Timothy P. Huff, AIA
Principal Architect

TPH architects

John Hedlund, AIA
Jeff Morris, AIA
Mike Clark, AIA CASp
Jonathan Gish, AIA
Associate Architects

Andrew Huff, PE
Structural Engineering

PROJECT MANUAL

FOR

SHILOH ELEMENTARY SCHOOL WATER TREATMENT PLANT

For Shiloh Elementary School District

OWNER:
Shiloh Elementary School District
6633 Paradise Rd.
Modesto, CA 95358
(209) 522-2261

ARCHITECT:
TPH Architects
519 McHenry Avenue
Modesto, CA 95354
(209) 571-2232

Timothy P. Huff & Associates
519 McHenry Ave
Modesto, CA 95354
(209) 571-2232

Timothy P. Huff, AIA
Principal Architect

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP. 02-122118 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 09/05/2024

H.C.S. Engineering
4512 Feather River Drive, Suite F
Stockton, CA 95219
(209) 478-8270

Richard Smith
Electrical Engineer

SHILOH ELEMENTARY SCHOOL WATER TREATMENT PLANT

FOR

SHILOH ELEMENTARY SCHOOL DISTRICT

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DIVISION 1 - GENERAL REQUIREMENTS

END OF SECTION

SHILOH ELEMENTARY SCHOOL DISTRICT
6633 Paradise Rd. Modesto, CA 95358
NOTICE TO BIDDERS

Sealed bids for SHILOH ELEMENTARY SCHOOL WATER TREATMENT PLANT, for SHILOH ELEMENTARY SCHOOL DISTRICT will be received in the District office of SHILOH ELEMENTARY SCHOOL DISTRICT, 6633 Paradise Rd. Modesto, CA 95358 until **June 24, 2025 at 2:00 p.m.**, at which time they will be opened and read.

Plans and Specifications are on file and may be viewed or downloaded from the website of TPH Architects, at http://tpharchitects.com/bidding/

A mandatory pre-bid job walk is scheduled for **June 10, 2025 at 2:00 p.m., at 6633 Paradise Rd. Modesto, CA 95358. We will meet at the flagpole**. The pre-bid job walk must be attended by a Principal of the company proposing to submit a bid or an employee of the company who is a Construction Superintendent or a Project Manager. The bid of any Contractor not in attendance at the pre-bid job walk will not be accepted.

If further information is needed, call Jeff Morris, AIA, at (209) 571-2232.

Bids shall be submitted on forms prepared by the Architect. A 3% Disabled Veteran Business Enterprise (DVBE) participation has been established for this project. All bidders must submit the required DVBE forms supplied in this project manual. Failure to submit DVBE documentation will deem the Bidder non-responsive.

The District has determined the general prevailing rate to be the per diem wages for each craft or type of workman or mechanic needed to execute this contract as set forth in the collective bargaining agreements for Stanislaus, San Joaquin, Merced, Mariposa and Tuolumne Counties, California. Copies of all collective bargaining agreements relating to the work are on file and available for inspection in the office of the California Department of Industrial Relations, Division of Labor Statistics and Research, 455 Golden Gate Avenue, San Francisco, CA, 94102, (415-703-4780), http://www.dir.ca.gov/dlsr/ .

In compliance with SB 854, 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 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)]. In addition, no contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

A valid B contractor's license will be required. In addition, process piping must be done by a C55 licenced personal.

SHILOH ELEMENTARY SCHOOL DISTRICT reserves the right to waive any irregularity or informality in the bidding.
Published: May 25, 2025 and June 1, 2025

INSTRUCTIONS TO BIDDERS

Securing Documents:

Drawings and Specifications are available at: http://tpharchitects.com/bidding/.

Proposals:

Proposals to receive consideration shall be made in accordance with the following instructions:

1. Proposals shall be made on a form obtained from the Architect or Owner. All items on the form must be filled out. Numbers must be stated in figures, and the signatures of all individuals must be in longhand. The completed form must be without interlineation, alterations, or erasures.

2. No proposal will be considered which makes exceptions, changes, or in any manner makes reservations to the terms of the Contract Documents.

3. Questions regarding documents, discrepancies, omissions, or doubt as to meanings shall be referred immediately to the Architect who will send written instructions clarifying such questions to each bidder.

4. Each bid must give the full business address of the bidder and be signed by him and his usual signature. Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name by one of the members of the partnership, or by an authorized representative, followed by the signature and designation of the person signing.

   Bids by corporations must be signed with the legal name of the corporation, followed by the name of the state of incorporation and by the signature and designation of the president, secretary, or other person authorized to bind it in the matter. The name of each person signing shall also be typed or printed below the signature. When requested by the Owner, satisfactory evidence of the authority of the officer signing in behalf of the corporation shall be furnished.

5. Contractor Registration: In compliance with SB 854, 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 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

   In addition, no contractor or subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

6. Labor Compliance Requirements: This contract/project is subject to compliance monitoring and enforcement by the Department of Industrial Relations, Office of the Labor Commissioner.

   Vendor/Contractor must comply with all labor compliance requirements including but not limited to prevailing wage, SB 854, Labor Code section 1771, 1771.1., 1774-1776, 1777.5, 1813 and 1815, as applicable.

   > 1771.1. (a) A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

7. Pursuant to the provisions of Sections 4100 to 4114, inclusive, of the Public Contract Code of the State of California, every Bidder shall, in his bid, set forth:

   A. The name, location of the place of business, Contractor's License Number, and DIR Registration Number of each subcontractor who will perform work or labor or render service to the bidder in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the bidder, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in plans and specifications, in an amount in excess of one-half (1/2) of one percent (1%) of the bidder's total bid.

   B. The portion of the work which will be done by each such subcontractor. Only one subcontractor shall be listed for each such portion of the work as defined in the bid. If the bidder fails to specify a subcontractor for each portion of the work to be performed under the contract in excess of one-half (1/2) of one percent (1%) of the bidder's total bid, he agrees to perform that portion himself. The successful bidder shall not, without the consent of the Owner either:

      1) Substitute any person as subcontractor in place of the subcontractor designated in the original bid.
      2) Permit any subcontractor to be assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the bid.
      3) Sublet or subcontract any portion of the work in excess of one-half (1/2) of one percent (1%) of the total bid as to which his original bid did not designate a subcontractor.

8. Proposals shall be sealed and filed in the District Office of, SHILOH ELEMENTARY SCHOOL DISTRICT, 6633 Paradise Rd. Modesto, CA 95358 **no later than, June 24, 2025 at 2:00 p.m.**. The following DVBE documentation are to be submitted **no later than June 24, 2025 at 2:00 p.m.** at the location noted above. including:
   A. Prime Bidder Certification of Disabled Veteran Business Enterprise Participation;
   B. Prime Bidder Good Faith Effort Work Sheet;
   C. As well as DVBE letters from the office of Small Minority Business (OSMB) as applicable,

   Disabled Veteran Business Enterprises. In Accordance with education Code section 17076.11 the District has a DVBE participation goal of 3% per year of the overall dollar amount of state funds allocated to the District pursuant to the Leroy F. Greene School Facilities Act of 1998, and expended each year by the District. Bidders must make a good faith effort to contact and utilize DVBE subcontractors and suppliers in securing bids for performance of the contract and certify, under penalty of prejury, that a good faith effort was made to include DVBE subcontractors and suppliers in the bid. Information regarding certified DVBE firms cal be obtained from the Office of Small Business Certification and Resources (OSBCR) at (916)323-5498 or (916)322-5060 as well as the OSBCR website at www.dgs.ca.gov/osbcr. Verification of DVBE status must be obtained from the OSBCR by receiving an approved certification letter and reference number from that office. Bidders are encouraged to retain documentation of their good faith efforts, in the event such documentation is requested by the District. If a Bidder is certified DVBE Certification Letter issued by OSBCR. In addition, bidders must indicate on the Designation of Subcontractors form whether a subcontractor is DVBE Certified, and provide the District a copy of the DVBE Certification Letter issued by OSBCR. Failure to comply with the requirements set forth in this paragraph shall render a bid non-responsive.

   Prior to, and as condition precedent for final payment under the Contract, the successful bidder shall provide the District with written documentation identifying the amount paid (if applicable) to certified DVBE subcontractors and suppliers in performance of the contract and provide a copy of the DVBE Certification Letter issued by OSBCR for each DVBE. This documentation will be used by the District to evaluate its success in meeting its DVBE participation goals.

California Nonresident Vendors

A. California nonresident vendors may be subject to a 7% withholding on payments over $1500 annually who are paid for:
   1) Performing services in California,
   2) A rental/lease of property located in California,
   3) Rental/lease of machinery and equipment,
   4) Royalties.

B. California nonresident vendors will be required to fully complete and provide the appropriate tax forms as required by the State of California Franchise Tax Board.

C. California nonresident vendors will also be required to fully complete and provide a Form 587 or 590.

D. All vendors will be required to fully complete and provide a Form W-9.

9. Proposals must be accompanied with a certified cashier's check, bank issued official check, or bidder's bond, for an amount not less than ten percent (10%) of the amount of the base bid. The certified cashier's check, bank issued official check, or bidder's bond shall be made payable to the order of SHILOH ELEMENTARY SCHOOL DISTRICT. If a bidder's bond accompanied the proposal, said bond shall be secured by a California based surety company satisfactory to SHILOH ELEMENTARY SCHOOL DISTRICT.

   Said check or bond shall be given as a guarantee that the bidder will enter into the contract and furnish the necessary bonds and insurance if awarded the work, and in case of refusal or failure to enter into said contract, the check or bond, as the case may be, shall be payable to SHILOH ELEMENTARY SCHOOL DISTRICT and retained as liquidated damages.

10. **Proposals shall be sealed and filed in the District Office of, SHILOH ELEMENTARY SCHOOL DISTRICT, 6633 Paradise Rd. Modesto, CA 95358 no later than June 24, 2025 at 2:00 p.m..**

Withdrawal of Proposals:

Proposals may be withdrawn by the bidder prior to the time fixed for the opening of bids.

