Four-Electrode Method
- C. American Society of Mechanical Engineers (ASME):
 - B16.1-15..... Pipe Flanges and Flanged Fittings
- D. National Association of Corrosion Engineers (NACE) International:
 - SP0169-2013 Control of External Corrosion on Underground or Submerged Metallic Piping Systems

PART 2 - PRODUCTS

2.01 ANODES

- A. Type: Type II, factory-packed in cloth bag or box containing prepared backfill mixture, with lead wires.
- B. Construction:
 - 1. Alloy Specifications:

Element	Percent of Weight
Aluminum	0.010 Max.
Manganese	0.50 - 1.30
Zinc	0.05 Max.
Silicon	0.50 Max.
Copper	0.02 Max.
Nickel	0.001 Max.
Iron	0.03 Max.
Other	0.30 Max.
Magnesium	Remainder

2. Core: Galvanized steel.
3. Lead Wire: Factory installed, No. 12 solid copper, 3 M (10 feet) long, with TW or THWN insulation.
4. Lead Wire Attachment to Core: Silver solder the lead wire to the anode core, and seal the connection with an epoxy sealing compound. Dielectric material shall extend past the connection and cover the lead wire insulation by not less than 12 mm (1/2 inch).
5. Packaging: Permeable cloth bag or box with backfill mixture completely surrounding anode 12 mm (1/2 inch) minimum.

a. Components:

Hydrated Gypsum	75 percent
Powdered Bentonite	20 percent
Anhydrous Sodium Sulphate	5 percent

- b. Center the anode in the firmly packed backfill using spacers.

2.02 INSULATED CABLE

- A. Single conductor, stranded, annealed copper, Type HMWPE (high molecular weight polyethylene) insulation.

B. Construction:

1. Thickness of insulation:

AWG-SIZE	mm (inches)
No. 8	2.8 (7/64)
No. 6	2.8 (7/64)
No. 4	2.8 (7/64)

AWG-SIZE	mm (inches)
No. 2	2.8 (7/64)
No. 1	3.2 (8/64)
No. 1/0	3.2 (8/64)

2. Insulation: ASTM D1248, Type 1, Class C, Category 5, Grade E5.
 3. Conductors: ASTM B8.
- B. Lead wires terminating at a junction box or test station shall have a cable identification tag.

2.03 CABLE CONNECTIONS

- A. Connections between cables and tank, pipes, casings, or structures shall be exothermic welding process. Connections between cables and between cables and leads shall be corrosion-resistant split bolts.
- B. Insulation of Cable-to-Cable Connections: Epoxy-resin splice kits with two-part resin, mold, sealing mastic.
- C. Coating of Cable Connections to Protected Structures: Field-applied coating similar to that on the protected structure.

2.04 CABLE AND WIRE IDENTIFICATION TAGS

- A. Stainless steel material with engraved letters. Print letters and numbers a minimum of 5 mm (3/16 inch) in size. Provide identifier legend in accordance with the drawings.

2.05 TEST STATIONS

- A. Type: Weatherproof, located at grade, or aboveground if so shown on the drawings. Enclosed terminals for anode leads, test leads, leads attached to protected system, and connection points for test instruments.
- B. Construction:
 1. Housing: The unit shall be of standard design, manufactured for use as a cathodic protection test station, complete with locking cover, terminal board, shunts, and brass or stainless steel hardware.
 2. Provide terminal boards for anode junction boxes, bonding boxes, and test stations made of phenolic plastic. Insulated terminal boards shall have the required number of terminals (one terminal required for each conductor). Install solderless copper lugs and copper bus bars, shunts, and variable resistors on the terminal board as indicated. Test station terminal connections shall be permanently tagged to identify each termination of conductors (e.g. identify the conductors connected to the protected structure, anodes, and reference electrodes). Conductors shall be permanently identified by means of tags to indicate termination. Each conductor shall be color coded as follows:

Anode lead wire - black

Structure lead wire – white

Reference electrode lead wire - red

2.06 PERMANENT REFERENCE ELECTRODES

- A. Permanent reference electrodes shall be zinc specifically manufactured for underground use, 10 inch diameter, by 24 inches long, plastic tube with an ion trap to minimize contamination of the cell. The cell shall be prepackaged by the manufacturer with a backfill material as recommended by the manufacturer. Provide cells with No. 14 HMWPE cable of sufficient length to extend to the test station without splicing. Reference electrodes shall have a minimum 15 year life, and stability of plus or minus 5 millivolts under 3 microampere load.

2.07 DIELECTRIC TAPE

- A. Vinyl plastic electrical tape, 0.18 to 0.25 mm (7 - 10 mils) thick, pressure-sensitive adhesive.

2.08 WARNING TAPE

- A. 50 mm (2 inches) wide, detectable with metal detector, mylar-encased aluminum, orange color, imprinted "Cathodic Protection Cable Below" or similar.

2.09 DIELECTRIC INSULATION

- A. Rubber-based, 13 mm (0.5 inch) thick.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Anodes:

1. Excavate hole to a minimum 3 inches larger than the packaged anode diameter, and a minimum of two feet deep. Install in native soil, 3 feet minimum from protected structure, below centerline of protected structure, and at locations shown. Backfill shall be native soil. Install anodes adjacent to fuel tanks vertically.
2. Do not lift or support anode by the lead wire. Where applicable, remove manufacturer's plastic wrap/bag from the anode. Exercise care to preclude damaging the cloth bag and the lead wire insulation.
3. Center the packaged anode in the hole with native soil in layers not exceeding 150 mm (6 inches). Hand tamp each layer to remove voids taking care not to strike the anode lead wire. When the backfill is 6 inches above the top of the anode, pour not less than ten gallons of water into the hole to saturate the anode backfill and surrounding soil. Anodes shall not be backfilled prior to inspection and approval by the IOR.

B. Cables and Anode Leads:

1. Burial: 2 feet minimum below finished grade, 6 inches minimum separation from other underground structures, backfill material in contact with cable free of rocks and

- debris. Cover the lead wire trench bottom with a 3 inch layer of sand or stone free earth. Center wire on the backfill layer, do not stretch or kink the conductor. Place backfill over wire in layers not exceeding 6 inches deep and compact each layer thoroughly. Do not place tree roots, wood scrap, vegetable matter and refuse in backfill. Place cable warning tape within 18 inches of finished grade, above cable and conduit.
2. Continuity Bonds: Use cable to connect adjacent protected structures, and protected structures separated by non-welded connectors. Provide 25 percent additional length as slack to allow differential movement of protected systems.
 3. Connections: Provide clean, bright, bare metal surface at all connection points. Connect anode lead wire(s) to the test station terminal board(s) by use of exothermic welds. Clean the structure surface by scraping, filing or wire brushing to produce a clean, bright surface. Weld connections using exothermic kit(s) in accordance with the kit manufacturer's instructions. Check and verify adherence of the bond to the substrate for mechanical integrity by striking the weld with a 2 pound hammer. Cover connections with an electrically insulating coating which is compatible with the existing coating on the structure. Allow sufficient slack in the lead wire to compensate for movement during backfilling operation.
 4. Warning Tape: Install 6 inches below grade, directly above cables.
- C. Test Stations: Provide test stations and permanent reference electrodes as follows:
1. At all above-ground water, fire water and natural gas appurtenances.
 2. At all insulating joints.
 3. At both ends of casings.
 4. Where the pipe crosses any other pipes.
 5. Where the pipe connects to an existing piping system.
 6. Where the pipe connects to a dissimilar metal pipe.
- D. Anchor terminal board firmly 2 feet minimum above grade for above grade units. Connect all anodes and protected structure to the test stations.
- E. Dielectric Insulation:
1. General: Provide complete dielectric insulation between protected and unprotected systems and between protected systems and structures which could ground the cathodic protection. Required insulation points include all pipe entrances to buildings, manholes, and pits.
 2. Flanges: Install in locations open to view after completion of construction. Provide insulating gaskets, insulating sleeves on all bolts, insulating washers under bolt heads and nuts.
 3. Unions: Install in locations open to view after completion of construction. Unions not permitted in pipe sizes over 2 inches.

4. Wall Penetration Seals: Install in space between pipes and wall sleeves at building and manhole walls.
 5. Coatings: Completely coat all pipe or conduit areas that are in contact with concrete.
- F. Permanent Reference Electrode Calibration and Installation:
1. Provide zinc reference electrode(s) as indicated on the drawings.
 2. Prior to installation, soak the prepackaged reference electrode in a container of potable water for 30 minutes.
 3. Calibrate the permanent reference electrode in the presence of the IOR measuring the potential difference between the permanent reference electrode and an independent (portable) calibrated reference electrode placed in the water adjacent to the permanent reference electrode. Potential differences between the two electrodes of the same generic type should not exceed 15 millivolts when the sensing windows of the two electrodes being compared are not more than 2 mm (1/16 inch) apart but not touching. Zinc permanent reference electrodes should be within the range of 1000 to 1150 millivolts when calibrated with an independent (portable) calibrated copper-copper sulfate reference electrode with the two electrodes being not more than 2 mm (1/16 inch) apart but not touching. Permanent reference electrodes not within these potential differences shall be removed and replaced at the Contractor's expense. Prior to completely backfilling over reference electrodes, again verify the accuracy of the reference electrode. The testing provision shall also apply to replacement reference electrodes as well.

3.02 RECONDITIONING OF SURFACES

- A. Restoration of disturbed surfaces in kind, or as shown in the contract documents.

3.03 FIELD QUALITY CONTROL

- A. Provide system with a calculated design life exceeding 40 years.
- B. Pre-construction Survey: The Corrosion Specialist shall perform a soil resistivity survey using the Wenner Four-Pin Method as described in ASTM G57. Survey entire length of proposed protected system at the structure depth. Also survey native-state structure-to-soil potential, soil pH, and presence of stray currents.
- C. Calculations: The Corrosion Specialist shall perform engineering calculations to verify the design of the system shown. Inform the Government of any recommended changes in the system design shown.
- D. Field Inspections During Construction: The corrosion specialist shall inspect the work at least twice to ascertain that there is no grounding, short circuits, coating damage, and that installation is in accordance with requirements.
- E. Final Inspection:
1. Performed by Corrosion Specialist; witnessed by IOR.
 2. Test Instruments:

- a. Digital Volt-Ammeter with impedance of 7-10 mega-ohms/volt.
 - b. Saturated copper-copper sulfate reference electrode.
 - c. Other instruments as required.
3. Procedures: Conform to NACE RP0169.
 4. Test Results Required for Acceptance:
 - a. Potential of minus 0.85 volt between protected structure and reference electrode.
 - b. Minimum shift of minus 300 millivolts upon application of protective current. Voltage measured between protected structure and reference electrode.
 - c. Minimum shift of minus 100 millivolts upon interruption of protective current. Voltage measured between protected structure and reference electrode.
 - d. Amperage value sufficient that anode life 40 years can be calculated. Provide calculations.
 5. Test Report: Submit a complete report to IOR showing all test measurements, calculations, list of instruments used. All structure-to-electrolyte measurements, including initial potentials and anode outputs, shall be recorded on applicable forms. Identification of test locations, test station and anode test stations shall coordinate with the as-built drawings and be provided on system drawings included in the report. The contractor shall locate, correct, and report to the IOR any short circuits encountered during the checkout of the installed cathodic protection system.
 6. One Year Warranty Period Testing: The Contractor shall inspect, test, and adjust the cathodic protection system semi-annually for one year, 2 interim inspections total, to ensure its continued conformance with the criteria outlined below. The performance period for these tests shall commence upon the completion of all cathodic protection work, including changes required to correct deficiencies identified during initial testing, and preliminary acceptance of the cathodic protection system by the IOR. Copies of the One Year Warranty Period Cathodic Protection System Field Test Report, including field data, and certified by the Contractor's corrosion engineer shall be submitted to the IOR.

3.04 AS-BUILT DRAWINGS

- A. Provide the District with one set of as-built drawings in hard copy and CD Rom showing dimensioned locations of all anodes, cables, test stations, and anode weights. Provide identification of test stations and anodes keyed to test reports.

3.05 INSTRUCTION

- A. Furnish the services of a factory-trained technician for one 4-hour period to instruct personnel in the operation, maintenance, safety, and emergency procedures of the cathodic protection system on the date requested by the District. The instructions shall cover all items contained in the operation and maintenance manual.

END OF SECTION

SECTION 31 10 00

SITE PREPARATION AND DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

- A. This section describes general requirements, products, and methods of execution relating to site preparation, unless otherwise noted. This section applies to:
1. Surface and subsurface demolition.
 2. Backfilling of excavations and depressions.
 3. Coordination, demolition and/or relocation of existing utilities.
 4. Prior to start of demolition of facilities, shut-off, disconnect, cut, and cap where required, underground utility services to facilities.
 5. Removal of A.C. pavement driveway and concrete pavement, concrete pads, and A.C. curbing.
 6. Removal of cyclone wire, wood fences and barricades.
 7. Removal of storm drainage piping, catch basins, and manholes.
 8. Removal of vegetation and trees as specified herein.
- B. Contractor shall provide labor, material and equipment required for demolishing, cutting, removing and disposing of existing construction as designated and shown on the drawings for the following as required, unless otherwise noted.
- C. Coordinate all work with capping or sealing of existing utilities.
- D. Related Sections:
1. Section 31 22 00 – EARTHWORK AND GRADING.
 2. Section 31 23 33 – TRENCHING, BACKFILLING, AND COMPACTING.

1.02 SUBMITTALS

- A. Comply with requirements of Section 01 33 00 – SUBMITTAL PROCEDURES.
- B. Submit copies of all permits and certificates required for the project to the District's Representative, for record purposes.
- C. Permits and notices authorizing demolition.
- D. Submit copy of letters or certificates of severance of utilities services from the affected agencies or utilities.

- E. Submit copies of proposed haul route(s) from the demolition worksite to an authorized disposal site as approved by authority having jurisdiction.
- F. Submit copy of permit for transport and disposal of debris.
- G. Make arrangements of disposing of waste and excess materials at a legally licensed landfill/disposal facility outside worksite and pay cost thereof.
- H. Photograph existing conditions of existing structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File photographs with District's Representative prior to start of work.
- I. Submit proposed dust control measures.
- J. Submit proposed noise control measures.
- K. Work Schedule: Submit a proposed schedule of work items to be performed, and a description of how the work is to be accomplished, for the review by the District's Representative.
- L. Report of inspections conducted with the District's Representative and Engineer both before and after performing work.

1.03 QUALITY ASSURANCE

- A. Comply with the following Standards: American National Standards Institute, Inc. "American National Standard Safety Requirements for Demolition" (ANSI A10.6 and A10.8).
- B. Regulatory Agencies:
 - 1. Comply with rules and regulations of State of California, California Code of Regulations, Title 8, Industrial Relations, Chapter 4, Subchapter 4, "Construction Safety Order."
 - 2. Comply with applicable local and state agencies having jurisdiction.
 - 3. Comply with governing EPA notification regulations.
- C. Secure all required Permits or Certificates for demolition or discontinuance of utilities, prior to beginning the work.

1.04 PROJECT CONDITIONS

- A. District's Representative assumes no responsibility for actual condition of the site to be altered.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by District's Representative as far as practical.
- B. Disposal of Existing Improvements:
 - 1. All materials indicated to be removed shall become the property of the Contractor; dispose of these outside the project site.

- a. Do not dispose of removed materials to the general public by sale, gift or in any other manner at the Site.
 - b. These provisions shall not be construed as limiting or prohibiting sale or disposal of such materials at the Site to duly licensed Contractors or material suppliers, provided materials are removed from the construction site by the Contractor.
 2. All removal of debris from the site, including removal of inventory to site of storage, is part of this Contract and shall be done by Contractor's employees and no others.
- C. Salvage and Reuse:
 1. Where units or items of existing work are designated in Section 01 31 13 - PROJECT COORDINATION or Contract Plans to be removed and reused in the new work or are to become salvage, remove such units or items carefully.
 - a. Use tools and methods that will not damage such units or items.
 - b. Protect underlying or adjoining work from damage.
 - c. Salvaged items shall be cleaned by the Contractor.
 2. Recycle AC pavement and Class II AB where practical.
 3. Recycle concrete where practical.
 4. Items indicated to be salvaged shall be removed carefully, cleaned, and returned to the District. Coordinate with the District's Representative.
- D. Protection:
 1. Erect and maintain temporary bracing, shoring, lights, and barricades, except construction barricades for subsequent new construction, warning signs, and guards necessary to protect public, the District's employees, finishes, improvements to remain and adjoining property from damage, all in accordance with applicable regulations.
 2. Wet down areas affected by this work as required to prevent dust and dirt from rising.
- E. Scheduling:
 1. Coordinate with the District's Representative in scheduling noisy or dirty work.
 2. Schedule work at the District's convenience to cause minimal interference with the District's normal operations.
 3. Jack hammering will be allowed only during the following time periods 7:00 AM - 6:00 PM on weekdays.

- F. Traffic Circulation: Ensure minimum interference with roads, streets, driveways, sidewalks, and adjacent facilities.
 - 1. Do not close or obstruct public thoroughfares without first obtaining the required permit or permission of the responsible jurisdiction.
 - 2. Where closing of a vehicular or pedestrian traffic circulation route is necessary, provide adequate directional signs to minimize the potential for confusion.
 - 3. Maintain emergency access routes and coordinate any interruptions with local entities.
 - 4. Provide pedestrian paths as necessary and coordinate with the District.

PART 2 – PRODUCTS

2.1. PIPE ABANDONMENT MATERIALS

- A. Slurry cement backfill conforming to Caltrans Standard Specification 19-3.02E.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas affected by work of this Section and verify following:
 - 1. Disconnection of utilities as required.
 - 2. That utilities serving occupied portions of buildings on and off the site will not be disturbed.
 - 3. Removal by the District of the District's personal property, movable furniture and equipment items not designated for relocation.
- B. Document video and/or photograph, as necessary, existing items to remain that are damaged and submit photographs to District.
- C. Where existing conditions conflict with representations of the Contract Documents, notify the District's Representative and obtain clarifications. Do not perform work affecting the conflicting conditions until clarification of the conflict is received.

3.2 PREPARATION

- A. Verify that the area to be demolished or removed has been vacated, or adequate space made available to perform the work.
- B. Arrange for, and verify, termination of utility services to include removing meters and capping of lines.
- C. Lay out cutting work at Job Site and coordinate with related work for which cutting is required.

3.3 DEMOLITION

- A. If known or suspected hazardous materials are encountered during operations, stop operations immediately and notify the District's Representative.
- B. Perform work in accordance with ANSI A10.6-1969 unless otherwise noted.
- C. Provide noise and dust abatement as required to prevent contamination of adjacent areas.
- D. Remove all materials not designated as salvage, in their entirety.
- E. Remove building foundations in their entirety, unless otherwise indicated on the plans.
- F. Fill voids in the land left by the removal of existing structures as follows:
 - 1. In accordance with the requirements of Section 31 22 00 – EARTHWORK AND GRADING. Grade finished remaining surface to the contours shown, or if not shown, to match the existing natural contours.
- G. Lower, or remove, heavy structural framing members by hoist or crane.
- H. Concrete and Masonry:
 - 1. Demolish concrete and masonry in sections, less than 3 feet in any direction.
 - 2. Method of cutting shall be limited to saw cutting and torch.
- I. If unknown items such as human remains are encountered during operations, stop operations immediately and notify the District's Representative.
- J. The District's Representative will provide a list of any items to be stockpiled for future use. Stockpile location will be a site on campus determined by the District's Representative.

3.4 DEMOLITION AND REMOVAL OF AC PAVEMENT:

- A. Saw cut pavement at edge of demolition area.
- B. Break pavement and remove.
- C. Remove any base material, gravel, and/or or any other non-native soil.

3.5 CUTTING

- A. Make new openings neat.
- B. Do not cut or alter structural members and any utilities including appurtenances unless indicated to do so in the Construction Documents or written approval is received from the District's Representative.
- C. Take care not to damage reinforcing or structural steel scheduled to remain in place.

- D. Concrete: Cut new openings in concrete by coring and saw cutting. Saw run-bys will not be permitted.

3.6 PREPARATION FOR NEW FINISH WORK

- A. Where demolished surfaces are scheduled to receive new finishes, Contractor shall restore such substrate to a condition ready to receive the scheduled new finishes, including grinding or leveling.

3.7 UTILITY REMOVAL:

- A. Where utility removal is shown on the plans, excavate to expose existing utility, demolish and remove section of pipe or conduit indicated. Cap section of pipe or conduit to remain. Mark end of utility with stake, rebar, or Surveyor's marker.
- B. Provide thrust block or other mechanical restraint where dead end is created on pressurized pipe systems. Thrust blocks shall be per NFPA 24 Standards.
- C. Included in demolition are any appurtenances, including but not limited to valves, valve boxes, and irrigation system components.
- D. Backfill trench in accordance with requirements of Section 31 23 33 – TRENCHING, BACKFILLING, AND COMPACTING.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning of demolished materials on-site is prohibited. Burning may be performed off-site of District's property provided it is done in a legal manner.

3.9 FIELD QUALITY CONTROL

- A. The District's Representative and Engineer will accompany the Contractor before and after performance of work to observe physical condition of existing structures or improvements involved.

END OF SECTION

SECTION 31 22 00

EARTHWORK AND GRADING

PART 1 - GENERAL

1.01 SUMMARY:

- A. This section describes general requirements, products, and methods of execution relating to on-site earthwork. Any work within the public right-of-way shall be constructed to the standards of the City of Livermore and State of California Department of Transportation. Work includes, but is not limited to, the following:
1. Grading.
 2. Material.
 3. Excavation.
 4. Filling and backfilling.
 5. Soil Sterilant.
 6. Termiticide.
- B. Provide labor, material and equipment and services necessary to complete the excavations, re-compaction and finish grading as specified and indicated on Drawings.
1. Obtain permit from local authorities.
 2. Provide surveying for grading operations.
 3. Provide shoring design.
 4. Provide dewatering operations.
 5. Provide site grading, cut, fill and finish.
 6. Provide excavation and backfill for filling construction, including trenches within building lines.
 7. Preparation for subgrade for building slabs, walks, pavements, and landscaping.
 8. Provide distribution of stockpiled topsoil.
 9. Provide sub-base course for walks and pavements.
 10. Provide engineered fills for building slabs and foundations.
 11. Provide sand and gravel for capillary break/moisture barrier under building slabs.
 12. Provide sub-surface drainage backfill for walls and trenches.
- C. The work includes removal and legal disposal off the site of debris, rubbish and other materials resulting from clearing and grubbing operations.

- D. Work specified in Related Sections:
 - 1. Section 31 10 00 – SITE PREPARATION AND DEMOLITION.
 - 2. Section 31 23 33 – TRENCHING, BACKFILLING, AND COMPACTING.

1.02 DEFINITIONS:

- A. Select Fill:
 - 1. Soil or soil-rock material approved by District's Representative used by the Contractor in order to raise grades or to backfill excavations.
 - 2. The District's Testing Agency will make sufficient tests and/or observations for the purpose of issuing a written statement that material meets or exceeds the specification requirements.
- B. On-site Material: Soil or earth material obtained from required on-site excavation.
- C. Excavation: Consists of the removal of material encountered to subgrade elevations and the re-use or disposal of materials removed.
- D. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below sub-base, drainage fill, rock base course, or topsoil materials.
- E. Import Material: Soil material obtained off-site when sufficient approved soil material is not available from excavations.
- F. Base Course: The layer placed between the sub-base and surface pavement in a paving system.
- G. Relative Compaction: In-place dry density of soil expressed as percentage of maximum dry density of same materials, as determined by laboratory test procedure American Society for Testing and Materials (ASTM) D1557.
- H. Over-excavation: Removal of material below required subgrade elevations.

1.03 SUBMITTALS:

- A. Comply with provisions of Section 01 33 00 – SUBMITTAL PROCEDURES.
- B. Product Data: Manufacturer's literature and data, including, where applicable, capacity, labels, or other markings on equipment made to the specified standards for materials, for the following:
 - 1. Imported materials.
 - 2. Class II aggregate base (Caltrans Section 26).
 - 3. Soil Sterilant.
 - 4. Termiticide.
 - 5. Cement Treatment.

6. Geotextiles.
 7. Subdrainage Pipe.
 8. Aggregate for Structural Soil Mix.
- C. Test Reports: Submit the following reports for import material directly to District's Representative from the Contractor's testing services:
1. Test reports on borrow material.
 2. Density test reports.
 3. One optimum moisture-maximum density curve for each type of soil encountered.
 4. Not used.
 5. Not used.
 6. Soil percolation rate test for soils to be used in storm water treatment zones.
 7. Structural Soil Mix Testing: Provide a two-gallon representative sample to approved testing laboratory for an analysis of the structural soil mix indicating the following:
 - a. Particle size analysis, including the following gradient of mineral content (USDA Designation Size in mm):
 1. 3" (76mm)
 2. 2 1/2" – 3" (63-76mm)
 3. 2" – 2 1/2" (50-63mm)
 4. 1 1/2" – 2" (37-50mm)
 5. 1" (25-37mm)
 6. 3/4" (19-25mm)
 7. Fine gravel – 1/8" – 3/4" (2-19mm)
 8. Sand – 0.05 -2mm
 9. Silt – 0.002-0.05mm
 10. Clay – minus 0.002mm
 - b. Provide manufacturer's analysis of the following:
 1. Loose and rodded unit weight.
 2. Bulk specific gravity and absorbance.
 3. Gravel dimension and surface texture description.

4. Aggregate soundness and L.A. abrasion.
 - c. Provide a percent pore space analysis defined as follows:
 1. Rodded Unit Weight divided by the Bulk Specific Gravity x 100.
 - d. Sample Collection Procedure:
 1. Collect a minimum of eight samples to make up the composite sample.
 2. Take samples from random locations in the stockpile varying from the top to the bottom and around the stockpile.
 3. Take at least half the samples from the lower third of the stockpile into a clean bucket
 4. Thoroughly mix material after samples are taken.
 5. Remove 2 gallon of material from bucket and fill a zip-lock plastic bag.
 6. Double bag the composite sample and label the bag with a permanent marker indicating the material name and date sample was taken.]
- D. Shoring Design: Where shoring is required by State Law or Contractor shall provide necessary design, provide proposed excavation shoring method for review prior to commencement of excavation requiring shoring. Include the following information:
1. Basic design assumptions.
 2. Design Calculations.
 3. Describe materials or shoring system to be used.
 4. Indicate whether or not any components will remain after filling or backfilling.
 5. The shop drawings for the proposed shoring system.
 6. Coordinate with the Construction Documents and identify any proposed modifications or deviations.
 7. Certification of the above by a registered professional civil or structural engineer licensed by the State of California.
 8. Submittal will be reviewed for general conformance with project plans, but no review of calculations will be provided.
- E. Dewatering Plan: Based upon site surface and subsurface conditions, including available geotechnical and hydrological data, provide a system to perform the following:
1. Lower the ground water level below bottom of excavation.
 2. Relieve the hydrostatic pressure below the subgrade to prevent uplift.
 3. Prevent surface drainage from accumulating within work area.

4. Legally discharge and dispose of excess water.
5. Submit description of basic components of proposed dewatering system and its planned method of operation.

F. Samples:

1. 20-lb. samples sealed in air-tight containers, of each proposed fill and backfill soil material from on-site or borrow sources. Provide to Geotechnical Engineer as requested.
2. 20-lb samples sealed in air tight containers of specialty soils for submission to a plant and soil testing facility for analysis. Include perc test and sieve analysis.

G. Pad Certification

1. Submit a pad certification stamped by a California Licensed Land Surveyor.

H. Storm Water Pollution Prevention / Erosion Control Plans/Water Pollution Control Plans

I. Permit/Notice of Intent (N.O.I.), for discharge of storm run-off from the construction site.

J. Haul Routes.

1.04 ASSURANCE:

A. Requirements of Regulatory Agencies:

1. Comply with State of California Business and Transportation Agency, California Department of Transportation (CDT, Caltrans) "Standard Specifications" (Caltrans Standard Specification).
2. Comply with State of California Code of Regulations (CCR).
3. Comply with State of California Construction Safety Orders, Latest Edition (CAL/OSHA).
4. City of Livermore Department of Public Works, Standards and Specifications and Drawings, latest edition.
5. BCDC, ACOE, Fish and Wildlife, if applicable.

B. Soil Testing:

1. District will engage a geotechnical testing agency, to include testing soil materials proposed for use in the work and for quality control testing during excavation and fill operations.

C. Codes and Standards:

1. Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.
2. Statewide General Permit to Discharge Storm Water associated with construction

activity.

3. The project Storm Water Pollution Prevention and Monitoring Plan.

D. Comply with the latest editions of the following Standards and Regulations:

1. American Society for Testing and Materials (ASTM):

- a. Concrete Aggregates.
- b. C125: Standard Terminology Relating to Concrete and Concrete Aggregates.
- c. C136: Sieve Analysis of Fine and Coarse Aggregates.
- d. C566: Total Evaporable Moisture Content of Aggregate by Drying.
- e. D421: Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants.
- f. D422: Particle Size Analysis of Soil.
- g. D854: Specific Gravity of Soils.
- h. D1556: Density of Soil by the Sand Cone Method.
- i. D1557: Laboratory Compaction Characteristics of Soil Using Modified Effort
- j. D2216: Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
- k. D2487: Classification of Soils for Engineering Purposes.
- l. D2922: Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- m. D2937: Density of Soil in Place by Drive Cylinder Method.
- n. D3017: Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- o. D4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

2. California Code of Regulations, Title 24, Part 2 - Basic Building Regulations, Chapter 24 - Excavations, Foundations, and Retaining Walls.

3. California Department of Transportation (Caltrans) Standard Specifications:

- a. Section 10: Watering.
- b. Section 18: Dust Palliatives.
- c. Section 19: Earthwork.

4. CAL/OSHA, Title 8.

5. City of Livermore Standard Plans and Specifications

6. Other authorities having jurisdiction

E. Geotechnical Engineering Services:

1. Geotechnical Engineer shall be provided by the District, as the District's Representative to observe grading observations during preparation offsite, excavation, and compaction of fill materials.
2. Make visits to site to familiarize him generally with progress and quality of work.
3. Make field observations and tests to enable him to form opinions regarding adequacy of site preparation, acceptability of fill materials and extent to which earthwork construction and relative compaction comply with specifications requirements.
4. Examine conditions exposed in foundation excavations.

F. Site Information:

1. A Geotechnical Investigation has not been carried out for this project site.
2. Soil borings and other exploratory operations may be made by Contractor at no cost to the District. Submit proposed boring locations for review prior to performing the work.

G. Contractor Qualifications:

1. Have successfully installed structural soil mixes similar to the quality specified for a period of not less than 5 years.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Protect materials of this section before, during and after installation; objects designated to be retained; and the installed work of other trades.
- B. In the event of damage to any of these items, immediately make repairs or replacements necessary to the acceptance of the District's Representative and at no additional cost to the District.
- C. Comply with provisions of Section 01 50 00 – TEMPORARY FACILITIES AND CONTROLS where necessary to control dust and noise on and near the work caused by operations during performance of the Work.

1.06 PROJECT CONDITIONS:

A. Site Information:

1. A Geotechnical Investigation has not been carried out for this project site.
2. Soil borings and other exploratory operations may be made by Contractor at no cost to the District. Submit proposed boring locations for review prior to performing the work.

B. Environmental Requirements:

1. Comply with the project SWPPP.
 2. When unfavorable weather conditions necessitate interrupting filling and grading operations, prepare areas by compaction of surface and grading to avoid collection of water.
 3. Provide adequate temporary drainage to prevent erosion.
 4. After interruption, reestablish compaction specified in last layer before resuming work.
 5. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.
 6. Protect existing streams, ditches and storm drain inlets from water-borne soil by means of straw bale dikes, filter fiber dams, or other methods.
- C. Protections of open excavations.
1. Barricade open excavations and post with warning lights.
 2. Comply with requirements of Section 01 50 00 –TEMPORARY FACILITIES AND CONTROLS.
 3. Operate warning lights as recommended by authorities having jurisdiction.
 4. Protect structures, utilities, sidewalks, pavements, and other facilities immediately adjacent to excavations, from damages caused by settlement, lateral movement, undermining, washout and other hazards.
- D. Protection of Subgrade
1. Protection of Subgrade: Do not allow equipment to pump or rut subgrade, stripped areas, footing excavations, or other areas prepared for project.
 2. At Contractor's option, and with the Geotechnical Engineer's approval, a working pad of granular material may be laid to protect footing and floor subgrade soils from disruption by traffic during wet conditions.
- E. Transport of soils.
1. Transport all excess soils materials by legally approved methods to disposal areas.
 2. Coordinate with the District's Representative.
 3. Sufficient topsoil and fill material shall be retained from the site to complete project requirements.
 4. Any additional topsoil and fill requirements shall be the responsibility of the Contractor.
- F. Blasting and use of explosives will not be permitted.

- G. Dust Control Requirements: At all times during earthwork operations and until final completion and acceptance of the earthwork, the Contractor shall prevent the formation of an airborne dust and dirt nuisance from interfering with the surrounding normal operations. The Contractor shall effectively stabilize the site of work in such a manner that it will confine dust particles to the immediate surface of the work and to obtain a minimum of 40 percent emissions reduction by applying a dust palliative except in areas of active cut and fill. The dust palliative shall be non-petroleum based. Water alone is not considered to be a dust palliative. The dust palliative shall be applied at the rate and method in conformance with Section 18, "Dust Palliatives," of the Caltrans Standard Specifications and as recommended and/or specified by the manufacturer. Contractor shall assume liability for all claims related to dust and dirt nuisances.
- H. All areas to receive Structural Soil shall be inspected by the District's Representative prior to beginning this work.

1.7 EXISTING UTILITIES

- A. The Contractor shall provide the District's Representative with a detailed schedule of any existing utilities interruption and shall notify the the District's Representative at least 48 hours prior to commencing any shutdown.
- B. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during excavation operations.
- C. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the District's Representative immediately for directions.
 - 1. Cooperate with the District and public and private utility companies in keeping their respective services and facilities in operation.
 - 2. Repair damaged utilities to the satisfaction of the District's Representative.
- D. Do not interrupt existing utilities serving facilities occupied and used by the District or others, except when permitted in writing by the District and then only after acceptable temporary utility services have been provided.

1.8 SEQUENCING AND SCHEDULING:

- A. The schedule of operations shall be reviewed by the District's Representative prior to commencement of any work.
- B. Coordinate operations with other construction activities, such as relocation of existing utilities.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. General:
 - 1. All Fill material will be subject to approval of the Geotechnical Engineer.
 - 2. For approval of imported fill material, notify the District's Representative at least 7 days in advance of intention to import material, designated proposed borrow area,

and permit the Geotechnical Engineer to sample as necessary from borrow area for purpose of making acceptance tests to prove quality of material.

3. The Geotechnical Engineer's report on acceptability shall be final and binding.
4. During grading operations, soil types other than those previously analyzed and approved by the Geotechnical Engineer, may be encountered.
5. Consult the Geotechnical Engineer to determine the suitability of these soils to be used as fill.