Opening of Proposals:

Opening of proposals shall be as soon after the hour set as will be possible. Any and all bidders will be permitted to attend. The Board of Trustees is allowed sixty (60) days from that date in which to determine low bidder.

Examination of Contract Documents and Site:

Before submitting a proposal, bidders shall examine the contract documents. They shall visit the site of the proposed work, examine the building, or buildings, if any, and any work that may have been done thereon. They shall fully inform themselves of all conditions, in, at, and about the site, the building or buildings, if any, and any work that may have been done thereon.

Form of Contract:

The form of contract which the successful bidder will be required to execute, if awarded the work, is attached hereto and is made a part hereof. Such contract contains, among other things, matters required by State Law to be inserted in contracts for public work, including wage scale, hours of work per day, etc.

Addenda:

Any addenda or bulletins, issued during the time of bidding, shall form a part of the contract documents loaned to the bidder for the preparation of his proposal, shall be covered in the proposal, and shall be made a part of the contract.

Award of Contract:

Rejection of any or all proposals, to abandon work entirely or waiver of any informality in receiving of bids is reserved as the right of the Owner. Before the contract is awarded, the Board of Trustees may at his sole discretion, require from the proposed Contractor further evidence of the reasonably qualifications of such contractor to faithfully, capable, and reasonable perform such proposed contract and may consider such evidence before making its decision on the award of such proposed contract.

> The contract shall be awarded to the lowest responsible bidder as interpreted by the Owner and specified herein and shall be entered into by the successful bidder within the (10) days after being notified by the Owner. Identity of lowest bidder will be determined by adding to or subtracting from the base bid the cost of such alternatives as Owner decided to include in the work and contract. The award, if made, will be made within sixty (60) days after the opening of the proposal.

Public Works Project Award Notification:

The PWC 100 form should be completed on-line by the Awarding Body. The completion and the submission of this form fulfills the required public works project award notification to both the Division of Apprenticeship Standards [Labor Code sec. 1773.3 (replacing former DAS-13 notification) and the Division of Labor Standards Enforcement Public Works Compliance Monitoring Unit [8 Cal. Code Reg. sec. 16451(a)].

Execution of Contract:

The Contract shall be signed by the successful bidder in duplicate counterpart and returned, together with the contract bonds and required insurance certificates, policies and endorsements within ten (10) days after the bidder has received notice that the contract has been awarded. Contractor and Owner shall sign a set of the contract documents for filing with the contract.

Contract Bonds:

Two bonds, as itemized below and in the forms presented in these contract documents, shall be furnished by the successful bidder at the time of entering into contract and filed with the Board of Trustees. They shall be in the form of surety bonds issued by corporations duly and legally licensed to transact business in the State of California, satisfactory to the Owner.

Performance Bond in the amount of one hundred percent (100%) of the contract sum to insure Owner during construction and for one year after completion against faulty or improper materials or workmanship and to assure Owner of full and prompt performance of contract and shall be secured from a California based surety or sureties satisfactory to the Owner.

Contractor's Bond (Labor and Material) in the amount of one hundred percent (100%) of the contract sum in accordance with the laws of the State of California to secure payment of any and all claims for labor and materials used or consumed in performance of this contract and shall be secured from a California based surety or sureties satisfactory to the Owner.

Payments:

Payments to the Contractor on account of the contract shall be made in accordance with the terms of the contract.

Certified Payroll:

All contractors and subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner (aka Division of Labor Standards Enforcement).

These new requirements will apply to all public works that are subject to the prevailing wage requirements of the Labor Code, without regard to funding source.

Time of Completion and Liquidated Damages:

Time is of the essence in this contract, and all work called for herein and all requirements shall be completed within one hundred eighty (180) calender days.

Should said work not be completed within the time limit as may be extended as herein provided, damages will be sustained by the Owner. It is understood and agreed that it is and will be impracticable or extremely difficult to determine the actual amount of damages which the Owner will sustain in the event of and by reason of such delay, and it is therefore agreed that the contractor will pay the Owner liquidated damages as specified in Article 8 of the General Conditions.

Partial Payments:

Once each month during the progress of the work, Contractor shall submit to Architect a progress payment request. The progress payment request shall be based on the approved bid breakdown for the cost of the work completed plus the acceptable materials delivered to the site or stored subject to the control of Contractor and not yet installed. The progress payment request shall be submitted on the monthly anniversary of the day selected by the Owner at job start meeting. Architect shall review and may certify as to the validity of the request. No progress payment shall be made without the certification of Architect. Progress payment requests shall be processed with a minimum of a five percent (5%) retention. This retention is part security for the fulfillment of the contract by Contractor. Progress payments shall not be construed as acceptance of any work which is not in accordance with the requirements of the contract.

END OF SECTION

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____ _____ as principal, and _____ _____as Surety, are hereby held and firmly bound unto SHILOH ELEMENTARY SCHOOL DISTRICT, hereinafter called the "Owner", in the sum of:

_____ Dollars

($ _____)

for payment of which sum, well and truly to be made, we hereby jointly and severally find ourselves, our heirs, executors, administrators, successors, and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to the Owner a certain bid, attached hereto and hereby made a part hereof, to enter into a contract in writing for the:

SHILOH ELEMENTARY SCHOOL WATER TREATMENT PLANT
for
SHILOH ELEMENTARY SCHOOL DISTRICT

in strict accordance with Contract Documents.

NOW, THEREFORE,

a. If said bid shall be rejected, or, in the alternate;

b. If said bid shall be accepted and the Principal shall execute and deliver a contract in the form of agreement attached hereto and shall execute and deliver Performance and Contractor's Bonds in the forms attached hereto (all property completed in accordance with said bid), and shall in all other respects perform the agreement created by the acceptance of said bid;

Then this obligation shall be void, otherwise the same shall remain in force and effect, it being expressly understood and agreed that the liability of the Surety for any and all default of the Principal hereunder shall be the amount of this obligation as herein stated. Surety, for value received, thereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract on the call for bids, or to the work to be performed thereunder, or the specifications accompanying the same, shall in anyway affect its obligation 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 or the call for bids, or to the work, or to the specifications.

In the event suit is brought upon this bond by the Owner and judgment is recovered the Surety shall pay all costs incurred by the Owner in such suit, including a reasonable attorney's fee to be fixed by the court.

IN WITNESS WHEREOF, the above-bounden parties have executed this Instrument under their several seals this _____ day of_____, 2024 the name and corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

In presence of:

_____(Seal)

_____ _____
(Address) (Business Address)

_____ _____(Seal)
(Individual Principal)

_____ _____
(Address) (Business Address)

Attest: _____
(Corporate Principal)

_____
(Business Address)

_____ By:_____
(Affix Corporate Seal)

_____

The rate or premium on this bond is _____
per thousand. Total amount of premium charged, $_____ .

(This bond must be signed and acknowledged by both Principal and Surety before a Notary Public, and acknowledgments with Notarial Seals attached hereto.)

_____
Surety

By: _____
Attorney-in-fact

(The above must be filled in by Corporate Surety. Surety company must be California admitted insured.)

END OF SECTION

PAYMENT BOND
(Labor & Material)

KNOW ALL MEN BY THESE PRESENTS:

That WHEREAS,

_____

and _____

Hereinafter designated as the "Principal," have entered into a contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to:

SHILOH ELEMENTARY SCHOOL WATER TREATMENT PLANT
for
SHILOH ELEMENTARY SCHOOL DISTRICT
6633 Paradise Rd. Modesto, CA 95358

Which said agreement dated _____, 2024, and all of the contract documents attached to or forming a part of said agreement, are hereby referred to and made a part hereof; and

WHEREAS, the Principal is required, before entering upon the performance of the work, to file a good and sufficient bond with the body by whom the contract is awarded to secure the claims arising under said agreement.

NOW, THEREFORE, THESE PRESENTS WITNESSETH:

That the said Principal and the undersigned_____
_____ as Corporate Surety, are held and firmly bound unto all laborers, material men, and other persons referred to in said statutes in the sum of
_____ Dollars
which sum well and truly be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally, by these presents.

The conditions of this obligation is that if the said Principal or any of his or its subcontractors, or the heirs, executors, administrators successors, or assigns of any, all, or either of them, shall fail to pay for any materials, provisions, provender or other supplies, or teams, used in, upon, for, or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, that said Surety will pay the same in an amount not exceeding the amount hereinabove set forth, and also in case suit is brought upon this bond, will pay a reasonable attorney's fee to be awarded and fixed by the Court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporation entitled to file claims so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect.

And the said Surety, for value received, hereby stipulates and agrees that no charge, extension of time, alteration, or addition to the terms of said contract or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration, or addition.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety this _____ day of_____, 2024.

(To be signed by)
(Principal and Surety,)
(and acknowledged and)
(Notarial Seal Attached.)_____
Principal

_____

_____
Surety

_____

_____

By _____
(Attorney-in-fact)

_____

The above bond is accepted and approved this_____day of_____, 2024.

END OF SECTION

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____ _____, as Principal, and _____ _____, as Surety, are held and firmly bound unto SHILOH ELEMENTARY SCHOOL DISTRICT, in the County of_____ , State of California, hereinafter called the "Owner", in the sum of

_____ Dollars

($_____)

for the payment of which sum well and truly made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

The condition of this obligation is such, that whereas the Principal entered into a certain contract with the Owner, date _____, 2024 for:

SHILOH ELEMENTARY SCHOOL WATER TREATMENT PLANT
for
SHILOH ELEMENTARY SCHOOL DISTRICT
6633 Paradise Rd. Modesto, CA 95358

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extension thereof that may be granted by the Owner, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, then, this obligation to be void, otherwise to remain in full force and virtue.

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

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals this _____ day of_____, 2024 , the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

In presence of:

_____ _____ _____

(Individual Principal) (Seal)

_____ _____

(Address) (Business Address)

_____ _____

_____ _____

_____ _____

Attest: _____

(Corporate Principal)

_____

(Business Address)

_____ By: _____

(Affix Corporate Seal)

_____

Attest: _____

(Corporate Surety)

_____

(Business Address)

_____ By: _____

(Affix Corporate Seal)

_____

The rate or premium on this bond is _____ per thousand.

Total amount of premium charged, $ _____ .

(The above must be filled in by Corporate Surety.)

END OF SECTION

FORM OF PROPOSAL

_____, California

_____, 2025

Board of Trustees
SHILOH ELEMENTARY SCHOOL DISTRICT
6633 Paradise Rd. Modesto, CA 95358

Members of the Board:

The undersigned doing business under the firm name of_____

_____

understands that the District may select from any line item(s) or combination of line items listed on the Base Bid. Furthermore, the undersigned, having carefully examined the Contract Documents, titled,

SHILOH ELEMENTARY SCHOOL WATER TREATMENT PLANT

for
SHILOH ELEMENTARY SCHOOL DISTRICT

proposes to furnish all materials and labor called for by them for the entire work, including all taxes for the following amounts:

Base Bid: The undersigned proposes to perform **all** work as defined in the Plans and Specifications to construct the project and all appurtenant work thereto for the sum of:
_____ Dollars
($_____).

If written notice of the acceptance of this bid is mailed, telegraphed, or delivered to the undersigned within sixty (60) days after the date of opening of the bids, or any time thereafter before the bid is withdrawn, the undersigned will, within ten (10) days after the date of such mailing, telegraphing, or delivering of such notice, execute and deliver a contract in the form of agreement present in these contract documents and give Performance and Contractor's Bonds and insurance certificates, endorsements, and/or policies in accordance with the Contract Documents.

The Undersigned hereby designates as his office to which such notice of acceptance may be mailed, telegraphed, or delivered:

Our Public Liability and Property Damage Insurance is placed with:

_____

Our Worker's Compensation Insurance is placed with:

_____

Circular letters, addenda, etc., bound with specifications or issued during the time of bidding are included in the proposal, and, in completing the contract, they are to become part thereof.

The receipt of the following addenda to the specifications is acknowledged:

Addendum No. _____ Date _____
Addendum No. _____ Date _____
Addendum No. _____ Date _____

This bid may be withdrawn by the bidder at any time prior to the scheduled time for the opening of bids. The representations made herein are made under penalty of perjury.

Dated_____ ,

License No._____

Expiration Date of License_____

By (please print)_____

Signed_____
_____

Business Address_____

Telephone_____

Fax_____

Federal I.D# or Social Security #:_____

Department of Industrial Relations #: _____

Note: If Bidder is a corporation, write state of incorporation under signature, attach notarized proof of authority to bind corporation and list corporation officers; and, if a partnership, give full names of all partners. Use space below to record this information.

Do not include in the envelope any bids for other work.

DESIGNATION OF SUBCONTRACTORS

Contractor's Name:_____

In accordance with the provisions of Division 1, Chapter 4 of the Public Contract Code, known as the "Subletting and Subcontracting Fair Practices Act," the contractor signatory to this agreement shall be known as the prime contractor of the work herein specified, and he shall set forth in his bid the complete name, location of the place of business and license number of each subcontractor who will perform work or labor, or render service to the prime contractor in or about the construction of the work in an amount in excess of one-half (1/2) of one (1) percent of the prime contractor's total bid, and the portion of the work which will be done by each subcontractor if the contract for said work is awarded to said bidder. The prime contractor shall list only one subcontractor for each such portion of the work as is defined by the prime contractor in his bid.

If the prime contractor fails to specify a subcontractor or if he specified more than one subcontractor for any portion of work to be performed under the contract, in excess of one-half (1/2) of one (1) percent of the prime contractor's total bid, he agrees that he is fully qualified to perform that portion himself, and that he shall perform that portion himself. If, after the award of the contract, the prime contractor shall, except as provided for in said Chapter herein above referred to, subcontract any such portion of the work, the prime contractor shall be subject to the penalties provided.

Subcontractor Name:_____ Location: _____
Portion of Work: **WELL DRILLING** License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: **PROCESS PIPING** License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:_____ Location: _____
Portion of Work: _____ License#: _____ DIR#: _____

Subcontractor Name:____________________________________ Location: _________________
Portion of Work: __________________________ License#: ____________ DIR#: _____________

Subcontractor Name:____________________________________ Location: _________________
Portion of Work: __________________________ License#: ____________ DIR#: _____________

Subcontractor Name:____________________________________ Location: _________________
Portion of Work: __________________________ License#: ____________ DIR#: _____________

Subcontractor Name:____________________________________ Location: _________________
Portion of Work: __________________________ License#: ____________ DIR#: _____________

Subcontractor Name:____________________________________ Location: _________________
Portion of Work: __________________________ License#: ____________ DIR#: _____________

Subcontractor Name:____________________________________ Location: _________________
Portion of Work: __________________________ License#: ____________ DIR#: _____________

Subcontractor Name:____________________________________ Location: _________________
Portion of Work: __________________________ License#: ____________ DIR#: _____________

Subcontractor Name:____________________________________ Location: _________________
Portion of Work: __________________________ License#: ____________ DIR#: _____________

Subcontractor Name:____________________________________ Location: _________________
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Subcontractor Name:____________________________________ Location: _________________
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Subcontractor Name:____________________________________ Location: _________________
Portion of Work: __________________________ License#: ____________ DIR#: _____________

Subcontractor Name:____________________________________ Location: _________________
Portion of Work: __________________________ License#: ____________ DIR#: _____________

"NONCOLLUSION AFFIDAVIT"

(TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID)

_____, being first duly sworn, deposes and says that he or she is

_____ of _____
is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that 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 bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid."
Added Stats 1988 ch 1548 sec 1.

_____ _____
Signature Date

_____ _____
Notary

END OF SECTION

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

ARTICLE 1 - CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.1 The Contract Documents - The Contract Documents consist of the Contract, the Instructions to Bidders, the Bid Bond, Performance and Payment Bond, the Conditions of the Contract (General, Supplemental, and other Conditions), the Drawings, the Specifications, all Addenda, issued prior to execution of the Contract, and all Modifications thereto. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the Architect pursuant to Subparagraph 1.2.5., or (4) a written order for a minor change in the work issued by the Architect pursuant to Paragraph 12.4. A Modification may be made only after execution of the Contract.

1.1.2 The Contract - The Contract Documents form the Contract. The Contract represents the entire and integrated agreement between the parties hereto, and supersedes all prior negotiation, representations, or agreements, either written or oral, including the bidding documents. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1.

1.1.3 The Work - The term work comprises the completed construction required by the Contract Documents and includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

1.1.4 The Project - The Project is the total construction designed by the Architect of which the work performed under the Contract Documents may be the whole or a part.

1.1.5 Owner - The Owner is SHILOH ELEMENTARY SCHOOL DISTRICT, of Stanislaus County, California, and named as such in the Agreement.

1.1.6 District - The District shall mean SHILOH ELEMENTARY SCHOOL DISTRICT, Stanislaus County, California.

1.1.7 Estimated Completion Date - The Estimated Completion Date shall be the date set forth as such in the Supplemental General Conditions.

1.1.8 Fixed Completion Date - The fixed Completion Date shall be the date set forth as such in the Supplemental General Conditions.

1.2 EXECUTION, CORRELATION, INTENT AND INTERPRETATIONS

1.2.1 The Contract Documents, including the Contract in the forms furnished the bidder prior to his bid, shall be signed in not less than triplicate by the Owner and Contractor.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.2.3 The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. The intention of the Documents is to include all labor, materials, equipment, and other items as provided in Subparagraph 4.4.1 necessary for the proper execution and completion of the work. It is not intended that work not covered under any heading, section, branch, class, or trade of the Specifications shall be supplied unless it is required elsewhere in the Contract Documents or is reasonable inferable therefrom as being necessary to produce the intended results. Words which have well-known technical or trade meanings are used herein in accordance with such recognized meanings.

1.2.4 The organization of the Specifications into divisions, sections, and 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.

1.2.5 Written interpretations necessary for the proper execution of progress of the work, in the form of drawings or otherwise, will be issued with reasonable promptness by the Architect and in accordance with any schedule agreed upon. Such interpretations shall be consistent with and reasonable inferable from the Contract Documents, and may be effected by Field Order.

1.3 COPIES FURNISHED AND OWNERSHIP

1.3.1 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, six (6) copies of Drawings and Specifications.

ARTICLE 2 - ARCHITECT

2.1 DEFINITION

2.1.1 The Architect is the person or organization identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Architect means the Architect or his authorized representative.

2.1.2 Nothing contained in the Contract Documents shall create any contractual relationship between the Architect and the Contractor.

2.2 ADMINISTRATION OF THE CONTRACT

2.2.1 The Architect will provide general Administration of the Construction Contract, including performance of the functions hereinafter described.

2.2.2 The Architect will be the Owner's representative during construction and until final payment. The Architect will have authority to act on behalf of the Owner to the extent provided in the Contract Documents, unless otherwise modified by written instrument which will be shown to the Contractor. The Architect will advise and consult with the Owner, and all of the Owner's instructions to the Contractor shall be issued through the Architect.

2.2.3 The Owner will provide one or more full time inspectors to assist the Architect in providing competent and adequate inspection during all normal working periods. The Inspector is to be approved by the Architect and The Division of the State Architect.

2.2.4 The Architect, his representatives, including the inspectors and owner, shall at all times have access to the work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the architect may perform his functions under the Contract Documents.

2.2.5 The Architect will make periodic visits to the site to familiarize himself generally with the progress and quality of the work and to determine, in general, if the work is proceeding in accordance with the Contract Document. On the basis of his on-site observations as an Architect, he will keep the Owner informed of the progress of the work, and will endeavor to guard the Owner against defects and deficiencies in the work of the Contractor. The Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work. The Architect will not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connections with the work, and he will not be responsible for the Contractor's failure to carry out the work in accordance with the Contract Documents.

2.2.6 Based on such observations and the Contractor's Applications for Payment, the Architect will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in Paragraph 9.4.