B. Native Fill Requirements:

1. Fill material will be subject to approval of the Geotechnical Engineer. Native materials shall have a particle size not exceeding 3 inches as determined by ASTM D422, at least 90 percent by weight passing the 1 inch sieve and less than 3 percent organic content by weight unless otherwise specified.

C. Imported Fill Requirements: Imported fill, where required, shall be non expansive granular soil, free of organic matter and deleterious substances. In general, import fill should be tested and documents to be non-corrosive and free from hazardous material in concentrations above the level of concern. Imported fill material shall conform to the following requirements:

1. Grading:

<u>U. S. Sieve Size</u>	<u>Percentage Passing Sieve</u>
2 ½ inch	100
No. 8	25-45
No. 200	0-10

2. Be thoroughly compactable without excessive voids.
3. Fill to be treated with lime per Geotechnical report recommendations.
4. Meeting one of following plasticity requirements:
 - a. Maximum Expansion Index of 50.
 - b. Maximum Plasticity Index of 12, as determined by ASTM D4318.

D. Imported Fill for Planting Areas: Imported fill for use in planting areas shall be sandy loam weed free soil. Coordinate with District Representative.

E. Topsoil: Friable clay loam surface soil found in a depth of not less than 10 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2 inches in diameter, and without weeds, roots and other objectionable material.

1. Use topsoil for top 2 feet of fill against exterior walls, except at paving and sidewalks.

2. Topsoil may also be used beyond the area within 5 feet of building, except under paving and sidewalks.
 3. Confirm suitability of stockpiled materials.
- F. Sand: Clean, well-graded fine to coarse sand with not more than 2 percent passing the No. 200 sieve based on wet sieve analysis. Provide at locations indicated in the construction documents.
- Where coarse sand is required, provide sand no finer than No. 40 sieve.
- H. Bioretention Soil Mixture
1. Follow Appendix L of the NPDES.
- J. Drain Rock:
1. Washed, uniformly graded mineral aggregate ASTM D448 with percentage composition of dry weight conforming to following limits:
 - a. Passing 1-inch Sieve: 100 percent.
 - b. Passing 3/4-inch Sieve: 90-100 percent.
 - c. Passing No. 4 Sieve: 0-10 percent.
 2. Absorption of water to saturated-surface dry condition shall not exceed 3 percent of oven-dry weight of a sample.
- K. Backfill material for use behind retaining walls shall be a granular material consisting of sand, broken rock, or a mixture of sand and gravel containing no size larger than 2 ½ inches and not more than 15 percent passing the No. 200 sieve.
- L. Pea Gravel: 3/8 inch to ½ inch washed, uncrushed gravel. Use at drainage pipe and at other locations indicated.
- M. Filter Fabric: Provide filter fabrics that meet or exceed the listed minimum physical properties determined according to ASTM D4759 and the referenced standard test method in parentheses.
3. Grab Tensile Strength (ASTM D4632): 120 lb.
 4. Apparent Opening Size (ASTM D4751): #70 U.S. Standard sieve.
 5. Permeability (ASTM D4491): 135 gallons per minute per square foot.
- N. Drainage Pipe:
1. Perforated corrugated plastic drainage tubing meeting ASTM F667, with continuous integral nylon filter screen.
 2. Acceptable Manufacturers and Products: Advanced Drainage Systems "DrainGuard," Hancor "Agri-Flow."

3. Provide couplings, elbows and other fittings as recommended by pipe manufacturer.
 - O. Water: Clean and free from deleterious amounts of acids, alkalis, salts and organic matter.
- 2.2 SOIL STERILANT:
- A. Soil Sterilant shall be Treflan E.C. or approved equivalent.
- 2.3 TERMITICIDE:
- A. Termiticide shall be Permethrin, Denon, or approved equivalent.

PART 3 - EXECUTION**3.01 GENERAL:**

- A. Prior to commencement of earthwork, become thoroughly familiar with site conditions.
- B. If event discrepancies are found, immediately notify the District's Representative in writing, indicating the nature and extent of differing conditions.
- C. Requirements:
 1. Grades and elevations are to be established with reference to benchmarks referenced on Drawings.
 2. Maintain engineering markers such as monuments, benchmarks and location stakes. If disturbed or destroyed, replace.
- D. No earthwork shall be performed without physical presence or acceptance of the Geotechnical Engineer.
- E. The Geotechnical Engineer's acceptance is required by these specifications; notify the District's Representative at least 48 hours prior to commencing any phase of earthwork.
 1. No phase of work shall proceed until prior phase has been accepted by the Geotechnical Engineer.
 2. Work shall not be covered up or continued until acceptance of the Geotechnical Engineer shall give written notice of conformance with the specifications upon completion of grading.
- F. Compacting:
 1. Compact by power tamping, rolling or combinations thereof as accepted by the Geotechnical Engineer.
 2. Where impractical to use rollers in close proximity to walls, stairs, etc., compact by mechanical tamping.
 3. Scarify and re-compact any layer not attaining compaction until required density is obtained.

4. Compaction by flooding, ponding or jetting will not be permitted, unless specifically accepted by the Geotechnical Engineer.

G. Hazardous Materials

1. If any materials are encountered that may be hazardous (as defined in Section 25117 of the California Health and Safety Code), inform the District's Representative verbally within 24 hours and in writing within 2 business days. Upon discovery, material is to remain undisturbed until investigation by State's representative is complete. The removal and disposal of hazardous materials, if discovered, is not part of the scope of work of this Division for this project.

3.02 SITE PREPARATION:

- A. Protect structures, utilities, sidewalks, pavements, and other facilities which are to remain from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations. Set up tree protection measures prior to commencing grading or demolition operations.

B. Clearing and Grubbing:

1. Remove from area of designated project earthwork all improvements and obstructions, including designated concrete curbs or slabs, asphaltic concrete, all tree and shrub roots, any abandoned buried utility, any irrigation lines, and other matter determined by the Geotechnical Engineer to be deleterious.
 - a. In all new planting areas, remove existing base material.
 - b. Use only hand methods for grubbing inside the drip line of trees indicated to be left standing.
 - c. Vegetation should be removed to such a depth that organic material is generally not present.
2. Remove from the site all trees and shrubs, unless otherwise indicated on the drawings as existing trees to be left standing.
3. Active utilities with the project limit should be rerouted or protected from damage by construction activities.
4. Rubble and excavated materials that do not meet the criteria of fill should be disposed of in an appropriate landfill.
5. Excavations resulting from the removal of buried utilities, tree stumps, or obstructions should be backfilled with compacted fill in accordance with recommendations provided by the geotechnical engineer
6. Existing Trees to remain:
 - a. Verify the locations of existing trees to be preserved.
 - b. Replace existing trees to remain that are damaged during construction at no additional cost to the District.

- c. Carefully make clean cuts at roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction. Paint cuts over ½ inch in size with tree pruning compound.
- C. Topsoil:
1. Strip topsoil to whatever depths encountered in manner to prevent intermingling with the underlying subsoil or other objectionable material.
 2. Remove heavy growths of grass from areas before stripping. Where trees are indicated to be left standing, stop topsoil stripping a sufficient distance to prevent damage to the main root system.
 3. Stockpile topsoil in storage piles to freely drain surface water.
 4. Cover storage piles if required to prevent windblown dust.

3.03 EXISTING UTILITIES:

- A. Protect existing utilities that are to remain in operation as specified.
- B. Demolish and completely remove from the site existing underground utilities indicated to be removed. See Section 31 10 00 – SITE PREPARATION AND DEMOLITION.
- C. Movement of construction machinery and equipment over existing pipes and utilities during construction shall be at contractor's risk.
- D. Excavation made with power-driven equipment is not permitted within 2 feet of any known utility or subsurface structure.
 1. Use hand or light equipment for excavating immediately adjacent to or for excavations exposing a utility or buried structure.
 2. Start hand or light equipment excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured.
 3. Support uncovered lines or other existing work affected by excavation until approval for backfill is obtained.
 4. Report damage of utility line or subsurface structures immediately to the District's Representative.

3.04 PREPARATION OF SUBGRADE:

- A. Contractor to review the necessity for over-excavation of subgrade soils with the Geotechnical Engineer onsite. Unless otherwise specified, Contractor is to scarify building pads, exterior flatwork and pavement subgrade to a depth of at least 8 inches and work until uniform and free from large clods.
 1. Bring expansive subgrades to not less than 3 percentage points above optimum moisture content (not less than 2 percentage points above optimum upper 6 inches

of pavement subgrade) and compact to 90 percent of the maximum laboratory dry density, in accordance with ASTM D1557.

2. Bring non-expansive subgrades to or slightly above the optimum moisture content and compact to 90 percent of the maximum laboratory dry density in accordance with ASTM D1557.
3. Increase compaction of the upper 6 inches of pavement subgrades to 95 percent of the maximum laboratory dry density and at least 2 percent over the optimum moisture content per ASTM D1557 for non-expansive subgrades.

3.05 DEWATERING:

- A. Do not allow water from surface drainage or underground sources to accumulate in excavations, unfinished fills, or other low areas.
- B. Provide and maintain ample means and devices to remove water promptly and dispose properly of water entering excavations or other parts of the work to prevent softening of exposed surfaces.
- C. Dewater by methods which will ensure dry excavation and preservation of finish lines and grades of excavation bottoms.
- D. Prior to excavating below ground water level, place dewatering system in operation.
 1. Lower the ground water level a minimum of 1 foot below the bottom of the excavation.
 2. Relieve the hydrostatic pressure in pervious zones below the subgrade elevation to prevent uplift.
 3. Use screens and gravel packs as necessary to prevent removal of fines from the soil.
- E. Operate the dewatering system continuously, 24 hours a day, 7 days a week until construction work below existing ground water level is completed.
 1. Measure and record the performance of the dewatering system.
 2. After placement of initial slabs and backfill, the ground water level may be allowed to rise.
 3. At no time allow ground water to rise higher than 1 foot below the prevailing level of excavation or backfill.
 4. Have a back-up pump and system available for immediate use.
- F. Dispose of water away from the work in suitable manner without damage to adjacent property or menace to public health.
- G. Do not drain water into work being built or under construction without prior acceptance of the District's Representative.

- H. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.

3.06 SITE EXCAVATION:**A. General**

1. All supports, shoring, and sheet piling required for the sides of excavations or for protection of adjacent existing improvements shall be provided and maintained by the Contractor. The adequacy of such systems shall be the complete responsibility of the Contractor.
2. Earth and rock, regardless of character and subsurface conditions, shall be excavated to depths shown on drawings and to the neat dimensions of the footings wherever practicable, to permit pouring of footings and grade beams without use of side forms, except at slab perimeters.
3. Large rocks, pieces of concrete or other obstructions, if encountered during the excavation/scarifying operations, shall be removed and disposed of by the Contractor off the site in a legal manner.
4. Where footing excavation is too deep, backfill shall be concrete. Where footings are over dug laterally, side forms shall be employed for backfill with rock fill or concrete backfill shall be used (Contractor's option).
5. Where forming is required, only that excavation necessary to permit placing and removal of forms shall be done.
6. Bottoms of all footings and foundations trenches shall be subject to testing by the Geotechnical Engineer. Corrective measures as directed by the State's representative shall be executed promptly.

B. Excavate subgrade as required to allow for finish grades shown on drawings, as required for structural fill or otherwise required for proper completion of the work.

C. Remove and replace subgrade materials designated by Geotechnical Engineer as unsuitable.

3.07 FILL AND COMPACTING:**A. General Requirements:**

1. Backfill excavations as promptly as work permits.
2. Do not place select fill or backfill until rubbish and deleterious materials have been removed and areas have been approved by the District's Representative.
3. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.
4. In excavations, use satisfactory excavated or borrow material.
5. Under grassed areas, use satisfactory excavated or borrow material.

- B. After subgrade compaction has been approved by the Geotechnical Engineer, spread the engineered fill materials in lifts not exceeding 8 inches and uniformly mixed during the spreading operation.
 - 1. Unless otherwise specified by the Geotechnical Engineer, bring non-expansive fill materials to or slightly above the optimum moisture content and compacted to at least 90 percent of the maximum laboratory dry density, per ASTM D1557
 - 2. Unless otherwise specified by the Geotechnical Engineer, bring non-expansive aggregate fill materials to or slightly above the optimum moisture content and compacted to at least 95 percent of the maximum laboratory dry density, per ASTM D1557.
 - 3. Do not compact the top 12 inches of soil in the planting areas.
 - 4. Fill sections greater than 5 feet in depth shall be compacted to at least 95 percent.
- C. Repeat compaction procedure until proper grade is attained.
- D. Rocks generated during site earthwork may be used in fill when conforming to material specifications.

3.08 MOISTURE CONTROL:

- A. Do not place, spread or roll fill material during unfavorable weather conditions or when fill material is excessively wet.
- B. Do not resume operations until moisture content and fill density are satisfactory to the Geotechnical Engineer.
- C. Provide berms or channels to prevent surface water from flooding excavations. Promptly remove water collecting in depressions.
- D. Where soil has been softened or eroded by flooding or by placement during unfavorable weather, remove damaged areas and re-compact as described for fill and compaction.
- E. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material.
 - 1. Prevent free water appearing on surface during or subsequent to compaction operation.
 - 2. Remove and replace, or scarify and air dry, soil material too wet to permit compaction to specified density.
 - 3. Soil material removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

3.09 GRADING:

- A. General: Uniformly grade areas of work including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes

between points where elevations are shown, or between such points and existing grades.

1. All areas covered by the project, including excavated and filled areas and adjacent transition areas, shall be uniformly graded so that finished surfaces are at the elevations established by the plans. Planter areas to receive future topsoil shall be graded below finished grade to allow for such material.
2. Finished surfaces and surfaces to receive paving and aggregate base shall be smooth, compacted, and free from irregular surface drainage.
3. Ditches, gutters, and swales shall be finished to permit proper surface drainage.
4. All surface areas, except paved and sloped embankments exceeding 8:1, shall be hydroseeded in accordance with specifications in Landscaping Sections.

B. Grading Tolerances:

1. Excavations shall not exceed 0.10-foot variation from dimensions and elevations shown or noted, unless otherwise approved by the District's Representative.
2. Fill and backfill shall be placed with tolerance of plus or minus 0.10 foot if placed in layers.
3. Grading shall be done within plus or minus 0.10 foot typically; areas under slabs, walks or pavements shall be graded within tolerance of 0 to 0.10 foot.
4. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.
5. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.
6. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than ½ inch above or below required subgrade elevation.

C. Compaction: After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

3.10 SOIL STERILIZATION:

- A. General: Soil sterilant shall be applied to prepared subgrade or after installation of rock or aggregate base as recommended by the manufacturer. Sterilant shall be applied uniformly at the rate recommended by the manufacturer to all areas beneath asphalt concrete pavement, brick pavement, concrete pavement, or on-grade concrete slabs including sidewalks, curbs, and gutters and areas between the inner and outer security fences. In addition to ground areas treated, sterilant shall be applied below expansion or control joints, and at all areas where pipe, ducts, or other features penetrate slabs.

3.12 DISPOSAL OF EXCESS AND WASTE MATERIALS:

- A. Removal of Excess Excavated Material: Excess material shall be removed by the Contractor off the site in a legal manner.

3.13 FIELD QUALITY CONTROL:

- A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
1. Perform field in-place density tests according to ASTM D1556 (sand cone method), ASTM D2167 (Rubber Balloon Method), or ASTM D2937 (Drive Cylinder Method), as applicable.
 - a. Field in-place density tests may also be performed by the nuclear method according to ASTM D6938 , provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D1556. With each density calibration check, check the calibration curves furnished with the moisture gauges according to ASTM D6938
 - b. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gauges at beginning of work on each different type of material encountered, and at intervals as directed by the District's Representative.
 2. Footing Subgrade: At footing subgrades, use a hand probe and consult with the District's Representative.
 3. Paved and Building Slab Areas; At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2,000 square feet or less of paved area or building slab, but in no case fewer than three tests.
 4. Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.
 5. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150 feet or less of trench, but not fewer than two tests.
- B. Number and location of test shall be at option of the Geotechnical Engineer.
- C. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, re-compact and retest until required density is obtained.
- D. After grading is completed and the testing agency has completed observation of the work, permit no further excavation or filling, except as approved by the District's Representative.

3.14 PROTECTION:

- A. Protect newly graded areas from traffic and erosion. In unpaved areas without landscaping, cover with straw erosion control blanket. Follow manufacturer's recommendations for installation. Provide and place straw wattles or biodegradable fiber logs across the slope at the midpoint and along the downhill edge of site. No soil is to be left uncovered at the completion of construction. Keep free of trash and debris.

- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Where completed compacted areas are disturbed by subsequent construction operation or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work, including retesting, prior to further construction.

3.15 CLEAN-UP:

- A. Comply with requirements of Section 01 70 00 – CONTRACT CLOSEOUT.

3.16 TERMITICIDE:

- A. Termiticide shall be applied to soils as recommended by the manufacturer. Termiticide shall be applied uniformly at the rate recommended by the manufacturer to all areas beneath and around wood frame structures.

END OF SECTION

SECTION 31 23 33**TRENCHING, BACKFILLING, AND COMPACTING****PART 1 – GENERAL****1.01 SUMMARY:**

- A. Provide labor, material, equipment, and services necessary to complete the backfilling and compacting as necessary for this project. Section includes, but is not limited to:
 - 1. Initial Backfill Material.
 - 2. Subsequent Backfill.
 - 3. Detectable Tape.
 - 4. Trench Excavation.
 - 5. Pipe Bedding.
 - 6. Trench Backfill.
 - 7. Trench Surfacing.
- B. Work specified in Related Sections include:
 - 1. Section 31 22 00 – EARTHWORK AND GRADING.
 - 2. Section 33 10 00 – WATER SYSTEMS.
 - 3. Section 33 30 00 – SANITARY SEWER.