2.2.7 The Architect will be, in the first instance, the interpreter of the requirements of the Contract Documents and the judge of the performance thereunder by both the Owner and Contractor. The Architect will, within a reasonable time, render such

interpretations as he may deem necessary for the proper execution of progress of the work.

2.2.8. Claims, disputes and other matters in question between the Contractor and the Owner relating to the execution or progress of the work or the interpretation of the Contract Documents shall be referred initially to the Architect for decision which he will render in writing within a reasonable time.

2.2.9 All interpretations and decisions of the Architect shall be consistent with the intent of the Contract Documents.

2.2.10 The Architect's decision in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.

2.2.11 The Architect will have authority to reject work which does not conform to the Contract Documents. Whenever he considers it necessary or advisable to insure the proper implementation of the Contract Documents, he will have authority to require the contractor to stop the work or any portion thereof, or to require special inspection or testing of the work as provided in Subparagraph 7.8.2 whether or not such work be then fabricated, installed or completed. However, neither the Architect's authority to act under this Subparagraph 2.2.11, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Architect to the Contractor, any subcontractor, any of their agents or employees, or any other person performing any of the work.

2.2.12 The Architect will review Shop Drawings and Samples as provided in Subparagraph 4.12.1 through 4.12.8 inclusive.

2.2.13 The Architect will prepare Change Orders in accordance with Article 12, and will have authority to order minor changes in the work as provided in Subparagraph 12.5.1.

2.2.14 The Architect will conduct inspections to determine the dates of the Substantial Completion and final completion, will review written guarantees and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment.

2.2.15 The Architect will not be responsible for the acts or omissions of the Contractor, or any Subcontractors, or any of his or their agents or employees, or any other persons performing any of the work.

2.2.16 In case of the termination of the employment of the Architect, the Owner shall appoint an architect whose status under the Contract Documents shall be that of the former architect.

ARTICLE 3 - OWNER

3.1 INFORMATION AND SERVICES REQUIRED OF THE OWNER

3.1.1 The Owner shall furnish all surveys describing the physical characteristics, legal limits and utility locations for the site of the project.

3.1.2 The Owner shall secure and pay for easements for permanent structures or permanent changes in existing facilities.

3.1.3 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the work.

3.1.4 The Owner shall issue all instructions to the Contractor through the Architect.

3.1.5 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Payment and Insurance in Article 9 and 11 respectively.

3.2 OWNER'S RIGHT TO STOP THE WORK

3.2.1 If the Contractor fails to correct defective work as required by Paragraph 13.2 or persistently fails to carry out the work in accordance with the Contract Documents, the Owner, by a written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

ARTICLE 4 - CONTRACTOR

4.1 DEFINITION

4.1.1 The Contractor is the person or organization identified as such in the Contract and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.

4.2 REVIEW OF CONTRACT DOCUMENTS

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Architect any error, inconsistency or omission he may discover; but the Contractor shall not be liable to the Owner or the Architect for any damage resulting from any such errors, inconsistencies or omissions in the Contract Documents. The Contractor shall perform no portion of the work at any time without Contract Documents or where required, approved Shop Drawings, Product Data or Samples for such portion of the work.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the Contract.

4.3.2 The Contractor shall be responsible to the owner for the acts and omissions of his employees, Subcontractors, and their agents and employees, and other persons performing any of the work under a contract with the Contractor.

4.3.3 The Contractor shall not be relieved from his obligations to perform the work in accordance with the Contract Documents either by the activities or duties of the Architect in his administration of the Contract, or by inspections, tests or approvals required or performed under Paragraph 7.8 by persons other than the Contractor.

4.4 LABOR AND MATERIALS

4.4.1 Unless otherwise specifically provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the work, whether temporary or permanent and whether or not incorporated or to be incorporated in the work.

4.4.2 The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the work any unfit person or anyone not skilled in the task assigned to him.

4.5 WARRANTY

4.5.1 The Contractor warrants to the Owner and the Architect that all materials and equipment furnished under this contract will be new unless otherwise specified, and that all work will be of good quality, free from faults and defects, and in

conformance with the Contract Documents. All work not so conforming to these standards may be considered defective.

4.5.2 The warranty provided in this Paragraph 4.5 shall be in addition to and not in limitation of any other warranty or remedy required by law or by the Contract Documents.

4.6 TAXES

4.6.1 The Contractor shall pay all sales, consumer, use, and other similar taxes required by law.

4.7 PERMITS, FEES, AND NOTICES

4.7.1 The Contractor shall secure and pay for all permits and licenses necessary for the prosecution of the work, including utility fees. District will reimburse Contractor the actual documented cost of such permits, licenses and fees, with no overhead or profit added.

4.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and orders of any public authority bearing on the performance of the work. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, he shall promptly notify the Architect in writing, and any necessary changes shall be adjusted by appropriate modification. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules, and regulations, and without such notice to the Architect, he shall assume full responsibility therefore, and shall bear all costs attributable thereto.

4.7.3 All materials and workmanship shall conform to the California Code of Regulations and Title 24, Parts 1 to 5, Part 9, and Part 12, Division of the State Architect, and the Contractor shall keep a copy of Title 24 on the job at all times. All work and materials shall be in full accordance with the latest Rules and Regulations of the State Fire Marshal, National Board of Fire Underwriters, California Electric Code, Safety Orders of Division of Industrial Safety, California Plumbing Code, and other applicable federal and state laws and regulations. Such laws and regulations shall be considered a part of these specifications, as if set forth herein in full and all work hereunder shall be executed in accordance therewith. Nothing in these plans or specifications is to be construed to permit work not conforming to the Codes.

4.7.4 All materials furnished and all work done under these specifications shall be subject to rigid inspection by the Architect and Owner who shall furnish competent and adequate inspection during normal working periods. When specific inspection is required as called for in plans and specifications, the Contractor shall inform the Architect and Inspector of the schedule of such work. Failure to do so may require

such work to be torn out and replaced under proper inspection, and the entire cost of tearing out and replacement including cost of any materials furnished by the Owner and used in the work torn out, shall be borne by the Contractor. Work covered up without the approval of the Architect or the Owner shall be uncovered to the extent required and the Contractor shall similarly bear the cost of performing all the work and furnishing all the materials necessary for the removal of the covering and its subsequent replacement.

4.7.5 Whenever the Contractor arranges to work at night, or at any time when work is not usually in progress, or to vary the period during which work is carried out each day, he shall give the Owner due notice so that inspection may be provided. Such work shall be done without extra compensation to the Contractor and such additional inspection costs shall be chargeable to the Contractor providing such work is not performed at the request of the Owner to meet earlier completion time than that established in the Contract, or for a cause not under control of the Contractor.

4.8 ALLOWANCES (not used)

4.9 SUPERINTENDENT

4.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the project site during the progress of the work. The superintendent shall be satisfactory to the Architect, and shall not be changed except with the consent of the Architect, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the contractor. Important communications will be confirmed in writing. Other communications will be so confirmed on written request in each case.

4.10 PROGRESS SCHEDULE

4.10.1 The Contractor, immediately after being awarded the Contract, shall prepare and submit for the Architect's approval an estimated progress schedule for the work. The progress schedule shall be related to the entire Project to the extent required by the Contract Documents. This schedule shall indicate the dates for the starting and completion of the various stages of construction and shall be revised as required by the conditions of the work, subject to the Architect's approval.

4.11 DRAWINGS AND SPECIFICATIONS AT THE SITE

4.11.1 The Contractor shall maintain at the site for the Owner one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders, and other modifications, in good order and marked to record all changes made during construction. these shall be available to the Architect. The Drawings, marked to record all changes made during construction, shall be delivered to the Architect for the Owner upon completion of the work.

4.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

4.12.1 Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any Subcontractor, manufacturer, supplier or distributor, and which illustrate some portion of the work.

4.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the work.

4.12.3 Samples are physical examples furnished by the Contractor to illustrate materials, equipment, or workmanship, and to establish standards by which the work will be judged.

4.12.4 The Contractor shall review, stamp with his approval and submit, with reasonable promptness and in orderly sequence so as to cause no delay in the work or in the work of any other contractor, all Shop Drawings and Samples required by the Contract Documents or subsequently by the Architect as covered by modifications. Shop Drawings and Samples shall be properly identified as specified, or as the Architect may require. At the time of submission the Contractor shall inform the Architect in Writing of any deviation in the Shop Drawings or Samples from the requirements of the Contract Documents.

4.12.5 By approving and submitting Shop Drawings, Product Data and Samples, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar date, or will do so, and that he has checked and coordinated the information contained within such submittal with the requirements of the work and of the Contract Documents.

4.12.6 The Architect will review and approve Shop Drawings, Product Data and Samples with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the project and with the information given in the Contract Documents. The Architect's approval of a separate item shall not indicate approval of an assembly in which the item functions.

4.12.7 The Contractor shall make any corrections required by the Architect and shall resubmit the required number of corrected copies of Shop Drawings, Product Data or new Samples until approved. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Architect on previous submissions.

4.12.8 The Architect's approval of Shop Drawings, Product Data or samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has informed the Architect in writing of such deviation at the time of submission and the Architect has given written approval to the specific deviation, nor shall the Architect's approval relieve the Contractor from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples.

4.12.9 No portion of the work requiring a Shop Drawing, Product Data, or Sample submission shall be commenced until the submission has been approved by the Architect. All such work shall be in accordance with approval submittal.

4.12.10 The Contractor shall submit to the Architect and Owner for approval, within thirty-five(35) days after the signing of the Contract, a complete list setting forth the brand name and manufacturer of all materials and/or equipment proposed for use under this Contract. The list shall include all items required under the Contract, although the brand name or manufacturer may not be specifically included in the specifications. Where specific brands are specified, substitutions therefore shall be clearly indicated on the material equipment list.

4.12.11 Wherever samples are called for in the specifications, or where it is desired to substitute another material or article for the specified, the Contractor shall submit samples in triplicate to the Architect with all freight charges prepaid. One sample will be returned to him at his expense, with letter stating that it is approved or rejected, and one sample will be returned to the Owner for his records. All materials delivered on the site or placed in the building shall be equal to the sample in every respect.

4.12.12 Where special makes or brands are called for, they are mentioned as a "Standard." Others of equal quality may be used, provided approval is first obtained in writing from the Architect. Unless substitutions are requested, no deviation from the plans and specifications will be allowed. Substitutions shall be requested or offered for investigation in ample time, as no delay or extra time will be allowed on account thereof.

Requests for substitution will only be considered when offered by the General Contractor and such requests must be made within thirty-five (35) days after the award of the Contract.

4.12.13 All materials shall be delivered as to insure a speedy and uninterrupted progress of the work. All materials shall be stored so as to cause no obstruction and so as to prevent overloading of any portion of the structure, and the Contractor shall be entirely responsible for damage or loss by weather or other cause.

4.13 USE OF SITE

4.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonable encumber the site with any materials or equipment.

4.14 CRIMINAL HISTORY CLEARANCE/SITE PROTECTION CERTIFICATION

4.14.1 The Criminal History Clearance/Site Protection Certification form, see Article 21 of the General Conditions, is required from all successful bidders pursuant to the requirements mandated by California Education Code Sections 33192 and 45124.1 et seq., the Michelle Montoya School Safety Act of 1997. This provides that a school district may require a construction contractor that has a contract with the district to obtain a criminal history clearance from the Department of Justice of all employees working on a school site under that contract.

4.15 CUTTING AND PATCHING OF WORK

4.15.1 The Contractor shall be responsible for all cutting, fitting, or patching that may be required to complete the work or to make its several parts fit together properly.

4.15.2 The Contractor shall not damage or endanger any portion of the work or the work of the Owner or any separate contractors by cutting, patching, or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate contractor except with the written consent of the Owner and of such separate contractor. The Owner shall not unreasonably withhold from the Contractor or any separate contractor his consent to cutting or otherwise altering the work.

4.16 CLEANING UP

4.16.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations.

At the completion and during the work he shall remove all his waste materials and rubbish from and about the Project as well as all his tools, construction equipment, machinery and surplus materials, and shall clean all glass surfaces and leave the work "broom clean" or its equivalent, except as otherwise specified. The Contractor cannot use the Owner's trash bins.

4.16.2 If the Contractor fails to clean up, the Owner may do so and the cost thereof shall be charged to the Contractor as provided in Paragraph 7.6.

4.17 COMMUNICATIONS

4.17.1 The Contractor shall forward all communications to the Owner through the Architect.

4.18 INDEMNIFICATION

4.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner and the Architect and their agents and employees from and against all claims, damages, losses, and expenses including attorney's fees arising out of or resulting from the performance of the work, or the failure, neglect or refusal of the Contractor to perform the work provided that any such claim, damage, loss or expenses (a) is attributable to bodily injury, sickness, disease or death, or in injury to or destruction of tangible property (other than the work itself) including the loss of use resulting there from, and (b) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless or whether or not it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party described in this Paragraph 4.18.

4.18.2 In any and all claims against the Owner or the Architect or any of their agents or employees by an employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the contractor or any Subcontractor under worker's compensation acts disability benefits acts or other employee benefit acts.

ARTICLE 5 - SUBCONTRACTORS

5.1 DEFINITION

5.1. A Subcontractor is a person or organization who has a direct contract with the Contractor to perform any of the work at the site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender, and means a Subcontractor or his authorized representatives. The term Subcontractor does not include any separate contractor or his subcontractors.

5.1.2 A Sub-subcontractor is a person or organization who has a direct or indirect contract with the Subcontractor to perform any of the work at the site. The term Sub-subcontractor is referred to throughout the contract Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.

5.1.3 Nothing contained in the Contract Documents shall create any contractual relation between the Owner or the Architect and any Subcontractor or Sub-subcontractor.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 The Contractor shall include with his Bid Proposal the names of each Subcontractor who will perform work or labor or render service to the Contractor in or about the work in an amount in excess of 1/2 of 1% of the bidder's total bid. The Contractor shall not, without written consent of the Owners, make any substitution thereto, or permit any subcontract to be assigned or transferred or performed by anyone other than the original Subcontractor listed in the Bid Proposal. The Contractor agrees that he is as fully responsible to the Owners for the acts and omissions of his Subcontractors and for the persons directly employed by him. The Owner will deal only through the General Contractor, who shall be responsible for the proper execution of the entire work.

Subletting the whole or any part of the Contract, if approved, shall be done only in accordance with the provisions of Sections 4100 to 4114 inclusive of the public Contract Code of the State of California, which are hereby incorporated by reference and made a part hereof.

5.2.2 If, prior to the award of the Contract, the Owner or Architect has a reasonable and substantial objection to any person or organization on such list, and refuses in writing to accept such person or organization, the successful bidder may, prior to the award, withdraw his bid without forfeiture of bid security. If the successful bidder submits an acceptable substitute, the Owner shall accept such substitute without any increase in bid price. If no satisfactory substitute is submitted, the Owner may disqualify the bid. If, after the award, the Owner or Architect refuses to accept any person or organization on such list, the Contractor shall submit an acceptable substitute and the Contract Sum shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued; however, no increase in the Contract Sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting a name with respect thereto prior to the award.

5.2.3 The Contractor shall not contract with any Subcontractor or any person or organization proposed for portions of the work designated in the bidding requirements or, if none is so designated, with any Subcontractor proposed for the principal portions of the work who has not been accepted by the Owner and the Architect. The Contractor will not be required to contract with any subcontractor or person or organization against whom he has a reasonable objection.

5.2.4 If the Owner and the Architect requires a change of any proposed Subcontractor or person or organization previously accepted by them, the Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued.

5.2.5 The Contractor shall not make any substitution for any Subcontractor or person or organization who has been accepted by the Owner and Architect, unless the substitution is acceptable to the Owner and the Architect.

5.3 SUBCONTRACTUAL RELATIONS

5.3.1 All work performed for the Contractor by a Subcontractor shall be pursuant to an appropriate agreement between the Contractor and the Subcontractor (and where appropriate between Subcontractors and Sub-subcontractors) which shall contain provisions that:

1. Preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the work to be performed under the subcontract so that the subcontracting thereof will not prejudice such rights;

2. Require that such work be performed in accordance with the requirements of the Contact Documents;

3. Require submission to the Contractor of applications for payment under such subcontract to which the contractor is a party, in reasonable time to enable the Contractor to apply for payment in accordance with Article 9;

4. Require that all claims for additional costs, extensions of time, damages for delays or otherwise with respect to subcontracted portions of the work shall be submitted to the Contractor (via any Subcontractor or Sub-subcontractor where appropriate) in the manner provided in the Contract Documents for like claims by the Contractor upon the Owner;

5. Waive all right the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance described in Paragraph 11.2, except such rights as they may have to the proceeds of such insurance help; and

6. Obligate such Subcontractor specifically to consent to the provisions of this Paragraph 5.3, and identify to each Subcontractor any terms and conditions of each proposed Subcontract which may be a variance with the Contract Documents.

5.4 CLAIMS FOR EXTRA WORK / FOR EXTENSIONS OF TIME

5.4.1 The Contractor shall not be entitled to the payment of any additional compensation or any extension of time for any cause, including any act, or failure to act by the Architect, or happening of any event, thing or occurrence, unless the Contractor shall have given the Architect due written notice of potential claims as hereinafter specified. It is the intention of this Section 5.4 that the differences between the parties, arising under and by virtue of the Contract be brought to the attention of the Architect at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action promptly taken. it is also the intention of this Section 5.4 to implement the provisions of Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3 of the Public Contract Code of California. the Contractor hereby agrees that he or she shall have no right to additional compensation or an extension of item for any claim that may be based on any act, failure to act, event, thing or occurrence for which no written notice of potential claim as hereby required was filed.

All claims shall be filed in writing on or before the times prescribed herein, but in no event later than the date of final payment. Claims shall be filed with the Architect prior to the time that the Contractor commences performance of the work giving rise to the potential claim for additional compensation, if based on any act or failure to act by the Architect, or in all other cases within ten (10) days after the happening of event, think or occurrence giving rise to the potential claim. All claims shall set forth clearly and in detail, for each item of additional compensation or extension of time claimed, the reasons for the specifications, the nature and the amount of the cost involved, the computations used in determining such costs, and all pertinent factual data necessary to substantiate the claim.

ARTICLE 6 - WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, he shall make such claim as provided elsewhere in the Contract Documents.

6.1.2 When separate contracts are awarded for different portions of the Project, "the Contractor" in the Contract Documents in each case shall be the contractor who signs each separate contract.

6.2 MUTUAL RESPONSIBILITY OF CONTRACTORS

6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall properly connect and coordinate his work with theirs.

6.2.2 If any part of the Contractor's work depends for proper executioner results upon the work of the Owner or any separate contractor, the Contractor shall inspect and promptly report to the Architect and Inspector any discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the Owner's or the separate Contractor's work as fit and proper to receive his work, except as to defects which may develop in the other separate contractor's work after the execution of the Contractor's work.

6.2.3 Should the Contractor cause damage to the work or property of any separate contractor on the Project, the Contractor shall, upon due notice, settle with such other contractor by agreement or arbitration, if he will so settle. If such separate contractor sues the Owner on account of any damage alleged to have been so sustained, the Owner shall notify the Contractor and the Contractor shall defend such proceedings at the Contractor's expense and, if any judgment against the Owner arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorneys fees and court cost which the Owner has incurred.

6.2.4 Any cost caused by defective or ill-timed work shall be borne by the party responsible therefore.

6.3 OWNER'S RIGHT TO CLEAN UP

6.3.1 If a dispute arises between the separate contractors as to their responsibility for cleaning up as required by paragraph 4.15, the Owner may clean up and charge the cost thereof to the several contractors as the Architect shall determine to be just.

ARTICLE 7 - MISCELLANEOUS PROVISIONS

7.1 LAW OF THE PLACE

7.1.1 The Contract shall be governed by the law of the place where the project is located.

7.2 SUCCESSORS AND ASSIGNS

7.2.1 The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any monies due or to become due or to become due to him hereunder, without the previous written consent of the Owner.