1.02 DEFINITIONS:

- A. Select Fill:
 - 1. Soil or soil-rock material approved by the Geotechnical Engineer and transported to the site by the Contractor in order to raise grades or to backfill excavations.
 - 2. Contractor shall provide sufficient tests, and a written statement that all materials brought onto the project site comply with specification requirements.
- B. Excavation: Consists of the removal of material encountered to subgrade elevations.
- C. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below base.
- D. Base: The layer placed between the subgrade and surface pavement in a paving system.

- E. Relative Compaction: In-place dry density of soil expressed as percentage of maximum dry density of same materials, as determined by laboratory test procedure American Society for Testing and Materials (ASTM) D1557.

1.03 SYSTEM DESCRIPTION:

- A. Requirements:
 - 1. Comply with the recommendations of the Geotechnical Engineer.
 - 2. Protect existing trees to remain. No grading is permitted under the drip line of protected trees.
 - 3. Excavations for appurtenant structures, such as, but not limited to, manholes, transition structures, junction structure, vaults, valve boxes, catch basins, thrust blocks, and boring pits, shall be deemed to be in the category of trench excavation.
 - 4. Unless otherwise indicated in the Drawings, all excavation for pipelines shall be open cut.

1.04 SUBMITTALS:

- A. Comply with provisions of Section 01 33 00 – SUBMITTAL PROCEDURES.
- B. Test Reports: Submit the following report for import material directly to the District's Representative from the Contractor's testing services:
 - 1. Compaction test reports for import materials.
- C. Submit description of compactors proposed for use when requesting placement of base material.

1.05 QUALITY ASSURANCE:

- A. Requirements of Regulatory Agencies:
 - 1. Comply with State of California Business and Transportation Agency, Department of Transportation (Caltrans) latest edition of "Standard Specifications." (Caltrans Standard Specification).
 - 2. Comply with State of California Code of Regulations (CCR).
 - 3. Comply with State of California Construction Safety Orders, Latest Edition (CAL/OSHA).
- B. Soil Testing:
 - 1. District shall engage a geotechnical testing agency, to include compaction testing and for quality control testing during fill operations.
 - 2. Test results will be submitted to the District's Representative.
- C. Codes and Standards:

1. Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.
2. NPDES Construction General Permit.
3. Project Storm Water Pollution Prevention Plan (SWPPP)
4. California Department of Transportation Standard Specifications (Caltrans Standard Specification):
 - a. Section 19: Earthwork.
 - b. Standard Test Methods: No. 202.
5. American Society for Testing and Materials (ASTM):
 - a. D1556: Density of Soil by the Sand Cone Method.
 - b. D1557: Moisture Density Relations of Soils and Soil-Aggregate Mixtures.

1.06 DELIVERY, STORAGE AND HANDLING:

- A. Protect materials before, during and after installation.
- B. Comply with provisions of Section 01 57 00 – TEMPORARY FACILITIES AND CONTROLS where necessary to control dust and noise on and near the work caused by operations during construction activities.

1.07 PROJECT CONDITIONS:

- A. Environmental Requirements:
 1. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.
 2. Protect existing streams, ditches and storm drain inlets during work on this project.
- B. Barricade open excavations and post with warning lights.
 1. Comply with requirements of Section 01 57 00 – TEMPORARY FACILITIES AND CONTROLS.
 2. Operate warning lights and barricades as required.
 3. Protect structures, utilities, sidewalks, pavements, and other facilities immediately adjacent to excavations, from damages caused by settlement, lateral movement, undermining, washout, and other hazards.
- C. Protection of Subgrade: Do not allow equipment to pump or rut subgrade, stripped areas, footing excavations, or other areas prepared for project.

- D. Transport all excess soils materials by legally approved methods to disposal areas.
 - 1. Coordinate with the District's Representative.
 - 2. Any additional fill requirements shall be the responsibility of the Contractor.

1.08 EXISTING UTILITIES:

- A. Locate existing underground utilities in the areas of work. For utilities that are to remain in place, provide adequate means of protection during excavation operations.
- B. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult utility agency immediately for directions.
 - 1. Cooperate with the District's Representative and public and private utility companies in keeping their respective services and facilities in operation.
 - 2. Repair damaged utilities to the satisfaction of the utility owner.
- C. Do not interrupt existing utilities serving facilities occupied and used by the District or others, except when permitted in writing by the District's Representative and then only after acceptable temporary utility services have been provided.

1.09 SEQUENCING AND SCHEDULING:

- A. The sequence of operations shall be reviewed by the District's Representative prior to commencement of any work.

PART 2 – PRODUCTS**2.01 MATERIALS:**

- A. General:
 - 1. Backfill materials will be subject to approval of the Engineer.
 - 2. For approval of backfill fill material, notify the District's Representative at least 7 days in advance of intention to import material.
 - 3. Consideration shall also be given to the environmental characteristics as well as the corrosion potential of backfill materials. Laboratory testing, including pH, soluble sulfates, chlorides, and resistivity shall be reviewed. Backfill materials shall not be more corrosive than the native materials.
- B. Trench Sand:
 - 1. Material free from clay, organic materials, and other deleterious substances and conforming to Caltrans Standard Specification Section 19-3.02F(2).
- C. Trench Gravel:

1. Granular material free from clay, organic materials, and other deleterious substances and conforming to Class 1 Type A Permeable Material, per Caltrans Standard Specification Section 68-2.02F(2).
- D. Approved Native Fill:
1. See Section 31 22 00 – EARTHWORK AND GRADING.
- E. Imported Fill:
1. See Section 31 22 00 – EARTHWORK AND GRADING.
- F. Class II Aggregate Base: $\frac{3}{4}$ " maximum, Class II AB, free from organic matter and other deleterious substances and conforming to Caltrans Standard Specification Section 26-1.02A.
- G. Controlled Low Strength Material (CLSM):
1. Low strength structural backfill with a compressive strength between 50 and 100 psi, conforming to Caltrans Standard Specifications Section 19-3.02G.
- H. Water: Clean and free from deleterious amounts of acids, alkalis, salts and organic matter.

2.02 BURIED WARNING AND IDENTIFICATION TAPE

- A. Polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 75 mm 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.
1. Warning Tape Color Codes.
 - Red: Electric.
 - Yellow: Gas, Oil; Dangerous Materials.
 - Orange: Telephone and Other Communications.
 - Blue: Water Systems.
 - Green: Sewer Systems.
 - White: Steam Systems.
 - Gray: Compressed Air.
 2. Warning Tape for Metallic Piping: Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum

strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

3. Detectable Warning Tape for Non-Metallic Piping: Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 920 mm 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.03 DETECTION WIRE FOR NON-METALLIC PIPING

- A. Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

PART 3 – EXECUTION

3.01 GENERAL:

- A. Prior to commencement of work, become thoroughly familiar with site conditions.
- B. In the event discrepancies are found, immediately notify the District's Representative in writing, indicating the nature and extent of differing conditions.
- C. Backfill excavations as promptly as work permits.
- D. Do not place engineered fill or backfill until rubbish and deleterious materials have been removed and areas have been approved by the District's Representative.
- E. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.
- F. In excavations, use satisfactory excavated or borrow material.
- G. Under grassed areas, use satisfactory excavated or borrow material.

3.02 COMPACTING:

- A. Compact by power tamping, rolling or combinations thereof.
 1. Where impractical to use rollers in close proximity to walls, stairs, etc., compact by mechanical tamping.
 2. Scarify and re-compact any layer not attaining compaction until required density is obtained.

3.03 SITE PREPARATION:

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, which are to remain, from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

- B. Protect existing storm drainage system from silt and debris resulting from construction activities. If contamination occurs, remove contamination at no cost to the District.

3.04 EXISTING UTILITIES:

- A. Identify the location of existing utilities.
 - 1. Prior to trenching, the Contractor shall excavate at locations specifically indicated on the Drawings, if any, and where new lines cross other utilities of uncertain depth and determine the elevation of the utility in question to ensure that the new line will clear the potential obstruction.
 - 2. The Contractor shall contact Underground Service Alert (USA) at 811 for assistance in locating existing utilities.
 - 3. If, after the excavation, a crossing utility does present an obstruction, then the line and grade of the new line will be adjusted as directed by the Engineer of Record to clear the utility.
- B. Protect all existing utilities to remain in operation.
- C. Movement of construction machinery and equipment over existing pipes and utilities during construction shall be at Contractor's risk.
- D. Excavation made with power-driven equipment is not permitted within 2 feet of any known utility or subsurface structure.
 - 1. Use hand or light equipment for excavating immediately adjacent to known utilities or for excavations exposing a utility or buried structure.
 - 2. Start hand or light equipment excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured.
 - 3. Support uncovered lines or other existing work affected by excavation until approval for backfill is obtained.
 - 4. Report damage of utility line or subsurface structures immediately to the District's Representative.
- E. Backfill trenches resulting from utility removal in accordance with this section.

3.05 TRENCH EXCAVATION

- A. General:
 - 1. Excavation shall include removal of all water and materials that interfere with construction. The Contractor shall remove any water which may be encountered in the trench by pumping or other methods during the pipe laying, bedding and backfill operations. Material shall be sufficiently dry to permit approved jointing.

2. Excavation shall include the construction and maintenance of bridges required for vehicular and pedestrian traffic, support for adjoining utilities.
3. The Contractor shall be responsible to safely direct vehicular and pedestrian traffic through or around his/her work area at all times.
4. The Contractor shall relocate, reconstruct, replace or repair, at his/her own expense, all improvements which are in the line of construction or which may be damaged, removed, disrupted or otherwise disturbed by the Contractor.

B. Existing Paving and Concrete:

1. Existing pavement over trench shall be saw cut, removed, and hauled away from the job. Existing pavement shall be neatly saw cut a minimum of 6-inches beyond the limits of excavations.
2. Existing concrete over the trench shall be saw cut to a full depth in straight lines either parallel to the curb or right angles to the alignment of the sidewalk.
3. Boards or other suitable material shall be placed under equipment out rigging to prevent damage to paved surfaces.

C. Trench Width:

1. The maximum allowable trench widths at the top of the pipe shall be as follows:

<u>Pipe Type</u>	<u>Trench Width (Maximum)</u>
Copper	Outside diameter of barrel plus 18 inches
Plastic	"
Vitrified Clay	"
Cast-Iron	Outside diameter of barrel plus 24 inches
Ductile-Iron	"
Reinforced Concrete	

- a. The maximum trench width shall be inclusive of all shoring.
 - b. If the maximum trench width is exceeded, the District's Representative or Inspector of Record may direct the Contractor to encase or cradle the pipe in concrete at no additional charge.
2. For pipes 3 inch diameter and larger, the free working space on each side of the pipe barrel shall not be less than 6 inches.

- D. Open Trench:
 - 1. The maximum length of open trench shall be 300 feet or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is greater. No trench shall be left open at the end of the day.
 - 2. Provisions for trench crossings and free access shall be made at all street crossings, driveways, water gate valves, and fire hydrants.

- E. Excavation Bracing:
 - 1. The excavation shall be supported and excavation operations shall be conducted in accordance with the California Industrial Accident Commission and CAL/OSHA.
 - 2. The Contractor shall, at his/her own expense, furnish, put in place, and maintain such sheeting and bracing as may be required to support the sides of all excavations (whether above or below the pipe grade), and to prevent any movement which could in any way diminish the required trench section or otherwise injure or delay the work. The sheeting and bracing shall be withdrawn in a manner such as to prevent any earth movement that might overload the pipe.

- F. Excavated Material:
 - 1. All excavated material not required for backfill shall be immediately removed and properly disposed of in a legal manner by the Contractor.
 - 2. Material excavated in streets and roadways shall be laid alongside the trench no closer than 2 feet from the trench edge and kept trimmed to minimize inconvenience to public traffic.
 - 3. Provisions shall be made whereby all storm and wastewater can flow uninterrupted in gutters or drainage channels.

3.06 PIPE BEDDING

- A. Bedding Excavation: The trench shall be excavated below the grade of the pipe bottom to the following minimum depths:

<u>Pipe Type</u>	<u>Depth</u>
Copper	3 inch
Reinforced Concrete	3 inch
Plastic: 2 inch diameter and smaller	3 inch
Cast/Ductile Iron	6 inch
Plastic: over 2 inch diameter	6 inch

- 1. Stabilization of Trench Bottom: When the trench bottom is unstable due to wet or spongy foundation, trench bottom shall be stabilized with gravel or crushed

rock. The Inspector of Record will determine the suitability of the trench bottom and the amount of gravel or crushed rock needed to stabilize a soft foundation. Soft material shall be removed and replaced with gravel or crushed rock as necessary.

2. Placement of Bedding Material: The trench bottom shall be cleaned to remove all loose native material prior to placing pipe bedding material. Pipe bedding shall be trench sand or trench gravel, as defined in these specifications. Sufficient pipe bedding material shall be placed in trench and tamped to bring trench bottom up to grade of the bottom of pipe, plus 1/8th of the pipe diameter. The relative compaction of tamped material shall be not less than 90 percent. It is the intention of these requirements to provide uniform bearing under the full length of pipe to a minimum width of 60 percent of the external diameter.

3.07 TRENCH BACKFILL

A. Initial Backfill:

1. Prior to trench backfill, the condition of the trench and lying of pipe must be inspected and approved by the Inspector of Record.
2. Trench Sand and Trench Gravel shall be used for initial backfill. After the pipe has been properly laid and inspected, initial backfill material shall be placed on both sides of the pipe and compacted to final depth as follows:

<u>Pipe Type</u>	<u>Depth</u>
Copper	6 inches above top of pipe
Cast Iron	6 inches above top of pipe
Plastic: less than 3 inches diameter	6 inches above top of pipe
Plastic: 3 inches diameter and larger	12 inches above top of pipe
Ductile Iron	12 inches above top of pipe
Reinforced Concrete	½ outside diameter of pipe (pipe spring line)

3. Compaction: Initial backfill compaction shall be by mechanical means. The initial backfill material shall be hand tamped in layers not exceeding 4 inches in un-compacted depth and shall be brought up uniformly on both sides of the pipe to avoid bending or distortional stress. After hand tamping, the relative compaction of the initial backfill material shall be not less than 90 percent.
4. Pipe Detection: In trenches containing pressurized plastic pipes, tracer wire shall be placed directly above the pipe and shall be connected to all valves, existing exposed tracer wires, and other appurtenances as appropriate.

B. Subsequent Backfill:

1. Subsequent backfill material shall consist of approved native material, imported fill, or Class II AB conforming to these specifications.

2. Structure and utility trench backfill should be moisture conditioned, placed in lifts eight inches or less in loose thickness, and mechanically compacted to at least 90 percent relative compaction except the relative compaction shall not be less than 95 percent within 2-1/2 feet of finished permanent surface grade or 1-1/2 feet below the finished subgrade, whichever is greater; jetting will not be permitted. The moderately expansive clay soils exposed in trenches should not be allowed to dry out prior to placement of trench backfill materials.
 3. It must be the contractor's responsibility to select equipment and procedures that will accomplish the grading as described above. He/she must organize his/her work in such a manner that the Soil Engineer can test and/or observe each element of grading.
- C. Controlled Low Strength Material (CLSM):
1. CLSM is permitted at Engineer of Records discretion or where indicated on the contract documents.
- D. Jetting and Ponding:
1. Jetting of trench backfill is not permitted.
- E. Compaction Testing:
1. Compaction testing shall be in accordance with California Test Method ASTM D1556 or D1557.

3.08 TRENCH SURFACING

- A. Unpaved Areas:
1. In unimproved areas, the trench surface shall be restored to its original condition. No mounds of earth shall be left along the trench. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
 2. Where completed compacted areas are disturbed by subsequent construction operation or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work, including retesting, prior to further construction.
- B. Temporary Surfacing:
1. Temporary surfacing shall be a minimum of 2 inches of cutback asphalt on 10 inches of Class 2 aggregate base and shall be placed at all trench locations subject to vehicular or pedestrian traffic.
 2. Temporary surfacing shall be laid within one day after backfilling (except where the Contractor elects to place permanent surfacing within this time period).
 3. Before the trenching area is opened for traffic, all excess dirt, rock, and debris shall be removed, the street surface shall be swept clean and the pavement shall be washed down with a water truck and pressure nozzle.

4. Temporary surfacing shall be maintained to prevent the occurrence of mud holes and prevent the surface from settling below 1 inch or rising more than 1 inch from the existing pavement grade.

3.09 MOISTURE CONTROL:

- A. Do not resume operations until moisture content and fill density are satisfactory to the Engineer.

3.10 DISPOSAL OF EXCESS AND WASTE MATERIALS:

- A. Testing Services: Allow testing agency to test each backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
- B. When testing agency reports that backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, re-compact and retest until required density is obtained.

3.11 PROTECTION:

- A. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Where completed compacted areas are disturbed by subsequent construction operation or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work, including retesting, prior to further construction.

3.12 CLEAN-UP:

- A. Remove all debris, equipment, tools and materials upon completion prior to final inspections to the satisfactions of the engineer.
- B. In unpaved areas without landscaping, cover with straw erosion control blanket. Follow manufacturer's recommendations for installation. Provide and place straw wattles or biodegradable fiber logs across the slope at the midpoint and along the downhill edge of site. No soil is to be left uncovered at the completions of construction.