7.3 WRITTEN NOTICE

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to him who gives the notice.

7.4 CLAIMS FOR DAMAGES

7.4.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or if any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

7.5 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7.5.1 The Owner shall require the Contractor to furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder in such form and amount as the Owner may prescribe and with such sureties as may be agreeable to the parties. If such bonds are stipulated in the bidding requirements, the premiums shall be paid by the Contractor; if required subsequent to the submission of quotations or bids, the cost shall be reimbursed by the Owner. The Contractor shall deliver the required bonds to the Owner not later than the date of execution of the Contract, or if the work is commenced prior thereto in response to a notice to proceed, the Contractor shall, prior to commencement of the work, submit evidence satisfactory to the Owner that such bonds will be issued.

7.6 OWNER'S RIGHT TO CARRY OUT THE WORK

7.6.1 If the Contractor defaults or neglects to carry out the work in accordance with the Contract Documents or fails to perform any provision of the Contract, the Owner may, after seven days written notice to the Contractor and without prejudice to any

other remedy he may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor, the cost of correcting such deficiencies, including the cost of the Architect's and the Owner's inspectors, additional services made necessary by such default, neglect or failure. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

7.7 ROYALTIES AND PATENTS

7.7.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified, but if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Architect.

7.8 TESTS

7.8.1 If the Contract Documents, Laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any work to be inspected, tested, or approved, the Contractor shall give the Architect timely notice of its readiness and of the date arranged so the Architect may observe such inspection, testing or approval. The Owner shall bear all costs of such inspection, tests, and approvals unless otherwise provided.

7.8.2 If, after the commencement of the work, the Architect determines that any work requires special inspection, testing, or approval which Subparagraph 7.8.1 does not include, he will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing, or approval, and the Contractor shall give notice as in Subparagraph 7.8.1. If such special inspection or testing reveals a failure of the work to comply (1) with the requirements of the Contract Documents or, (2) with respect to the performance of the work, with laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, the Contractor shall bear all cost thereof, including the Architect's and the Owner's inspectors, additional service made necessary by such failure; otherwise the Owner shall bear such costs, and an appropriate Change Order will be issued.

7.8.3 All sampling and tests shall be made by a properly qualified person or testing laboratory, approved by the Division of the State Architect, who shall furnish copies of the test results to the Contractor, Architect, Owner, and the Division of the State Architect. All tests as well as sampling and preparation of samples where applicable shall be in accordance with Standards as latest adopted by A.S.T.M.

7.8.4 If the Architect wishes to observe the inspections, tests or approvals required by this Paragraph 7.8, he will do so promptly and, where practicable, at the source of supply.

7.8.5 Neither the observations of the Architect in his administration of the Contract, nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from his obligations to perform the work in accordance with the Contract Documents.

7.8.6 Payment for Tests and Inspection will be made as follows:

A. District will pay cost of testing and inspection except the following for which the Contractor shall reimburse the District:

1. Any retesting and sampling required due to failure of original test.
2. Concrete design mix.
3. Bacteriological Water Analysis testing for new relocatable buildings.

7.8.7 The Inspector of Record is to be employed by the Owner and approved by the Architect and DSA.

ARTICLE 8 - TIME - LIQUIDATED DAMAGES

8.1 DEFINITIONS

8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for substantial completion of the work as defined in Subparagraph 8.1.3, including authorized adjustments thereto.

8.1.2 The date of commencement of the work is the date established in a Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the Contract or such other date as may be established therein.

8.1.3 The Date of Substantial Completion of the work or designated portion thereof is the Date certified by the Architect when construction is sufficiently completed, in accordance with the Contract Documents, so the Owner may occupy the work or designated portion thereof for the use for which it is intended.

8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless specifically designated.

8.2 PROGRESS AND COMPLETION

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

8.2.2 The Contractor shall begin the work on the date of commencement as defined in Subparagraph 8.1.2. He shall carry the work forward expeditiously with adequate forces and shall complete it within the contract time.

8.3 DELAYS AND EXTENSIONS OF TIME - TIME LIMIT

8.3.1 The project shall be completed in the manner provided for in the Contract on or before the completion date as set forth in the Supplementary General Conditions (hereinafter called the "Fixed Completion Date"), unless extensions of time are granted in accordance with the Contract for delays caused by the perils covered by the insurance required by Article 1 hereof or by any are declared by an enactment of the Congress of the United States of America as set forth herein. Failure to complete the work within such time and in the manner provided for by the Contract shall subject the Contractor to liquidated damages in accordance with Paragraph 8.4 "Liquidated Damages." Time is and shall be of the essence.

8.3.2 The Contractor shall commence work on the Project on or before five (5) calendar days from and after receipt of written "Notice to Proceed" from the Owner to the Contractor, and will diligently prosecute the work to completion. Said Notice to Proceed shall be issued following execution of Contract and the filing by the Contractor of the required bonds and insurance. The Contractor agrees to complete all of the work on or before the Estimated Completion Date. The continuous prosecution of the work within such time shall be subject only to delays caused by any changes in the work or by any default, act or omission of the Owner, or by any other contractor employed by the Owner on the work or by riots, strikes, lock-outs, fire, earthquake, flood and conditions resulting therefrom or by the inability to obtain material, equipment or labor due to Federal Government restrictions or requirements arising out of any defense or war program. Such delays, if any, shall operate only to extend the Estimated Completion Date above specified (not in excess of the period of such delay).

8.3.3 In the event it is deemed necessary by the Owner and the Contractor to extend the time of completion of the work to be done under these specifications beyond the dates of required completion herein specified, such extensions as shall be granted by the Owner shall in no way release any guarantee given by the Contractor pursuant to the provisions of the Contract, or to relieve or release the sureties on the bonds executed pursuant to said provision. The sureties in executing the bonds on the Contract shall be deemed to have expressly agreed to any such extension of time. The Owner shall not be required to pay extended overhead cost to the Contractor for allowing an extension of time to the Contract.

8.3.4 All claims for extension of time shall be made in writing to the Architect no more than fifteen days after the occurrence of the delay; otherwise they shall be waived. In the case of a continuing cause of delay, only one claim is necessary.

8.3.5 If no schedule or agreement is made stating the dates upon which written interpretations as set forth in Subparagraph 1.2.5 shall be furnished, then no claim for delay shall be allowed on account or failure to furnish such interpretations until fifteen days after demand is made for them, and not then unless such claim is reasonable.

8.3.6 This Paragraph 8.3 does not exclude the recovery of damages for delay by either party under other provisions of the Contract Documents.

8.4 LIQUIDATED DAMAGES

8.4.1 The actual fact of the occurrence of damages and the actual amount of the damages which the Owner would suffer if the work were not completed within the specified times set forth are dependent upon many circumstances and conditions and could prevail in various combinations, and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which the Owner would suffer in the event of delay include loss of the use of the project, and, in addition, include, but are not limited to, expenses of prolonging employment of an engineering staff, costs of administration, inspection, supervision and the loss suffered by the public within the District by reason of the delay in the construction of the project to serve the public at the earliest possible time. Accordingly, the parties hereto agree that the amounts herein set forth shall be presumed to be the amount of damages sustained by the failure of the Contractor to complete the project within the respective times specified.

8.4.2 The amount of liquidated damages to be paid by the Contractor to the Owner for failure to complete the work specified will be **$250.00 for each calendar day** by which completion of the project is delayed beyond the Fixed Completion Date and continuing thereafter to the time at which the Project is completed such amount being in each case the actual cash value agreed upon as the loss to the Owner resulting from the Contractor's default.

8.4.3 In the event the Contractor shall become liable for liquidated damages under this section, the Owner, in addition to all other remedies provided by law, shall have the right to withhold any and all retained payments which would otherwise be or become due the Contractor until the liability of the Contractor under this section has been finally determined.

The Owner shall have the right to use and apply such retained amounts, in whole or in part, to reimburse the Owner for all damages due to or to become due to the Owner. Any remaining balance of such retained amounts shall be paid to the Contractor only after discharge in full of all liability incurred by the Contractor under this article. If the retained amount is not sufficient to discharge all liabilities of the Contractor incurred under this article the Contractor and its sureties shall continue to remain liable to the Owner until all such liabilities are satisfied in full.

8.4.4 In addition to any other rights it may have, the Owner may terminate the Contract at any time after the Fixed Completion Date unless the Contractor shall have been granted an extension of time for delay pursuant to this Article 8. Upon such termination the Contractor shall not be entitled to any compensation for services rendered by before or after such termination, and he shall be liable to the Owner for liquidated damages for all periods of time beyond such date until the project is fully completed.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.1 CONTRACT SUM - DEFINITION

9.1.1 The Contract Sum is stated in the Contract, or is as may be modified by duly executed change orders, and is the total amount payable by the Owner to the Contractor for their performance of the work under the Contract Documents.

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to the various portions of the work, including quantities if required by the Architect, aggregating the total Contract Sum, divided by section as enumerated in the Project Manual's "Table of Contents", so as to facilitate payments to Subcontractors. Prepare schedule of values on AIA Documents G702 and G703, and supported by such data to substantiate its correctness as the Architect may require. Each item in the schedule of values shall include its proper share of overhead, and profit. This schedule, when approved by the Architect, shall be used as a basis for the Contractor's Applications for Payment.

9.3 PROGRESS PAYMENTS

9.3.1 At least ten days before each progress payment falls due, the Contractor shall submit to the Architect an itemized Application for Payment, supported by such data substantiating the Contractor's right to payment as the Owner or the Architect may require.

9.3.2 If payments are to be made on account of materials or equipment not incorporated in the work but delivered and suitable stored at the site, or at some other location agreed upon in writing, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest including applicable insurance and transportation to the site.

9.3.3 The Contractor warrants and guarantees that title to all work, materials, and equipment covered by an application for payment, whether incorporated in the project or not, will pass to the Owner upon the receipt of such payment of the Contractor, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens" and that no work, materials, or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing the work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the contractor or such other person.