END OF SECTION

SECTION 32 12 33
PAVING AND SURFACING

PART 1 - GENERAL**1.01 SUMMARY**

- A. Section Includes (but is not necessarily limited to):
 - 1. Asphalt Concrete Paving.
 - 2. Portland Cement Concrete Paving.
 - 3. Liquid Asphalt and Asphalt Emulsion.
 - 4. Aggregate Base.
 - 5. Concrete Pavers.
 - 6. Decomposed Granite.
 - 7. Sealants
- B. Related work furnished under other sections but conforming to the provisions of this section:
 - 1. Subgrade preparation.
 - 2. Aggregate Base installation.
- C. Related Sections:
 - 1. Section 31 10 00 – SITE PREPARATION AND DEMOLITION.
 - 2. Section 31 22 00 – EARTHWORK AND GRADING.
 - 3. Section 32 17 23 – PAVEMENT MARKING.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. A615: Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 2. C150: Portland Cement.
 - 3. D1557: Moisture Unit Weight Relations of Soils and Aggregate Mixtures Using a 10 lb (4.5 kg) Rammer and 18 in. (457 mm) Drop.
 - 4. D1682: Breaking Loads and Elongation of Textile Fabrics.
- B. California Code of Regulations (CCR): Title 24, Chapter 2-71, Site Development Requirements for ADA Accessibility.

- C. California Department of Transportation (Caltrans):
 - 1. Standard Specifications:
 - a. Section 20-10: Decomposed Granite.
 - b. Section 24: Stabilized Soils.
 - c. Section 26: Aggregate Bases.
 - d. Section 37: Bituminous Seals.
 - e. Section 39: Asphalt Concrete.
 - f. Section 40: Concrete Pavement.
 - g. Section 41: Concrete Pavement Repair.
 - h. Section 51: Concrete Structures.
 - i. Section 52: Reinforcement.
 - j. Section 73: Concrete Curbs and Sidewalks.
 - k. Section 88: Geosynthetics.
 - l. Section 90: Portland Cement Concrete.
 - m. Section 92: Asphalts.
 - n. Section 93: Liquid Asphalts.
 - o. Section 94: Asphaltic Emulsions.
 - p. Section 95: Epoxy
 - 2. Traffic Manual.
 - 3. Highway Design.
- D. Institute of Transportation Engineers: Transportation and Traffic Engineering Handbook.
- E. American Concrete Institute Manual of Practice.
- F. Interlocking Concrete Pavement Institute (ICPI).

1.03 SUBMITTALS

- A. Requirements: Refer to Section 01 33 00 – SUBMITTAL PROCEDURES.
- B. Asphalt Concrete Paving:
 - 1. Provide copies of material certificates signed by the material producer and the Contractor, certifying that each material item complies with or exceeds specified requirements.

2. The Contractor shall furnish a certified weight or load slip for each load of material used in the construction of the asphalt concrete pavement.
- C. Concrete Paving: The Contractor shall furnish mill test reports on the cement, reinforcement bars, and aggregates, showing compliance with the respective specifications. The Testing Engineer may make concrete test cylinders and slump tests as deemed necessary to determine compliance with the Specifications.
 - D. Liquid Asphalt.
 - E. Pavement Reinforcement Fabric.
 - F. Tack Coat.
 - G. Pavement Reinforcement Mesh.
 - H. Structural Geotextile Fabric.
 - I. Concrete Pavers.
 - J. Slurry Seal.
 - K. Joint Sealants.
 - L. Backer Rod.
 - M. Joint Filler.
 - N. Epoxy Crack Filler.
 - O. Bonding Epoxy.
 - P. Concrete Quality Control Plan. Inclusive of the following:
 - Placing and timing of joints including a location plan for all joints
 - Bar placement, alignment
 - Concrete placement methods
 - Finishing and curing methods and timing.
 - Joint sealants and timing of placement

1.04 PROJECT CONDITIONS

- A. Liquid Asphalt and Asphalt Emulsion:
 1. Seal coat and paint binder shall be applied only when the ambient temperature is above 50° Fahrenheit and when temperature has not been below 35° Fahrenheit for 12 hours immediately prior to application.
 2. Fog coat, seal coat, and paint binder shall not be applied when base or surfaces are wet or contain excess moisture.

- B. Asphalt Concrete Paving: Asphalt concrete surfaces shall be constructed only when ambient temperature is above 50° Fahrenheit and when base is dry.
- C. Portland Cement Concrete: Concrete shall be placed when the conditions will yield satisfactory results and when the ambient temperature will be above 40°F for 72 hours after placement with no threat of precipitation.
- D. Joint Sealants: Sealants shall be placed per the manufacturers recommendations and when temperature is above 40°F for 2 days after and no threat of precipitation.

PART 2 - PRODUCTS

2.01 PAVING MATERIALS

- A. Aggregate Base: Aggregate base shall conform to Caltrans Class 2 (R value 78 min) aggregate base, 3/4" maximum size, as specified in Section 26 of the Caltrans Standard Specifications.

- B. Asphalt Concrete Paving:

- 1. Shall be Type A HMA, conforming to Section 39-2.02B of the Caltrans Standard Specifications.
- 2. Asphalt binder to be mixed with aggregate shall be performance-graded asphalt, PG64-10, conforming to Section 92 of the Caltrans Standard Specifications.
- 3. Aggregate size shall be as follows:

Total AC Thickness	Min # of AC lifts	Aggregate Grading
3/4 inch – 1-1/2 inch	1	1/2" max
2 inch – 2-1/2 inch	1	1/2" max
3 inch or greater	2	1/2" max for top lift and 3/4" max for initial lifts

- 4. If multiple lifts, apply a tack coat before placing a subsequent lift.
- 5. Asphaltic emulsion for paint binder, fog coat, and seal coat shall be emulsified asphalt, Type SS-1h, conforming to Section 94 of the Caltrans Standard Specifications.

- C. Portland Cement Concrete:

- 1. Concrete shall be minor concrete conforming to Section 90-2 of the Caltrans Standard Specifications, except as modified by these specifications.
- 2. Concrete Pavement shall contain a minimum of 505 lbs/yard of cementitious material.

3. Cement shall be a combination of Type II or Type V Portland cement and supplemental cementitious materials conforming to Section 90-1.02B of the Caltrans Standard Specifications.
 4. For minor concrete, the maximum aggregate size must not be larger than 1-1/2 inches or smaller than 3/4 inch, per Section 90-2.02C of the Caltrans Standard Specifications.
 5. Water shall be potable and free of organic matter and injurious amounts of oil, acid, alkali, or other deleterious substances.
 6. Unless otherwise noted on the plans the concrete mix design shall provide a minimum compressive strength of 3,000 psi at 28 days.
 7. Supplementary Cementitious Materials (SCM) shall comply with Section 90-1.02B(3) of the Caltrans Standard Specifications including chemical properties, physical properties, and proportioning.
 8. Reinforcing bars shall be deformed and shall conform to ASTM A615.
 9. Filled joints, unless noted otherwise on the Drawings, shall be 1/4-inch wide, the full depth of the concrete section and conforming to Section 51 of the Caltrans Standard Specifications.
 10. Joint filler shall conform to Section 51 of the Caltrans Standard Specifications for pre-molded expansion joint filler and expanded polystyrene joint filler.
 11. No admixtures will be allowed without prior approval of the Engineer of Record.
- D. Epoxy shall meet the requirements of Section 95 of the Caltrans standard specifications.
1. Epoxy used to bond dowels to hardened concrete shall be Type 1, Grade 1, Class B or C per ASTM C881.
 2. For high strength applications epoxy shall be Type IV.
- E. Pavement Reinforcement Fabric: Pavement reinforcement fabric shall meet Caltrans Section 96-1.02J. BP Petromat, or approved equivalent.
- F. Crack Sealant:
1. Crack sealant shall be rubberized hot-pour type and shall meet ASTM D 3405. Husky 1611, or approved equivalent.
 2. Blotting Agent shall be one of: Screened sand, cement, or fly ash.
- G. Tack coat: Tack coat shall meet Caltrans Section 39-2.01B(10).
- H. Pavement reinforcement mesh: Pavement reinforcement mesh for use in overlays shall be Glasgrid Model 8501, or approved equivalent.
- I. Structural geotextile fabric: Structural geotextile fabric shall be Mirafi 500X, or approved equivalent.

- J. Joint Sealant:
 - 1. Dow Corning 890-SL or approved silicone sealant conforming to ASTM D5893, C639, C1183, C679, C792, C66 and C792.
 - 2. Conform to Caltrans Section 41-5.02B.
- K. Backer Rod
 - 1. Backer Rod shall be expanded, cross linked, crossed-cell polyethylene foam compiling to ASTM D5249, Type I.
 - 2. Rod diameter shall be 25% greater than the saw cut joint width.

2.02 BITUMINOUS SEALS

- A. Fog Seal: Fog Seal asphaltic emulsion shall conform to Caltrans Section 37-4.02.
- B. Flush Coat: Flush Coat asphaltic emulsion shall conform to Caltrans Section 37-4.03. Sand for the flush coat shall comply with the fine aggregate grading in Caltrans Section 90-1.02C(3), sand must be free of organic material or clays.
- C. Slurry Seal: Slurry seal shall conform to Caltrans Section 37-3.02B, and be Type II unless otherwise specified.
- D. Chip Seal: Chip seal shall conform to Caltrans Section 37-2 for polymer modified asphaltic emulsion seal coat and included screenings per Caltrans Section 37-2.01B.
- E. Crack Sealant: Crack Sealant shall conform to Caltrans Section 37-6.02, Type 2, unless otherwise specified.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Subgrade and Aggregate Base:
 - 1. Prepare subgrade and over excavate per Section 31 22 00 – EARTHWORK AND GRADING.
 - 2. Aggregate base shall be compacted to 95 percent ASTM D1557 per the Geotechnical report. Section 26-1.03E of the Caltrans Standard Specifications shall apply.
 - 3. Soil sterilant shall be applied to prepared subgrade or after installation of rock or aggregate base uniformly at the rate recommended by the manufacturer.
- B. Crack Sealing:
 - 1. Before sealing, cracks shall be cleared of dirt, dust, and all other deleterious materials to a depth of 1/4-inch to 1/2-inch.
 - 2. Cracks 1/8-inch in width and greater shall be sealed.

3. Application of crack sealer shall be in accordance with the manufacturer's recommendations unless otherwise directed.

3.02 ASPHALT CONCRETE PAVING

A. General:

1. Asphalt concrete shall be proportioned, mixed, placed, spread, and compacted in conformance with Section 39 of the Caltrans Standard Specifications.
2. Before placing asphalt concrete, an asphalt emulsion tack coat shall be applied to all vertical surfaces of existing pavement, curbs, gutters, construction joints, and all existing pavement to be surfaced, in conformance with Section 39 of the Caltrans Standard Specifications.
3. Spreading and compacting asphalt concrete shall be performed in accordance with Section 39 of the Caltrans Standard Specifications.
4. Fog seal shall be applied to all finished surfaces of asphalt concrete pavement at a rate of 0.05 gallons per square yard, in accordance with Section 37 of the Caltrans Standard Specifications.
5. After fog seal has been applied, ample time shall be allowed for drying before traffic is allowed on the pavement or paint striping is applied.

3.03 CONCRETE CONSTRUCTION

A. General:

1. All concrete shall be mixed in accordance with applicable provisions of Section 90 of the Caltrans Standard Specifications.
2. Construction of concrete substructures shall conform to applicable provisions of Section 51 of the Caltrans Standard Specifications. Unless noted otherwise in the Specifications, all exposed surfaces of structure shall have Class 1 surface finish. Finish shall match adjacent existing concrete paving.
3. Schedule of Locations for Concrete Finish Types, unless otherwise specified:
 - a. Slabs or Stairs to receive toppings and fills: Scratched.
 - b. Exposed Stairs Fills: Nonslip.
 - c. Exterior Paved Areas: Light Broomed.
 - d. Formed Surface to receive paint: Smooth Formed.
 - e. Concealed Concrete Surfaces: Rough Formed.
4. Curing shall conform to provision of Caltrans Section 90-1.03B. No pigment shall be used in curing compounds for construction of concrete curbs, gutters, and structures.

5. All work shall be subject to field inspection. No concrete shall be placed until the Program Manager has approved the forms and reinforcement.
6. Expansion joints on curbs and gutters shall be placed 20 feet on centers, adjacent to structures, and at all returns, and shall be filled with joint filler. Control joints shall be formed 10 feet on centers.
7. Concrete shall not be dropped freely where reinforcing bars will cause segregation, nor shall it be dropped freely more than 6 feet. Spouts, elephant trunks, or other approved means shall be used to prevent segregation.

3.04 CONCRETE PAVER CONSTRUCTION

- A. Installation - General
 1. Concrete pavers to be clean and free of foreign materials before installation.
 2. Paving work to be plumb, level and true to line and grade as shown.
 3. Install pavers in pattern and layout as shown on Plans. Use string lines to hold pattern lines true.
 4. Use a masonry saw to cut pavers.
 5. Protection: Protect the installed concrete paver system work from damage, including sediment deposition due to subsequent construction activity on the site.
 6. During the landscape maintenance period, promptly remove any pavers that settle or deviate from the grades as shown on plans.
- B. Sand Bedding (Non Permeable) – Install dry sand to uniform depth required for flush finish after pavers are installed. The maximum designed depth shall be one inch thick with no sand thickness less than $\frac{3}{4}$ " or more than $1\frac{1}{2}$ " except where required otherwise by Drawings. Sand is to remain undisturbed prior to the installation of unit pavers. Moisture content of sand to remain constant.
- C. Open-graded Subbase and Base (Permeable)
 1. Moisten, spread and compact the No. 2 subbase in 4-inch to 6-inch lifts without wrinkling or folding the geotextile.
 2. For each lift, make at least two passes in the vibratory mode, then at least two in the static mode, with a minimum 10-ton vibratory roller, until there is no visible movement of the No. 2 stone. Do not crush aggregate with the roller.
 3. The surface tolerance of the compacted No. 2 subbase shall be $\pm 2\frac{1}{2}$ in. over a 10 ft straightedge.
 4. Moisten, spread and compact the No. 57 base in 4-inch lift over the compacted No. 2 subbase with a minimum 10-ton vibratory roller, until there is no visible movement of the No. 57 stone. Do not crush aggregate with the roller.
 5. The surface tolerance the compacted No. 57 base should not deviate more than ± 1 in. over a 10 ft straightedge.
 6. Compacted density of base and subbase, per ASTM D4254, to be 95% of the

laboratory index density established for the subbase and base stone.

- D. No. 8 Stone Bedding (Permeable)
 - 1. Moisten, spread and screed the No. 8 stone bedding material.
 - 2. Fill voids left by removed screed rails with No. 8 stone.
 - 3. The surface tolerance of the screeded No. 8 bedding layer shall be $\pm 3/8$ inches over a 10-foot straightedge.
 - 4. Do not subject screeded bedding material to any pedestrian or vehicular traffic before paving unit installation begins.

- E. Non-Permeable Paver Installation
 - 1. Install pavers hand-tight on the undisturbed sand laying course as indicated on Plans, with tolerance from given dimensions not to exceed $3/8$ -inch in 100 feet.
 - 2. Use a roller or plate vibrator with a rubber shoe to compact the pavers and to vibrate the sand into the joints between the pavers.
 - 3. Spread joint filler sand over the installed pavers and vibrate into the joints between the pavers.
 - 4. Sweep excess sand into the joints. Remove remaining excess sand from installed pavers and dispose of off-site.

- F. Quality Control
 - 1. The final surface elevation of pavers shall not deviate more than $3/8$ in. under a 10 ft long straightedge.
 - 2. The surface elevation of pavers shall be $1/8$ to $1/4$ inch above adjacent drainage inlets, concrete collars or channels.
 - 3. No greater than $1/8$ inch difference in height between adjacent pavers.
 - 4. Prior to applying Water-based Paver Sealer, remove any stains and efflorescence using cleaners. Apply Water-based Paver Sealer, per ICPI Tech Spec 5 and label Instructions, after final cleanup and wash down of paving stone surface. During application, protect surrounding areas from over spray. All traffic, pedestrian or vehicular, shall be kept off of sealed pavers until initial cure time has been achieved.

3.05 BITUMINOUS SEALS

- A. General:
 - 1. Mixing, spreading and placing shall be in accordance with applicable provisions of Section 37 of the Caltrans Standard Specifications.

3.06 SEALANTS AND BACKER ROD

- A. General: Where indicated on the plans and/or specifications, Contractor shall seal joints with a sealant and backer rod.
 - 1. Width and depth of joints shall meet project requirements and accommodate sealant and backer rod in conformance with Manufactures requirements.

2. Placements and shall conform to Manufactures requirements.

3.07 FIELD QUALITY CONTROL

A. Asphalt Concrete Paving:

1. Contractor shall perform a flood test in the presence of the engineer and/or Las Positas College's Representative. Location of ponding greater than 1/8" in depth may impact proper drainage and shall be marked and remedied by the contractor.
2. The specified thickness of the finished pavement shown on the plans and specifications shall be the minimum acceptable.
3. Conforms shall form a smooth, pond-free transition between existing and new pavement.
4. Depressions in paving between high spots are not to exceed 1/8-inch when measured below a 10-foot long straight edged placed anywhere on surface in any direction.
5. The finished asphalt pavement shall have positive drainage without ponding.

3.08 CLEANUP

A. General:

1. Surplus material remaining upon completion of paving operations shall become the property of the Contractor, to be removed from the work site and disposed of in a lawful manner.
2. Surfaces shall be left in a clean, neat, and workmanlike condition, and all construction waste, rubbish, and debris shall be removed from the work site and disposed of in a lawful manner.

END OF SECTION

SECTION 32 17 33

PAVEMENT MARKING

PART 1 – GENERAL

1.01 SUMMARY:

- A. Provide requirements for materials, fabrications, and installation of traffic control and pavement markings.

1.02 SUBMITTALS:

- A. Submit manufacturer's product data describing application of products and compliance with VOC requirements.
- B. Shop Drawings: Show complete layout and location of pavement markings prior to demolition or obliteration of the existing markings.
- C. Submit samples as follows:
 - 1. Traffic paint.
 - 2. Pavement markers and adhesives.
 - 3. Reflectorized markers and posts.

1.03 DELIVERY, STORAGE AND HANDLING:

- A. Comply with Division 1 requirements and specifications.
- B. Deliver and store packaged products in original containers with seals unbroken and labels intact until time of installation.
- C. Provide proper facilities for handling and storage of products to prevent damage. Where necessary, stack products off ground on level platform, fully protected from weather.

PART 2 – PRODUCTS

2.01 MATERIALS:

- A. Traffic Marking and Symbol Paint:

- 1. Traffic Marking and Symbol Paint shall conform to the applicable requirements of Caltrans Standard Specification Section 84-2.02C.
- 2. Physical Characteristics shall conform to the following:

Volatile Organic Compounds	100 g/l max
Pigment (White) Content, by Weight	58-62%
Pigment (Yellow) Content, by Weight	56-60%

Total Nonvolatile Content, by Weight 75-79%

3. EF Series, Fast Dry, Waterborne Traffic Paint distributed by Ennis Flint (Product Code PTWB01WH, Color Fed 595 White 37925); (Product Code PTWB01YLF, Color Lead Free Yellow 33538); or approved equivalent.
- B. Accessible Symbol Background Paint: Blue Color. Glidden Co. "Glid-Guard Lifemaster Finish No. 5200 /series, Color 1/M 79", or approved equivalent.
- C. Thermoplastic Stripes and Markings:
1. Thermoplastic stripes and markings shall be hot applied conforming to Caltrans Standard Specification Section 84 and shall be Cataphote-Catatherm brand, Pavemark thermoplastic brand, or approved equivalent.
 2. Thermoplastic stripes and markings shall include glass beads to meet retroreflective requirements of Caltrans Section 84-2.02A and 84-2.02B
- D. Glass beads shall be per Caltrans Section 84-2.02D.
- E. Pavement Markers and Adhesives:
1. Pavement markers shall be two-way retroreflective markers and shall conform to the applicable requirements of Caltrans Standard Specification Section 81.3.02C.
 - a. Pavement Marker: For fire hydrants shall be blue.
 - b. Pavement Marker: For lane delineation shall be per plan.
 2. Adhesive for pavement markers shall be standard set epoxy adhesive conforming to the requirements of Caltrans Standard Specification Section 95-1.02F.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Examine receiving surfaces and verify that surfaces are clean and proper for installation.
- B. Do not start work until unsatisfactory conditions have been corrected.

3.02 APPLICATION:

- A. Preparation:
 1. Clean and prepare surfaces to receive traffic paint in accordance with Caltrans Standard Specification Section 84-2.03B and these special provisions. Where required, remove existing striping and markings by wet blasting or equivalent method. Do not use dry sandblasting or other dust producing methods.
- B. Traffic Paint:

1. Traffic paint shall be machine applied in accordance with Caltrans Standard Specification Section 84-2.03C.
 2. No paint shall be applied until the surface has been approved by the Engineer and until at least 10 days after the slurry seal on asphalt concrete has been placed. Place markers in accordance with Caltrans Standard Specification Section 81-3.03.
- C. Striping Layout:
1. Layout striping locations via “cat tracking” or chalk line for District approval prior to application of any markings or paint.
 2. Traffic stripe shall be single and double, solid and broken, and of the color to match existing conditions.
 3. Traffic striping shall be placed in patterns to match existing conditions, contractor shall document.
- D. Thermoplastic Stripes and Markings:
1. Thermoplastic stripes and markings shall be applied hot in conformance with manufacturer’s recommended instructions and the applicable requirements of Caltrans Standard Specification Sections 84-2.03B and 2.03C.
- E. Pavement Markers:
1. Pavement markers shall be installed to delineate the location of fire hydrants along off-site and on-site roadways. No markers shall be installed until the surface has been approved by the Engineer and until at least 10 days after the slurry seal on asphalt concrete has been placed. Place markers in accordance with Caltrans Standard Specification Section 81-3.03
- F. Apply marking paint in accordance with approved manufacturer’s recommendations.
- G. Density of paint coverage shall hide color and texture of substate.
- H. Parking Stripes: Paint four inches wide unless otherwise noted.
- I. Symbol Marking: Paint to match existing conditions.

3.03 CLEANING AND PROTECTION:

- A. Comply with requirements of Section 01 74 00 – CLEANING.
- B. Upon completion of work, remove surplus materials and rubbish and clean off spilled or splattered paint resulting from this work.
- C. Permit no surface traffic until pavement and symbol marking has dried thoroughly.

END OF SECTION

SECTION 33 10 00**WATER SYSTEMS****PART 1 - GENERAL****1.01 SUMMARY**

- A. This section describes general requirements, products, and methods of execution relating to on-site domestic water and fire water systems serving all buildings and appurtenances. Unless otherwise noted, this section does not apply to irrigation water systems and water systems inside and within 5 feet of buildings. This section applies to:
 - 1. Domestic water distribution and services.
 - 2. Fire water distribution and services.
 - 3. Water storage tanks.
- B. Contractor shall provide all labor, equipment, materials, and testing services unless otherwise noted.
- C. Related Sections:
 - 1. Section 31 23 33 – TRENCHING, BACKFILLING, AND COMPACTING.

1.02 SUBMITTALS

- A. Comply with requirements of Section 01 33 00 – SUBMITTAL PROCEDURES.
- B. Product Data: Manufacturer's literature and data, including, where applicable, sizes, pressure rating, rated capacity, listing/approval stamps, labels, or other marking on equipment made to the specified standards for materials, and settings of selected models, for the following:
 - 1. Piping and fittings.
 - 2. Gaskets, couplings, sleeves, and assembly bolts and nuts.
 - 3. Gate valves and ball valves.
 - 4. Blow-off valves, air release and vacuum valves, and combination air valves.
 - 5. Check valves.
 - 6. Pressure reducing valves.
 - 7. Backflow preventers.
 - 8. Valve boxes, frames and covers.
 - 9. Water meter boxes, frames and covers.

10. Post indicators.
 11. Fire department connections and wet stand pipes.
 12. Fire hydrants.
 13. Thrust block concrete mix and/or restrained joints and fittings.
 14. Tapping sleeves and tapping valves.
 15. Corporation stops.
 16. Identification materials and devices.
 17. Corrosion protection.
 18. Water sampling stations.
- C. Test Reports:
1. Bacteriologic Testing: Provide copies of the test results indicating water sample meets California Drinking Water Standards.
- D. Samples: None specified. Provide as necessary.

1.03 QUALITY ASSURANCE

- A. Comply with the latest edition of the following Standards and Regulations:
1. American Water Works Association (AWWA) and American National Standards Institute (ANSI):
 - a. C104/A21.4 ANSI Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
 - b. C105/A21.5 ANSI Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
 - c. C110/A21.10 ANSI Standard for Ductile-Iron and Gray-Iron Fittings, 3 inch - 48 inch for Water.
 - d. C111/A21.11 ANSI Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - e. C115/A21.15 ANSI Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
 - f. C116/A21.16 ANSI Standard for Protective Fusion-Bonded Epoxy Coatings Interior & Exterior Surfaces for Ductile-Iron and Gray-Iron Fittings.
 - g. C150/A21.50 ANSI Standard for Thickness Design of Ductile-Iron Pipe.

- h. C151/A21.51 ANSI Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
- i. C153/A21.53 ANSI Standard for Ductile-Iron Compact Fittings for Water Service.
- j. C500 Metal-Seated Gate Valves for Water Supply Service.
- k. C502 Dry-Barrel Fire Hydrants.
- l. C503 Wet-Barrel Fire Hydrants.
- m. C504 Rubber-Seated Butterfly Valves.
- n. C507 Ball Valves, 6 inches - 48 inches.
- o. C508 Swing-Check Valves for Waterworks Service, 2 inches - 24 inches NPS.
- p. C509 Resilient-Seated Gate Valves for Water Supply Service.
- q. C510 Double Check Valve Backflow Prevention Assembly.
- r. C511 Reduced-Pressure Principle Backflow Prevention Assembly.
- s. C512 Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
- t. C550 Protective Epoxy Interior Coating for valves and Hydrants.
- u. C600 Installation of Ductile-Iron Water Mains and their Appurtenances.
- v. C602 Cement- Mortar Lining of water Pipelines in place- 4 inches and larger.
- w. C605 Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
- x. C651 Disinfecting Water Mains
- y. C652 Disinfection of Water-Storage Facilities
- z. C800 Underground Service Line Valves and Fittings for 1/2 inches - 2 inches.
- aa. C900 Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 inches - 12 inches, for Water Distribution.
- bb. C901 Polyethylene (PE) Pressure Pipe and Tubing, 1/2 inches through 3 inches, for Water Service.
- cc. C905 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 inches - 48 inches.

- dd. C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 inches - 63 inches, for Water Distribution and Transmission.
 - ee. C907 Polyvinyl Chloride (PVC) Pressure Fittings for Water, 4 inches - 8 inches.
 - ff. C908 PVC Self-Tapping Saddle Tees for Use on PVC Pipe.
 - gg. D103 Factory-Coated Bolted steel Tanks for water Storage.
2. National Fire Protection Association (NFPA):
- a. NFPA 13 Standard for the Installation of Sprinkler Systems.
 - b. NFPA 14 Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems.
 - c. NFPA 20 Standard for the Installation of Stationary Pumps for Fire Protection.
 - d. NFPA 22 Standard for Water Tanks for Private Fire Protection.
 - e. NFPA 24 Private Service Mains and their Appurtenances.
 - f. NFPA 25 Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.
3. Uni-Bell Plastic Pipe Association (UNI).
- a. PUB 3 PVC Pipe – Technology Serving the Water Industry.
 - b. PUB 7 External Corrosion of Underground Water Distribution Piping Systems.
 - c. PUB 8 Tapping Guide for AWWA C900 Pressure Pipe.
 - d. PUB 9 Installation Guide for PVC Pressure Pipe.
 - e. B-8 Recommended Practice for the Direct Tapping of Polyvinyl Chloride (PVC) Pressure Water Pipe (Nominal Diameters 6-12 inch).
4. American Society of Testing and Materials (ASTM).
- a. ASTM A536 Standard Specification for Ductile Iron Castings.
 - b. ASTM A674 Standard Practice for Polyethylene Encasement for Ductile Iron Pipe for Water or Other Liquids.
 - c. ASTM D1785 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
 - d. ASTM D2241 Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe.

- e. ASTM D2466 Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
 - f. ASTM D2564 Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
 - g. ASTM D2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
 - h. ASTM D3139 Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
 - i. ASTM D3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
 - j. ASTM D3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
 - k. ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
 - l. ASTM F1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.
 - m. ASTM F1056 Standard Specification for Socket Fusion Tools for Use in Socket Fusion Joining Polyethylene Pipe or Tubing and Fittings.
 - n. ASTM A53/A53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - o. ASTM A795 Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
 - p. ASTM A865 Standard Specification for Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints.
 - q. ASTM B88 Standard Specification for Seamless Copper Water Tube.
5. American Society of Mechanical Engineers (ASME).
- a. ASME B16 series for valves, fittings, flanges, and gaskets applicable for use in water systems.
 - b. ASME B1.20.1 American Standard Tapered Pipe Threads for factory-threaded pipe and pipe fittings.
6. National Sanitation Foundation (NSF).

- a. NSF/ANSI 14 Plastics Piping System Components and Related Materials.
 - b. NSF/ANSI 61 Standard for Drinking Water Systems Components – Health Effects.
7. Underwriters Laboratories, Inc. (UL).
- a. UL 157 Standard for Safety for Gaskets and Seals.
 - b. UL 194 Standard for Safety for Gasketed Joints for Ductile-Iron Pipe and Fittings for Fire Protection Service.
 - c. UL 213 Rubber Gasketed Fittings for Fire-Protection Service.
 - d. UL 246 Standard for Safety for Hydrants for Fire-Protection Service.
 - e. UL 262 Standard for Safety for Gate Valves for Fire-Protection Service.
 - f. UL 312 Standard for Safety for Check Valves for Fire-Protection Service.
 - g. UL 405 Standard for Safety for Fire Department Connections.
 - h. UL 448 Standard for Safety for Pumps for Fire-Protection Service.
 - i. UL 789 Standard for Safety for Indicator Posts for Fire-Protection Service.
 - j. UL 860 Pipe Unions for Flammable and Combustible Fluids and Fire-Protection Service.
 - k. UL 1091 Standard for Safety for Butterfly Valves for Fire-Protection Service.
 - l. UL 1285 Pipe and Couplings, Polyvinyl Chloride (PVC), for Underground Fire Service.
 - m. UL 1468 Direct Acting Pressure Reducing and Pressure Restricting Valves.
 - n. UL 1478 Standard for Safety for Fire Pump Relief Valves.
8. FM Global (FM).
- a. FM 1020 Automatic Water Control Valves.
 - b. FM 1045 Waterflow Detector Check Valves.
 - c. FM 1110 Indicator Posts.
 - d. FM 1111 Post-Indicator-Valve-Assembly.
 - e. FM 1112 Indicating Butterfly Valves.

- f. FM 1120 and FM 1130 Fire Service Water Control Valves (OS&Y and NRS Type Gate Valves).
 - g. FM 1210 Swing Check Valves.
 - h. FM 1221 Backflow Preventers (Reduced Pressure Principle and Double Check Valve Types).
 - i. FM 1311 Centrifugal Fire Pumps (Horizontal, Split-Case Type).
 - j. FM 1312 Centrifugal Fire Pumps (Vertical-Shaft, Turbine Type).
 - k. FM 1319 Centrifugal Fire Pumps (Horizontal, End Suction Type).
 - l. FM 1361 Water Pressure Relief Valve.
 - m. FM 1362 Pressure Reducing Valves.
 - n. FM 1371 Centrifugal Fire Pumps (In-Line Type).
 - o. FM 1510 Fire Hydrants (Dry Barrel Type) for Private Fire Service.
 - p. FM 1511 Fire Hydrants (Wet Barrel Type) for Private Fire Service.
 - q. FM 1530 Fire Department Connections.
 - r. FM 1610 Plastic Pipe & Fittings for Underground Fire Protection Service.
 - s. FM 1620 Pipe Joints & Anchor Fittings for Underground Fire Service Mains.
9. Plastics Pipe Institute (PPI).
- a. Underground Installation of Polyethylene Pipe.
 - b. Polyethylene Joining Procedures.
 - c. Inspections, Test and Safety Considerations.
10. American Association of State Highway and Transportation Officials (AASHTO) for H₂O Loading.
11. American Concrete Institute (ACI).
- a. ACI 348 - Meter Pit Construction.
12. City of Livermore Standard Specifications and Details.
13. Livermore – Pleasanton Fire Department.
14. Other authorities having jurisdiction.
- B. System Description: Grades and elevations are to be established with benchmarks referenced on Plans.

- C. Comply with City of Livermore Standards and authorities having jurisdiction for the installation and testing of potable water piping and fire protection systems.
- D. Comply with City of Livermore Standards and authorities having jurisdiction for the installation, testing and separation requirements of recycled/reclaimed water piping and fire protection systems.
- E. All testing of systems specified in this section shall be witnessed by representatives of the local water department or local authority. Provide at least 7 days notice.

PART 2 - PRODUCTS

2.01 PIPING

- A. Water Distribution Main (pipe size 4 inches and larger).
 - 1. Ductile Iron Pipe (DIP): Pressure Class 350 pipe conforming to AWWA/ANSI C151/A21.5, cement-mortar lining conforming to AWWA/ANSI C104/A21.4, with standard thickness per AWWA/ANSI C150/A21.50. U.S. Pipe, American Cast Iron Pipe Company (ACIPCO), or approved equivalent.
 - a. Flanged ends shall conform to AWWA/ANSI C115/A21.15.
 - b. Rubber-gasket joints shall conform to AWWA/ANSI C111/A21.11.
 - 2. Polyvinyl Chloride Pipe (PVC): Pressure Class 235, DR 18, spigot and gasket bell end, conforming to AWWA C900 or AWWA C905, with equivalent cast-iron pipe outer diameter (O.D.). J-M Manufacturing, PW Pipe, North American Pipe Company, or approved equivalent.
 - 3. Polyethylene Pipe (PE): PE 4710, ASTM F714, Pressure Class 200, DR 9, conforming to AWWA C906, or approved equivalent.
- B. Water Service Line (pipe size 3 inches and smaller)
 - 1. Copper (Cu): Provide Type K soft or hard copper pipe conforming to ASTM B88.
 - 2. High Density Polyethylene Pipe (HDPE): PE4710, Pressure Class 200, DR 9 conforming to AWWA C901. J-M Manufacturing PIPE or approved equivalent.
- C. Recycled/Reclaimed Water piping shall be purple.

2.02 FITTINGS, GASKETS, COUPLINGS, SLEEVES, AND ASSEMBLY BOLTS AND NUTS

- A. For DIP: Provide fittings with pressure rating greater than or equal to that of the pipe. Provide flanged joints, mechanical joints, push-on joints, and insulating joints where indicated. Fittings with push-on joint ends shall conform to the same requirements as fittings with mechanical-joint ends. Provide mechanically coupled type joints using a sleeve-type mechanical coupling where indicated.

Provide ends of pipe and fittings suitable for the specified joints. Fittings shall have cement-mortar lining conforming to AWWA/ANSI C104/A21.4.