9.3.4 SUBMISSION OF CERTIFIED PAYROLL RECORDS: For all on-site work only, SHILOH ELEMENTARY SCHOOL DISTRICT requires weekly submission of certified payroll certificates. In addition to the weekly payroll records for your company, you are required to submit the weekly payroll records for all subcontractors.

9.4 CERTIFICATES FOR PAYMENTS

9.4.1 If the Contractor has made Application for Payment as above, the Architect will, with reasonable promptness but not more than seven (7) days after the receipt of the Application, issue a Certificate for Payment to the Owner with a copy to the contractor for such amount as he determines to be properly due or state in writing his reasons for withholding a Certificate as provided in Subparagraph 9.5.1.

9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on his observations at the site as provided in Subparagraph 2.2.4 and the data comprising the Application for Payment, that the work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the work is in accordance with the Contract Documents (subject to an evaluation of the work as a functioning whole upon substantial Completion, to the results of any subsequent tests required by the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in his Certificate and that the Contractor is entitled to payment in the amount certified). In addition, the Architect's final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Subparagraph 9.7.2 have been fulfilled. However, by issuing a Certificate for

Payment, the Architect shall not thereby be deemed to represent that he has made exhaustive or continuous on-site inspections to check the quality or quantity of the work or that he has reviewed construction means, methods, techniques, sequences, or procedures, or that he has made any examination to ascertain how or for what purpose the Contractor has used the monies previously paid on account of the Contract sum.

9.4.3 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner provided in the Contract.

9.4.4 No Certificate for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the project by the Owner, shall constitute an acceptance of any work not in accordance with the Contract Documents.

9.5 PAYMENTS WITHHELD

9.5.1 The Architect may decline to approve an Application for Payment and may withhold his Certificate in whole or in part if in his opinion he is unable to make representations to the Owner as provided in Subparagraph 9.4.2. The Architect may also decline to approve any Applications for Payment or, because of subsequently discovered evidence or subsequent inspections, he may nullify the whole or any part of any Certificate for payment previously issued to such extent as may be necessary in his opinion to protect the Owner from loss because of:

1. Defective work not remedied;

2. Claims filed or reasonable evidence indicating probably filing of claims;

3. Failure of the Contractor to make payments properly to Subcontractors or for labor, materials, or equipment;

4. Reasonable doubt that the work can be completed for the unpaid balance of the Contract Sum;

5. Damage to another contractor;

6. Reasonable indication that the work will not be completed within the Contract Time; or,

7. Unsatisfactory prosecution of the work by the Contractor.

9.5.2 When the above grounds in Subparagraph 9.5.1 are removed, payment shall be made for amounts withheld because of them.

9.5.3 The Contractor may, in accordance with the provisions of Public Contract Code,

Section 22300, substitute securities for any monies which the Owner may withhold to insure performance under the Contract.

9.6 FAILURE OF PAYMENT

9.6.1 If the Architect should fail to issue any Certificate for Payment, through no fault of the Contractor, within ten days after receipt of the Contractor's Application for Payment, or if the Owner would fail to pay the Contractor within twenty days after the date of payment established in the Contract any amount certified by the Architect, then the Contractor may, upon seven (7) additional days written notice to the Owner and the Architect, stop the work until payment of the amount owing has been received.

9.7 SUBSTANTIAL COMPLETION AND FINAL PAYMENT

9.7.1 When the Contractor determines that the work or a designated portion thereof acceptable to the owner is substantially complete, the Contractor shall prepare for submission to the Architect a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents.

When the Architect on the basis of an inspection determines that the work is substantially complete he will then prepare a Certificate of Substantial Completion, which shall establish the Date of Substantial Completion, which shall state the responsibilities of the Owner and the Contractor for maintenance, heat, utilities, and insurance, and shall fix the time listed therein, said time to be within the Contract Time unless extended pursuant to Paragraph 8.3.

The Certificate of Substantial Completion shall be submitted to the Owner and the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.

9.7.2 Upon receipt of written notice that the work is ready for final inspection and acceptance, and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when he finds that work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue a final Certificate for Payment stating that to the best of his knowledge, information, and belief, and on the basis of his observations and inspections, the work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor, and noted in said final Certificate, is due and payable.

9.7.3 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Architect (1) and Affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment and (3) if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens, claims or stop notices, arising out of the Contract, to the extent and in such form as may be designated by the Owner. If any Subcontractor refuses to furnish a release or waiver required by the Owner, the contractor may furnish a bond satisfactory to the Owner to indemnify him against any such lien, claim, or stop notice. If any such lien, claim, or stop notice remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the alter may be compelled to pay in discharging such lien, claim, or stop notice, including all costs and reasonable attorneys fees.

9.7.4 If after Substantial Completion of the work final completion thereof is materially delayed through no fault of the Contractor, and the Architect so confirms, the Owner shall, upon certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the work fully completed and accepted. If the remaining balance for work not fully completed or corrected is less than the retainage stipulated in the Contract, and if bonds have been furnished as required in Subparagraph 7.5.1, the written consent of the surety to the payment of the balance due for that portion of the work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

9.7.5 The making of final payment shall constitute a waiver of all claims by the Owner except those arising from:

1. Unsettled liens;

2. Faulty or defective work appearing after Substantial Completion;

3. Failure of the work to comply with the requirements of the Contract Documents; or,

4. Terms of any special guarantees required by the Contract Documents.

9.7.6 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and still unsettled.

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury, or loss to:

1. Employees on the work and all other persons who may be affected thereby;

2. All the work and all materials and equipment to be incorporated therein whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors; and,

3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadway, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations, and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by existing conditions and progress of the work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

10.2.3 When the use or storage of explosives or other hazardous material or equipment is necessary for the execution of the work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

10.2.4 Shoring and Trench Safety Plan - Attention is directed to Section 832 of the Civil Code of the State of California relating to lateral and subjacent support, and the Contractor shall comply with this law.

10.2.5 In accordance with Section 6705 of the State Labor Code, the Contractor shall submit to the District specific plans to show details of provisions for worker protection from caving ground. Not less than thirty (30) days before beginning excavation for any trench or trenches five feet or more in depth required under this Contract, the Contractor shall furnish to the Architect working drawings of his trench

safety plan. The trench safety plan working drawings shall be detailed plans showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground.

If such plan varies from the shoring system standards established by the Construction Safety Orders of the California Division of Industrial Safety or the Federal safety standards of the Department of Health, Education and Welfare, the plan shall be prepared by a registered civil or structural engineer. In no event shall the Contractor use a shoring, sloping, or protective system less effective than that required by said Construction Safety Orders, or less effective than that required by said Federal Safety Standards. Submission of this plan in no way relieves the Contractor from the requirement to maintain safety in all operations performed by him or his Subcontractors.

10.2.6 All damage or loss to any property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied by the Contractor, except damage or loss attributable to faulty Drawings or Specifications or to the acts or omissions of the Owner or Architect or anyone employed by either of them or for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor.

10.2.7 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the Owner and the Architect.

10.2.8 The Contractor shall not load or permit any part of the work to be loaded so as to endanger its safety.

10.2.9 Should the Contractor encounter material reasonably believed to be asbestos or polychlorinated biphenyl (PCB) on the site which has not been rendered harmless, the Contractor shall immediately stop work in the affected area and notify the District and the Architect of the condition in writing. Work in the affected area shall not be resumed except by written agreement of the District and Contractor if the material is asbestos or PCB, or when it has been rendered harmless.

10.2.10 The Contractor shall not be required to perform without consent any work relating to asbestos or PCB.

10.3 EMERGENCIES

10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 12 for Changes in the work.

ARTICLE 11 - INSURANCE

11.1 PROJECT INSURANCE

11.1.1 Scope - Contractor shall procure prior to commencing any activities and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or subcontractors. The cost of such insurance shall be included in the Contractor's bid.

11.1.2 Minimum Limits of Insurance - Contractor shall maintain coverage and limits no less than:

Liability - Comprehensive General Liability Insurance or Commercial General Liability Insurance including coverage for premises and operation, contractual liability, personal injury liability, products/completed operations liability, broad form property damage and owners/contractors protective liability in an amount not less than one million dollars ($1,000,000) per occurrence, combined aggregate single limit for bodily injury, personal injury and property damage written on as occurrence form. For protection of the aggregate a separate liability policy must be used for this Contract or an endorsement issued to reserve the required aggregate for this specific contract.

Automobile - Comprehensive Automobile Liability Insurance, including as applicable owned, non-owned, and hired automobile in an amount not less than one million dollars ($1,000,000) per occurrence combined single limit for bodily injury and property damage written on an occurrence form.

Workers' Compensation - The Contractor shall submit proof that Workers' Compensation Insurance as required by the Labor Code of the State of California is secured. The insurance shall include Employers Liability limits of one million dollars ($1,000,000) per accident.

11.1.3 Builder's Risk Insurance: The contractor shall take out and maintain until final acceptance of the project, Builder's Risk Insurance against all perils on a special form basis with the customary exclusions. The District shall be named as an additional

insured and the policy shall be in sufficient amount to cover fully the replacement cost of structures constituting any part of the project excluding excavation, grading and land filling.

11.2 GENERAL CONDITIONS

11.2.1 Deductibles and Self-Insured Retention - Any deductible or self-insured Retention must be declared to and approved by the District. At the option of the District either the insurer shall reduce or eliminate such deductibles or self-insured Retention as respects the District, its officials and employees; or the Contractor shall procure a bond guaranteeing payment of losses and related investigation, claim administration and defense expenses.

11.2.2 Other Provisions - The policies are to contain, or be endorsed to contain, the following provisions:

1. General Liability and Automobile Liability Coverage:
   a. The District, its officials, employees and volunteers are to be covered as additional insured as respects: liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor; premises owned, leased or used by the Contractor.

   b. The Contractor's insurance coverage shall be primary insurance as respects the District, its officials, employees and volunteers. Any insurance or self-insurance maintained by the district, its officials, employees and volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

   c. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the District, its officials, employees or volunteers.

   d. Coverage shall state that the contractor's insurance shall apply separately to each insured against who claim is made or suit is brought, except with respect to the limits of the insurer's liability.