1. Flanged Joints: Provide bolts, nuts, and gaskets in conformance with AWWA/ANSI C115/A21.15. Flanged fittings shall conform to AWWA/ANSI C110/A21.10 or C153/A21.53.
 - a. Provide flange for set screwed flanges of ductile iron, ASTM A536, Grade 65-45-12, and conform to the applicable requirements of ASME B16.1, Class 250.
 - b. Provide setscrews for set screwed flanges of 190,000 psi tensile strength, heat treated and zinc-coated steel.
 - c. Gaskets for set screwed flanges shall conform to the applicable requirements for mechanical-joint gaskets specified in AWWA/ANSI C111/A21.11.
 - d. Design of set screwed gaskets shall provide for confinement and compression of gasket when joint to adjoining flange is made.
 - e. Unless otherwise required, above ground flange assembly bolts shall be standard hex-head, cadmium plated machine bolts with American Standard Heavy, hot-pressed, cadmium plated hexagonal nuts. Buried flange nuts and bolts shall be as above except they shall be of Type 304 stainless steel.
 2. Mechanical Joints: Dimensional and material requirements for pipe ends, glands, bolts and nuts, and gaskets shall conform to AWWA/ANSI C111/A21.11.
 3. Push-on Joints: Provide shape of pipe ends and fitting ends, gaskets, and lubricant for joint assembly conforming to AWWA/ANSI C111/A21.11. Modify bell design fittings, as approved.
 4. Insulating Joints: Provide a rubber-gasketed or other suitable approved type of insulating joint or dielectric coupling which will effectively prevent metal-to-metal contact at the joint between adjacent sections of dissimilar metals.
 - a. Provide joint of the flanged type with insulating gasket, insulating bolt sleeves, and insulating washers.
 - b. Provide gasket of the dielectric type, full face, as recommended in AWWA/ANSI C115/A21.15.
 - c. Provide bolts and nuts as recommended in AWWA/ANSI C115/A21.15.
 - d. Fittings shall be epoxy lined and coated with a thickness not less than 6-mils.
- B. For PVC: Fittings shall be DIP or PVC.

1. DIP fittings: Provide gray-iron or ductile-iron conforming to AWWA/ANSI C110/A21.10, with cement-mortar lining conforming to AWWA/ANSI C104/A21.4, and standard thickness, with equivalent cast-iron pipe O.D.
 - a. Fittings with push-on joint ends shall conform to the same requirements as fittings with mechanical-joint ends, except the bell design shall be modified, as approved, for push-on joint suitable for use with PVC plastic pipe.
 - b. Provide push-on joints, compression joints and mechanical joints where indicated between pipe and fittings, valves, and other accessories.
 - c. Mechanical joints, glands, bolts and nuts, and gaskets shall conform to AWWA/ANSI C111/A21.11.
 - d. Fittings shall be epoxy lined and coated with a thickness not less than 6-mils.
2. PVC fittings: Provide fabricated PVC fittings for pressure pipe conforming to AWWA C900, C905, or C907.
 - a. PVC fittings shall conform to ASTM D2466.
 - b. Push-on joints shall conform to ASTM D3139.
 - c. Compression joints shall conform to ASTM D3139.
 - d. Provide each joint connection with an elastomeric gasket suitable for the bell or coupling with which it is to be used. Gaskets shall conform to ASTM F477.
- C. For PE: Fittings shall conform to AWWA C901 or AWWA C906. Driscopipe, or approved equivalent.
 1. Socket type fittings shall conform to ASTM D2683.
 2. Butt fusion fittings shall conform to ASTM D3261.
 3. Electrofusion fittings shall comply with ASTM F1055.
- D. For Cu:
 1. Cast copper alloy solder-joint pressure fittings shall conform to ASME B16.18.
 2. Wrought copper solder-joint pressure fittings or wrought copper alloy unions shall conform to ASME B16.22
 3. Cast copper alloy flare fittings shall conform to ASME B16.26.
 4. Wrought copper alloy body, hexagonal stock, metal-to-metal seating surfaces, and solder-joint threaded ends shall conform to ASME B1.20.1.
 5. Compression connections shall be Mueller 110, Ford or approved equivalent.

- E. For HDPE:
 - 1. Cast Copper Fittings shall conform to ASME B16.18.
 - 2. Cast Copper Compression Fittings and connections shall be Mueller 110 Ford or approved equivalent.
 - 3. HDPE Fittings shall conform to PE4710, Pressure Class 200, DR 9 conforming to AWWA C901. Wolseley Industrial Group or approved equivalent.

2.03 GATE VALVES AND BALL VALVES

- A. Gate Valves: Valves shall open by counterclockwise rotation of the valve stem. Provide valves with ends as appropriate for the adjoining pipe.
 - 1. Stuffing boxes shall have O-ring stem seals. Provide stuffing boxes bolted and constructed so as to permit easy removal of parts for repair.
 - 2. Valves (2-1/2 inches and larger):
 - a. Provide valves conforming to AWWA C500 or AWWA C509 and of one manufacturer. Valves shall have a non-rising stem, a 2-inch square nut, and double-disc gates. Valves shall be rated for 250 psi maximum working pressure. Mueller 2360 series, ACIPCO, or approved equivalent.
 - b. For the domestic water system, valves shall also conform to ANSI/NSF 61.
 - c. For the fire water system, valves 2 inches through 16 inches in size shall also conform to UL 262 and FM 1120 or FM 1130 to a working pressure of 200 psi.
 - 3. Where a post indicator is shown, provide valve with an indicator post flange.
- B. Ball Valves: Valves shall open by counterclockwise rotation of the valve stem. Provide valves with ends as appropriate for the adjoining pipe.
 - 1. Valves (2-inches and smaller):
 - a. Provide valves conforming to AWWA C800 and of one manufacturer. Mueller 300 Series, Ford, or approved equivalent.
 - 2. Provide valve with operating nut or handle as shown on the Construction Documents.

2.04 BLOW-OFF VALVES, AIR RELEASE AND VACUUM VALVES, AND COMBINATION AIR VALVES

- A. Blow-off valves: Provide valve and service size as shown in the Contract Documents. Provide 2-inch valves at low points of the piping system, and 4-inch valves at dead-ends of the piping system, unless otherwise directed by the Engineer.

1. 2-inch blow-off shall have a 2-inch vertical female iron pipe (FIP) inlet and a 2-inch normal pressure and temperature (NPT) nozzle outlet with cap. Valve shall open by counterclockwise rotation of a top-mounted 9/16-inch square operating nut. All working parts shall be serviceable without excavation. Kupferle/Truflo Model TF550, or approved equivalent.
 2. 4-inch blow-off shall have a 4-inch vertical FIP inlet and a 4-inch male iron pipe (MIP) outlet with cap. Valve shall open by counterclockwise rotation of a top-mounted 9/16-inch square operating nut. All working parts shall be serviceable without excavation. Kupferle/Truflo Model TF800, or approved equivalent.
- B. Air release and vacuum valves: Provide valve and service size as shown on the Contract Documents, and where there is an increase in the downward slope or a decrease in the upward slope of the piping system. Valve shall have cast-iron single valve body, and shall conform to AWWA C512. A compound lever system shall have a maximum operating pressure of 300psi. Provide a protective cap for the outlet of the valve. Provide universal air-vacuum type valves, Crispin Model UL, Apco, or approved equivalent.
- C. Combination air valves: Provide valve and service size as shown on the Contract Documents, and at high points and sharp changes in gradient of the pipe system. Valve shall have cast-iron single valve or double valve body, and shall conform to AWWA C512. A simple or compound lever system shall have a maximum operating pressure of 300psi. Provide a protective cap for the outlet of the valve. Crispin Model C, Apco, or approved equivalent.

2.05 CHECK VALVES

- A. Valves: Valves shall have clear port opening and a cast-iron body. Provide spring-loaded or weight-loaded valves where indicated on the Construction Documents.
1. For the domestic water system, provide swing-check type valves conforming to AWWA C508. Provide valves of one manufacturer. Mueller, Apco, or approved equivalent.
 2. For the fire water system, provide swing-check type valves conforming to FM 1210 and UL 312. Mueller, Watts, or approved equivalent.

2.06 PRESSURE REDUCING VALVES

- A. Pressure Reducing Valves: Valves shall have a cast-iron body, conforming to ASTM A536, with epoxy interior coating conforming to AWWA, and rated to Pressure Class 300. Cla-Val Model 90-01, Singer, or approved equivalent.
1. Valves shall have flanged ends.
 2. Valves sized 3-inches or smaller may have screwed ends.

2.07 POST INDICATORS

- A. Posts Indicators shall withstand up to 900 ft-lbs of operating torque, be free-standing, and tamper-proof.
- B. Post Indicators shall conform to UL 789 and FM 1110. Mueller, ACIPCO, or approved equivalent.
- C. Post indicators on recycled/reclaimed systems shall be painted purple.

2.08 VALVE BOXES, METER BOXES, FRAMES AND COVERS

- A. Water Valve Box: Provide pre-cast concrete valve box for each buried valve. Provide box with steel or cast iron traffic cover marked "WATER." Christy Model G5 with G5C cover or approved equivalent.
- B. Valve or Meter Boxes: Contractor shall verify box size required for water system appurtenances as shown in the Contract Documents. Provide a precast concrete utility box for each buried appurtenance. Provide a traffic-rated lid for H20 loading. A non-traffic rated lid may be used for boxes located in landscape areas. Christy, or approved equivalent.
- C. Valve boxes, meter boxes, frames and covers on recycled/reclaimed systems shall be purple.

2.09 BACKFLOW PREVENTERS

- A. Provide backflow preventers as shown on the Contract Documents. Subject to local water department approval. Backflow preventers on the fire water system shall be subject to approval by the local office of the Fire Marshal.
- B. Reduced Pressure Principle Assemblies (RPPA): Provide a cast-iron body RPPA consisting of two independently operating check valves with a pressure differential relief valve located between the two check valves, two shut-off valves and four test cocks. RPPA shall be tamper-proof and conform to AWWA C511. Febco 860, Watts, or approved equivalent.
- C. Double Check Detector Assemblies (DCDA): Provide a cast-iron body DCDA consisting of mainline double check assemblies in parallel with a bypass double check and meter assembly, two shut-off valves and four test cocks. DCDA shall be tamper-proof and conform to AWWA C510. Febco 806, Watts, or approved equivalent.
- D. Backflow preventers on recycled/reclaimed systems shall be painted purple.

2.10 FIRE DEPARTMENT CONNECTIONS AND WET STAND PIPES

- A. Fire Department Connections (FDC): Provide FDC's with 2-1/2 inch female hose connections, sidewalk or free-standing type. Number of inlets shall be as shown on the Contract Documents. Clapper and spring check inlets shall each have a minimum capacity of 250 gpm, and be furnished with Knox FDC plug. Outlet shall be sized for simultaneous use of all inlets. Connection shall be branded "AUTO SPKR".
 - 1. 2-Way FDC: Connection shall conform to UL 405 or FM 1530. Elkhart, Croker, or approved equivalent.

2. 3-Way FDC: Connection shall be subject to approval by the local water department or fire marshal. Elkhart, Croker, Potter-Roemer or approved equivalent.
 3. 4-Way FDC: Connection shall conform to UL 405. Potter-Roemer, Croker, or approved equivalent.
 4. 6-Way FDC: Connection shall be subject to approval by the local water department or fire marshal. Croker, Potter-Roemer or approved equivalent.
- B. Wet Stand Pipes (WSP): Provide 2-Way WSP's with valves and two (2) 2-1/2 inch male hose connections free-standing type, with a 4" inlet. Each outlet shall each have a minimum capacity of 250 gpm, and be furnished with a Knox cap. Water to the WSP shall be controlled with a remote valve. Connection shall be branded "HYDRANT." Subject to approval by the local water department or fire marshal. Croker, Elkhart, Potter-Roemer or approved equivalent.
- C. Fire department connections and wet stand pipes on recycled/reclaimed systems shall be painted purple.

2.11 FDC AND WET STAND PIPE CAPS AND PLUGS

- A. Provide Knox caps or plugs for all new FDC and wet-stand pipes included in the project. Coordinate the number of Knox keys as well as the key signage location with the local Fire Marshal.

2.12 FIRE HYDRANTS

- A. Provide two 2-1/2 inch and one 4-1/2 inch outlets with a 6-inch nominal inside diameter inlet and break-away type bolts. Hydrant shall have a working pressure of 250 psi and shall conform to AWWA C502 or C503, and be UL listed and FM approved. Provide hydrants of one manufacturer. Clow 800 series, Mueller, ACIPCO, or approved equivalent, subject to approval by the local water department and Fire Marshal. Hydrants on recycled/reclaimed systems shall be painted purple.

2.13 THRUST BLOCKS AND PIPE RESTRAINTS

- A. Blocks: Provide thrust blocks in accordance with NFPA 24 Standards. Use concrete conforming to ASTM C94 having a minimum compressive strength of 2,500 psi at 28 days; or use concrete of a mix not leaner than one part cement, 2-1/2 parts sand, and 5 parts gravel, having the same minimum compressive strength.
- B. Pipe Restraints: Provide thrust restraint systems for fittings and joints as required or as indicated on the Plans.
1. For mechanical joint fittings and joints: Pipe restraints shall be "Mega-Lug" pipe restraint system by EBBA Iron, Inc., or approved equivalent.
 2. For push-on joint fittings and joints: Pipe restraints shall be "Field-Lok" gaskets by U.S. Pipe, or approved equivalent.

- C. Thrust blocks, gravity blocks, or mechanical pipe restraints may be used at Contractor's option, unless otherwise indicated on the Plans.
- D. Provide thrust blocks or mechanical pipe restraints at all fittings and changes in angle, alignment or elevation.
- E. Where depth or location of water piping, existing utilities, or other structures prohibit the use of standard thrust blocks, gravity blocks or mechanical pipe restraints may be used. Conform to NFPA 24 Standards.

2.14 TAPPING SLEEVES AND TAPPING VALVES

- A. Sleeves shall be epoxy coated and furnished with stainless steel washers, nuts and bolts. Mueller H-615 and H-619, Ford, or approved equivalent.
- B. Tapping valves shall have flanged inlet, Class 125, conforming to ASME B16.1 and furnished with stainless steel washers, nuts and bolts. Tapping valves shall be constructed with a mechanical joint outlet. Mueller T-687, T-642, T-681, or approved equivalent.

2.15 CORPORATION STOPS

- A. Provide ground key type; bronze conforming to ASTM B61 or ASTM B62, for a working pressure of 100 psi. and suitable for the working pressure of the system.
 - 1. Ends shall be suitable for adjoining pipe and connections, solder-joint, or flared tube compression type joint.
 - 2. Threaded ends shall conform to AWWA C800.
 - 3. Coupling nut for connection to flared copper tubing shall conform to ASME B16.26.
 - 4. Mueller H-15000 Series with "CC" threads and a copper flare straight connection outlet, Ford, or approved equivalent.

2.16 IDENTIFICATION MATERIALS AND DEVICES

- A. Marker Tape: Provide marker tape consisting of metallic foil bonded to plastic film not less than 2-inches wide. Film shall be inert polyethylene plastic. Film and foil shall each not be less than 1-mil. thick. The tape shall be identified with lettering, not less than 3/4-inch high, "CAUTION: WATER MAIN BELOW," repeated at approximately 24-inch intervals.
- B. Tracer Wire for Nonmetallic Piping: Provide 12 gage, coated copper or aluminum wire not less than 0.10 inch in diameter in sufficient length to be continuous over each separate run of nonmetallic pipe. Wire shall be tied in at all valves.
- C. Recycled Water identification signage is required according to City of Livermore standards.

2.17 SETTLEMENT JOINTS

- A. Flexible joints shall be used if a differential settlement of greater than 2-inches is anticipated. Flexible joints shall be ductile iron rated, rated for 350 psi working pressure and FM approved. Megalug Flextend or approved equivalent.
- B. Provide pipe restraint on either side of flexible joint to resist thrust forces.

2.18 CORROSION PROTECTION

- A. In soils with low resistivity, high sulfides, high/low ph, redox potential and/or poor surrounding drainage conditions, or as indicated in the Contract Documents, encase underground pipe and appurtenances in 4-mil, high-density cross-laminated (HDCL) polyethylene film or 8-mil linear low-density (LLD) polyethylene film in accordance with AWWA/ANSI C105/A21.5. U.S. Pipe, ACIPCO, or approved equivalent.

2.19 CATHODIC PROTECTION

- A. See Section 26 42 00 for cathodic protection requirements.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Examine surfaces and areas for suitable conditions where water service is being installed.
- B. Do not begin installation until unsatisfactory conditions have been corrected.

3.02 LOCATION OF WATER LINES

- A. Where the location of the water line is not clearly defined by dimensions on the Plans, do not lay water line closer than 10 feet horizontally from any sewer line.
- B. Where water lines cross under gravity sewer lines, encase sewer line in concrete for a distance of at least 10 feet on each side of the crossing, unless sewer line is made of pressure pipe with rubber-gasketed joints and no joint is located within 3 feet horizontally of the crossing.
- C. Where water lines cross sewer force mains and inverted siphons, install water line at least 2 feet above these sewer lines.
- D. When joints in the sewer line are closer than 3 feet horizontally from the water line, encase sewer line joints in concrete.
- E. Do not lay water lines in the same trench with other utilities.
- F. Install water lines at 3'-0" minimum depth or as detailed on Plans.

3.03 INSTALLATION OF PIPING

- A. Inspection:

1. Before placing in position, inspect pipe for noticeable defects. Clean the pipe, fittings, valves, and accessories, and maintain in a clean condition.
 2. Remove fins and burrs from pipe and fittings.
- B. Pipe laying and jointing:
1. Provide proper facilities for lowering sections of pipe into trenches.
 2. Do not drop or dump pipe, fittings, valves, or any other water line material into trenches.
 3. Cut pipe accurately to length established at the site and work into place without springing or forcing. Replace any pipe or fitting that does not allow sufficient space for proper installation of jointing material.
 4. Blocking or wedging between bells and spigots will not be permitted. Lay bell-and-spigot pipe with the bell end pointing in the direction of lying.
 5. Grade the pipeline in straight lines; avoid the formation of dips and low points.
 6. Support pipe at proper elevation and grade.
 7. Provide secure firm, uniform support. Wood support blocking will not be permitted.
 8. Lay pipe so that the full length of each section of pipe and each fitting rests solidly on the pipe bedding; excavate recesses to accommodate bells, joints, and couplings.
 9. Provide anchors and supports where indicated and where necessary for fastening work into place.
 10. Make proper provision for expansion and contraction of pipelines.
 11. Keep trenches free of water until joints have been properly made.
 12. Do not lay pipe when conditions of trench or weather prevent proper installation.
 13. All fittings shall be blocked with appropriately sized thrust blocks as shown in the Contract Documents.
- C. Installation of Tracer Wire:
1. Install a continuous length of tracer wire for the full length of each run of nonmetallic pipe.
 2. Attach wire to top of pipe in such manner that it will not be displaced during construction operations.
- D. Connections to Existing Lines:
1. Make connections to existing water lines after approval is obtained and with a minimum interruption of service on the existing line.

2. Make connections to existing lines under pressure in accordance with the recommended procedures of a manufacturer of pipe of which the line being tapped is made.
- E. The end of each work day, close open ends of pipe temporarily with wood blocks or bulkheads to keep out debris and contamination.

3.04 INSTALLATION OF DUCTILE-IRON PIPING

- A. Install pipe and fittings in accordance with requirements of AWWA C600 for pipe installation, joint assembly, valve-and-fitting installation, and thrust restraint.
- B. Jointing:
1. Provide push-on joints with the gaskets and lubricant specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly.
 2. Provide mechanical joints with the gaskets, glands, bolts, and nuts specified for this type joint; assemble in accordance with the applicable requirements of AWWA C600 for joint assembly and with the recommendations of AWWA C111.
 3. Provide flanged joints with the gaskets, bolts, and nuts specified for this type joint.
 - a. Install flanged joints up tight; avoid undue strain on flanges, fittings, valves, and other equipment and accessories.
 - b. Align bolt holes for each flanged joint.
 - c. Use full size bolts for the bolt holes; use of undersized bolts to make up for misalignment of bolt holes or for any other purpose will not be permitted.
 - d. Do not allow adjoining flange faces to be out of parallel to such degree that the flanged joint cannot be made watertight without over straining the flange.
 - e. Where flanged pipe and fitting have dimensions that do not allow the installation of a proper flanged joint as specified, replace it by one of proper dimensions.
 - f. Use set screwed flanges to make flanged joints where conditions prevent the use of full-length flanged pipe. Assemble in accordance with the recommendations of the set screwed flange manufacturer.
 4. Provide insulating joints with the gaskets, sleeves, washers, bolts, and nuts previously specified for this type joint. Assemble insulating joints as specified for flanged joints. Bolts for insulating sleeves shall be full size for the bolt holes.
 5. Ensure that there is no metal-to-metal contact between dissimilar metals after the joint has been assembled.

- C. Exterior Protection: Completely encase buried ductile iron pipelines and underground appurtenances with polyethylene wrap. Install 8-mil linear low-density polyethylene (LLD) film or 4-mil high-density cross-laminated (HDCL) film per manufacturer's recommendations and in accordance with AWWA/ANSI C105/A21.5 and ASTM A674.
- D. Pipe Anchorage:
 - 1. Provide concrete thrust blocks or restrained joints for pipe anchorage, except where metal harness is indicated on the Construction Documents.
 - 2. Pipe anchorage shall be in accordance with NFPA 24 Standards.

3.05 INSTALLATION OF POLYVINYL CHLORIDE PIPING

- A. Install pipe and fittings in accordance with the requirements of UNI B-3 for the following:
 - 1. The laying of pipe, joining PVC pipe to fittings and accessories.
 - 2. The setting of hydrants, valves, and fittings.
- B. Comply with the recommendations for pipe joint assembly and appurtenance installation in AWWA Manual M23, Chapter 7, "Installation."
- C. Comply with the applicable requirements of AWWA C600 for joint assembly, and with the recommendations of Appendix A to AWWA C111.
- D. Jointing:
 - 1. Provide push-on joints with the elastomeric gaskets specified for this type joint, using either elastomeric-gasket bell-end pipe or elastomeric-gasket couplings.
 - 2. For pipe-to-pipe push-on joint connections, use only pipe with push-on joint ends having factory-made bevel.
 - 3. For push-on joint connections to metal fittings, valves, and other accessories, cut spigot end of pipe off square and re-bevel pipe end to a bevel approximately the same as that on ductile-iron pipe used for the same type of joint.
 - 4. Use an approved lubricant recommended by the pipe manufacturer for push-on joints.
 - 5. Assemble push-on joints for connection to fittings, valves, and other accessories in accordance with the requirements of UNI B-3 for joining PVC pipe to fittings and accessories and with the applicable requirements of AWWA C600 for joint assembly.
 - 6. Make compression-type joints/mechanical-joints with the gaskets, glands, bolts, nuts, and internal stiffeners previously specified for this type joint. Cut off spigot end of pipe for compression-type joint or mechanical-joint connections and do not re-bevel.

7. Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer using internal stiffeners as previously specified for compression-type joints.
- E. Pipe Anchorage:
1. Provide concrete thrust blocks or restrained joints for pipe anchorage, except where metal harness is indicated on the Construction Documents.
 2. Anchorage shall be in accordance with the requirements of UNI B-3 and in accordance with NFPA 24 Standards for reaction or thrust blocking and plugging of dead ends, except that size and positioning of thrust blocks shall be as indicated on the Construction Documents.

3.06 INSTALLATION OF POLYETHYLENE PIPING

- A. Install pipe, fittings, and appurtenances in accordance with PPI and Manufacturer's Recommendations.
- B. Jointing:
1. Provide mechanical joints, compression fittings, or flanges as recommended by the manufacturer.
 2. Jointing shall be performed using proper equipment and machinery by trained and certified personnel.
 3. Joints, fittings and tools shall be clean and free of burrs, oil, and dirt.
 4. Butt fusion:
 - a. Pipe ends shall be faced to establish clean, parallel mating surfaces.
 - b. Align and securely fasten the components to be joined squarely between the jaws of the joining machine.
 - c. Heat the ends of the pipe to the pipe manufacturer's recommended temperature interface pressure and time duration. A pyrometer or other surface temperature measuring device should be used to insure proper temperature of the heating tool. Temperature indicating crayons shall not be used on a surface which will come into contact with the pipe or fitting.
 - d. Prevent molten plastic from sticking to the heater faces. Molten plastic on the heater faces shall be removed immediately according to the tool manufacturer's instructions.
 - e. Bring the molten ends together with sufficient pressure to properly mix the pipe materials and form a homogeneous joint. Hold the molten joint under pressure until cooled adequately to develop strength. Refer to the Manufacturer's recommendations for temperature, pressure, holding, and cooling times.

- f. Remove the inside bead from the fusion process using Manufacturer's recommended procedure.
5. Socket fusion:
- a. Mixing manufacturers' heating tools and depth gages will not be allowed unless the tools conform to ASTM F1056.
 - b. Pipe ends shall be faced square to establish clean, parallel mating surfaces.
 - c. Clamp the cold ring on the pipe at the proper position using a depth gauge.
 - d. Heat the tool to the pipe manufacturer's recommended temperature. A pyrometer or other surface temperature measuring device should be used to insure proper temperature. Temperature indicating crayons shall not be used on a surface which will come into contact with the pipe or fitting.
 - e. Follow manufacturer's recommendations for bringing the hot tool faces into contact with the outside surface of the end of the pipe and the inside surface of the socket fitting.
 - f. Simultaneously remove the pipe and fitting from the tool.
 - g. Inspect the melt pattern for uniformity and immediately insert the pipe squarely and fully into the socket of the fitting until the fitting contacts the cold ring. Do not twist the pipe or fitting during or after the insertion.
 - h. Hold or block the pipe in place during cooling.
6. Electrofusion:
- a. Pipe ends shall be faced square to establish clean, parallel mating surfaces.
 - b. Clamp the pipe and fitting at the proper position in the fixture.
 - c. Connect the electrofusion control box to the fitting and to the power source. Apply the electric current using manufacturer's instructions.
 - d. Allow the joint to cool before removing the clamping fixtures.

3.07 INSTALLATION OF VALVES

- A. Install gate valves conforming to AWWA C500 and UL 262 in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the recommendations of the Appendix (Installation, operation, and Maintenance of Gate Valves) to AWWA C509.
- B. Install gate valves conforming to AWWA C509 in accordance with the requirements of AWWA C600 for valve-and-fitting installation and with the

recommendations of the Appendix (Installation, Operation, and Maintenance of Gate Valves) to AWWA C509.

- C. Install gate valves on PVC water mains in addition in accordance with the recommendations for appurtenance installation in AWWA Manual M23, Chapter 7, "Installation."
- D. Install check valves in accordance with the applicable requirements of AWWA C600 for valve-and-fitting installation, except as otherwise indicated.
- E. Provide and assemble joints to gate valves and check valves as specified for making and assembling the same type joints between pipe and fittings.

3.08 INSTALLATION OF VALVE AND METER BOXES

- A. Boxes shall be centered over the appurtenance so as not to transmit shock or stress. Covers shall be set flush with the surface of the finished pavement, or as shown in the Construction Documents. Backfill shall be placed around the boxes and compacted to the specified level in a manner that will not damage or displace the box from proper alignment or grade. Misaligned boxes shall be excavated, plumbed, and backfilled at no additional cost to the [District/Owner].

3.09 INSTALLATION OF HYDRANTS

- A. Install hydrants, except for metal harness, plumbed vertical, in accordance with AWWA C600 for hydrant installation and as indicated.
- B. Provide and assemble joints as specified for making and assembling the same type joints between pipe and fittings. Hydrants shall be set so that mounting bolts clear the top of finished grade by three inches so bolts may be easily replaced if needed.
- C. Provide metal harness as specified under pipe anchorage requirements for the respective pipeline material to which hydrant is attached.

3.10 SERVICE LINE CONNECTIONS TO WATER MAINS

- A. Connect service lines of size shown on plans to the main with a rigid connection or a corporation stop and gooseneck. Install a gate valve on the service line.
- B. Connect service lines to ductile-iron water mains in accordance with AWWA C600 for service taps.
- C. Connect service lines to PVC plastic water mains in accordance with UNI-B-8 and the recommendations of AWWA Manual M231, Chapter 9, "Service Connections."

3.11 INSTALLATION OF BACKFLOW PREVENTERS

- A. Devices shall be installed horizontal and level, with three feet minimum clearances from obstructions.
- B. Bottom of backflow device shall be 12-24" above grade.

3.12 WATER TANKS

- A. Install water tanks per Manufacturer's recommendations in conformance with AWWA D103.

3.14 HYDROSTATIC PIPELINE TESTING

A. Requirements:

1. After the pipe has been laid and backfilled, perform hydrostatic pressure tests.
2. Do not conduct tests until at least 12 hours have elapsed since pipe lying and at least 5 days have elapsed since placing of concrete thrust blocks.
3. Fill the pipe with water which shall remain without external application of pressure for 24 hours before tests are conducted.
4. Prior to hydrostatic testing, flush pipe system with fresh water until piping is free of dirt and foreign matter.
5. Apply pressure by a pump and measured by a test gage. All necessary apparatus and labor for conducting the pressure and leakage tests shall be furnished by the Contractor.
6. Ensure the release of air from the line during filling, and prevent collapse due to vacuum when dewatering the line.
7. For pressure test, use a hydrostatic pressure not less than 200 psi for fire water or combined water systems and 1 ½ times operating pressure for domestic water systems. The duration of the test shall not be less than 4 hours with the variation in pressure of not more than 5 psi for the duration of the test.

B. Leakage Tests:

1. At Contractor's option, leakage tests can be performed at the same time as hydrostatic pressure tests.
2. Leakage rate shall be measured for at least 4 hours with a certified water meter, or other approved method. If requested, meter certification shall be submitted to the District for approval prior to testing.
3. Leakage shall not be measured by a drop in pressure in a test section over a period of time.
4. Leakage at mechanical couplings and joints, tapping sleeves, flanged joints, and copper piping will not be accepted. Correct any visible leaks.
5. Push-on joints: Test ductile iron pipe for leakage in accordance with AWWA C600 as shown in the following table:

TABLE 1

Allowable Leakage per 1000 feet of DIP Pipeline (Gal/Hr)

Average Test Pressure (psi)	Nominal Pipe Diameter - Inches									
	3	4	6	8	10	12	14	16	18	20
300	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60
275	0.37	0.50	0.75	1.00	1.24	1.49	1.74	1.99	2.24	2.49
250	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.37
225	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12

6. When the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.
7. Test polyvinyl chloride pipe for leakage in accordance with the recommendations of the Uni-Bell Plastic Pipe Association (UNI) as shown in the following table:

TABLE 2

Allowable Leakage per 1000 feet or 50 joints of PVC Pipeline (Gal/Hr)

Nominal Pipe Size (inches)	Average Test Pressure in Line (psi.)	
	200	250
4	0.38	0.43
6	0.57	0.64
8	0.76	0.85
10	0.96	1.07
12	1.15	1.28
14	1.34	1.50
16	1.53	1.71
18	1.72	1.92
20	1.91	2.14

8. Should any section of new pipe fail to pass either test, locate and repair the defective pipe and repeat the test.

3.15 STERILIZATION AND FLUSHING

- A. General:

1. Domestic water lines, mains, and branches by chlorination in accordance with AWWA C601 and as herein specified.

B. Sterilization Methods:

1. Liquid Chlorine Solution Method:

- a. Flush all foreign matter from mains, branch runs, hydrant runs, and installed services.
- b. Introduce liquid chlorine solution at appropriate locations to assure uniform distribution through the facilities at the proper concentration.
- c. Do not use installed copper service lines to convey the concentrated chlorine solution to the mains.
- d. The sanitizing solution shall be retained in the facilities for a period of 24 hours after which each service, hydrant run, branch run and dead end shall be flushed until:
 - i. Residual chlorine is less than 1 part per million.
 - ii. Residual chlorine is no greater than the concentration of chlorine in the water supplied for flushing.
- e. Chlorine shall be a 1 percent solution (containing 10,000 parts per million available chlorine) or shall be obtained by use of dry chlorine in tablet form firmly attached to inside tope of the pipe.
- f. The required concentration of chlorine in the pipe is 50 parts per million. This concentration may be attained by adding 5 gallons of the chlorine solution to 1,000 gallons of water.
- g. The weight of chlorine or chlorine compound required to make a 1 percent chlorine solution is as follows:

TABLE 3

One-Percent Chlorine Solution Mix

AMOUNT OF PRODUCT COMPOUND		QUANTITY OF WATER (in gallons)
High-Test Calcium Hypochlorite (65-70% Cl)	1 pound	7.50
Chlorinated Lime (32-35% Cl)	2 pounds	7.50
Liquid Laundry Bleach (5.25% Cl)	1 gallon	4.25
Liquid Chlorine (100% available)	0.62 pounds	7.50

AMOUNT OF PRODUCT COMPOUND		QUANTITY OF WATER (in gallons)
chlorine)		

2. HTH Tablet Method:

- a. The required concentration of chlorine in the mains may be obtained by the use of HTH tablets as produced by Olin Mathieson in the following quantities or approved equivalent:

TABLE 4

HTH Tablet (70%) Dosage

Number of Tablets Per Length of Pipe

Length of Section	DIAMETER OF PIPE				
	4 inches	6 inches	8 inches	10 inches	12 inches
13 feet	1	2	3	4	6
18 feet	1	2	3	5	6
20 feet	1	2	3	5	7
30 feet	2	3	5	7	10
36 feet	2	3	5	8	12
40 feet	2	4	6	9	14
100 feet	4	9	15	23	30

- b. Tablets are to be fastened to the inside top surface of each length of pipe using "Permatex No. 1" no earlier than the day pipe is laid.
- c. Tablets shall not be installed in the pipe and left overnight before laying and shall not be accessible at any time for casual pilferage by the general public or by children. Tablets shall be stored in a hermetically sealed container.
- d. The new water lines are to be slowly filled with water. Air is to be exhausted from each dead end, branch run, hydrant run, and installed service.
- e. Water shall be retained for a period of 24 hours, after which each service, hydrant run, branch run and dead end shall be thoroughly flushed to clear foreign matter and until:
 - i. Residual chlorine concentration is less than 1 part per million
 - ii. Residual chlorine is no greater than the concentration of chlorine in the water supplied for flushing.

C. Bacteriological Testing:

1. Samples shall be gathered and tests conducted at the expense of the Contractor by a laboratory certified by the California Department of Health Services as an Environmental Testing Laboratory (ELAP).
2. Samples are to be taken at representative points as required by the District and authorities having jurisdiction.
3. The new water lines shall remain isolated and out of service until satisfactory test results have been obtained that:
 - a. Meet the requirements of the California Department of Health Services, Drinking Water Standards.
 - b. District has accepted the results as indicative of the bacteriological condition of the facilities.
 - c. If unsatisfactory or doubtful results are obtained from the initial sampling, repeat the chlorination process until acceptable test results are reported.

3.16 HYDRANT FLOW TESTING

- A. After completion of the pipe and hydrant installation and service connections, the new hydrants shall be flow tested and results provided to the District's Representative and Engineer. The Contract shall provide the following information:
 1. Who performed the test.
 2. Testing date.
 3. Hydrant location.
 4. Static pressure (psig).
 5. Residual pressure (psig).
 6. Flow (gpm).
 7. Orifice size (in).

END OF SECTION