ARTICLE 12 - CHANGES IN THE WORK

12.1 ADDENDA

12.1.1 Addenda are to be signed by the Architect and approved by DSA.

12.2 CONSTRUCTION CHANGE DOCUMENTS (CCD)

12.2.1 Construction Change Documents (CCD) shall be the process for documenting changes to the approved Plans or Specifications after the contract has been awarded. CCD's shall comply with DSA Interpretation of Regulations IR A-6. All CCD's shall be signed by the Architect and approved by DSA.

12.3 CHANGE ORDERS

12.3.1 A Change Order is a written order to the Contractor signed by the Owner and the Architect, and approved by the Division of the State Architect, issued after the execution of the Contract, authorizing a Change in the work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time.

12.3.2 The Owner, without invalidating the Contract, may order changes in the work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the work shall be authorized by Change Order, and shall execute under the applicable conditions of the Contract Document. Change Orders shall be approved by the Division of the State Architect and signed by the Contractor, in addition to the Owner and Architect.

12.3.3 The cost or credit to the Owner resulting from a change in the work shall be determined in one or more of the following ways:

1. By mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating date to permit evaluation;

2. By unit prices stated in the Contract Documents, Form of Proposal or subsequently agreed upon;

3. By costs to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or,

4. By the method provided in Subparagraph 12.2.4.

5. For all changes in the work, the allowance for overhead, profit and bond combined, included in the total cost to the Owner, shall be based upon the following schedule:

   For the Contractor, for any work performed by his own force, twelve percent (12%) of the cost;

For each subcontractor involved, work performed by his own forces, twelve percent (12%) of the cost;

For the Contractor, for work performed by his subcontractor, six percent (6%) of the amount due the subcontractor.

Cost shall be limited to the following: cost of materials, including sales tax and cost of delivery, cost of labor, including Social Security, Old Age and Unemployment Insurance (labor cost may include a prorated share of foreman charge); worker's Compensation Insurance; Rental cost of power tools and equipment.

12.3.4 If none of the methods set forth in Clauses 12.2.3.1, 12.2.3.2 or 12.2.3.3 is agreed upon, the Contractor, provided he receives a written order signed by the Owner, shall promptly proceed with the work involved. The cost of such work shall then be determined by the Architect on the basis of the reasonable expenditures and savings of those performing the work attributable to the change, including, in the case of an increase in the Contract Sum, an allowance for overhead and profit in accordance with the schedule set forth above in paragraph 12.2.3.5.

In such case, and also under Clauses 12.2.3.3 and 12.2.3.4 above, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following:

1. Cost of materials, including sales tax and cost of delivery.

2. Cost of labor, including social security, old age and unemployment insurance and fringe benefits required by collective bargaining agreement or custom.

3. Worker's compensation insurance.

4. Bond premiums.

5. Rental cost of equipment and machinery

6. Additional cost of supervision and field office personnel directly attributable to the change.

7. As-Builts.

Pending final determination of cost to the Owner, payments on account shall be made on the Architect's Certificates for Payment. The amount of credit to be allowed by the Contractor to the Owner for any deletion or change which results

in a net decrease in the Contract Sum will be the amount of the actual net cost as confirmed by the Architect. When both additions and credits covering related work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any with respect to that change.

12.4 CONCEALED CONDITIONS

12.4.1 Should concealed conditions encountered in the performance of the work below the surface of the ground be at variance with the conditions indicated by the Contract Documents or, should unknown physical conditions below the surface of the ground of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work of the character provided for in this Contract, be encountered, the Contract Sum shall be equitably adjusted by Change Order upon claim by either party made within a reasonable time after the first observance of the conditions.

12.5 CLAIMS FOR ADDITIONAL COST OR TIME

12.5.1 If the Contractor wishes to make a claim for an increase in the Contract Sum or an extension in the Contract Time, he shall give the Architect and the Construction Manager written notice thereof within ten (10) days time after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the work except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Subparagraph 12.5.1. No such claim shall be valid unless so made.

If the Owner and the Contractor cannot agree on the amount of the adjustment in the Contract Sum or the Contract Time, it shall be determined by the Architect. Any change in the Contract Sum or Contract Time resulting from such claim shall be authorized by Change Order.

12.5.2 If the Contractor claims that additional cost or time is involved because of (1) any written interpretation issued pursuant to Subparagraph 1.2.5, (2) any order by the Architect to stop the work pursuant to Subparagraph 2.2.11 where the Contractor was not at fault, or (3) any written order for a minor change in the work issued pursuant to Paragraph 12.5, the Contractor shall make such claim as provided in this Paragraph 12.4.1.

12.6 MINOR CHANGES IN THE WORK

12.6.1 The Architect shall have authority to order minor changes in the work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes may be effected by Field Order or by other written order. Such changes shall be binding on

the Owner and the Contractor. The Owner shall be notified in writing by the Architect of such changes. The Contractor shall carry out such written orders promptly.

12.7 FIELD ORDERS

12.7.1 The Architect may issue written Field Orders which interpret the Contract Documents in accordance with Subparagraph 1.2.5 or which order minor changes in the work in accordance with Paragraph 12.5 without change in Contract Sum or Contract Time. The Contractor shall carry out such Field Orders promptly.

ARTICLE 13 - UNCOVERING AND CORRECTION OF WORK

13.1 UNCOVERING OF WORK

13.1.1 If any work should be covered contrary to the request of the Architect, or to requirement specifically expressed in the Contract Document, it must if required in writing by the Architect, be uncovered for his observation and replaced, at the Contractor's expense.

13.1.2 If any other portion of the work has been covered which the Architect has not specifically requested to observe prior to being covered, the Architect may request to see such work and it shall be uncovered by the Contractor.

If such work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall be by appropriate Change Order, be charged to the Owner. If such work be found not in accordance with the Contract Document, the Contractor shall pay such costs unless it be found that this condition was caused by the Owner or a separate contractor employed as provided in Article 6, and in that event the Owner shall be responsible for the payment of such costs.

13.2 CORRECTION OF WORK

13.2.1 The Contractor shall promptly correct all work rejected by the Architect as defective or as failing to conform to the Contract Documents 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 the cost of the Architect's additional services thereby made necessary.

13.2.2 If, within one year after the Date of Substantial Completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any of the work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition.

13.2.3 The Contractor shall remove from the site all portions of the work which are defective or non-conforming and which have not been corrected under Subparagraphs 4.5.1, 13.2.1 and 13.2.2, unless removal is waived by the Owner.

13.2.4 If the Contractor fails to correct defective or non-conforming work as provided in Subparagraphs 4.5.1, 13.2.1 and 13.2.2, the Owner may correct it in accordance with Paragraph 7.6.

13.2.5 If the Contractor does not proceed with the correction of such defective or non-conforming work within a reasonable time fixed by written notice from the Architect, the Owner may remove it and may store the materials or equipment at the expense of the Contractor.

If the Contractor does not pay the cost of such removal and storage within ten days thereafter, the Owner may upon ten additional days written notice sell such work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the cost that should have been borne by the Contractor, including compensation for additional architectural services. If such proceeds of sale do not cover all cost which the Contractor should have borne, the difference shall be charged the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

13.2.6 The Contractor shall bear the cost of making good all work of the Owner or separate contractors destroyed or damaged by such correction or removal.

13.2.7 Nothing contained in this Paragraph 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 4.5 hereof. The establishment of the time period of one year after the Date of Substantial Completion or such long period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the work, and has no relationship to the time within which his obligation to comply with the Contract Documents may be sought to be enforced, not to the time within which proceedings may be commenced to establish the Contractor's

liability with respect to his obligations other than specifically to correct the work.

13.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK

13.3.1 If the Owner prefers to accept defective or non-conforming work, he may do so instead of requiring its removal and correction, in which case the Change Order will be issued to reflect an appropriate reduction in the Contract Sum, or, if the amount is determined after final payment, it shall be paid by the Contractor.

ARTICLE 14 - TERMINATION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 If the work is stopped for a period of thirty (30) days under an order of any court or other public authority having jurisdiction, through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the work under a contract with the Contractor, or if the work should be stopped for a period of thirty days by the Contractor because the Architect has not issued a Certificate for Payment as provided in Paragraph 9.6 or because the Owner has not made payment thereon as provided in Paragraph 9.6, then the Contractor may, upon fifteen days written notice to the Owner and the Architect, terminate the Contract and recover from the Owner payment for all work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit and damages.

14.2 TERMINATION BY THE OWNER

14.2.1 If the Contractor is adjudged bankrupt, or if he makes general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough property skilled workmen or proper materials, or if he fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations or order of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any right or remedy and after giving the Contractor and his surety, if any, seven days written notice, terminate the employment of the Contractor and take possession of the site, and of all materials, equipment, tools, construction, equipment and machinery thereon owned by the Contractor and may finish the work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished.

14.2.2 If the unpaid balance of the Contract Sum exceeds the costs of finishing the work,

including compensation for the Architect's and the Owner's inspectors, additional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor shall pay the difference to the Owner.

The costs incurred by the Owner as herein provided shall be certified by the Architect.

ARTICLE 15 - GUARANTEE OF WORK

15.1.1 In addition to guarantees called for elsewhere in these specifications, the Contractor shall guarantee all of his work for a period of one (1) year after the date of filing of the Notice of Completion against defective material or faulty workmanship that may arise within that period. All guarantees must be submitted to the Owner in the form attached hereto.

ARTICLE 16 - USE OF ASBESTOS

16.1.1 The use of asbestos or asbestos containing materials in this project is absolutely forbidden.

ARTICLE 17 - CHECK-IN AT SCHOOL OFFICE

17.1.1 California State Law requires that anyone, other than District personnel, must check-in at a school office before beginning work on a school site. Field crews, foremen and sub-contractors must check-in at the school office daily, must give location of work area, must describe work to be performed and must give an estimate of time required to complete the work. Compliance with these requirements will facilitate timely response from District staff including assistance to the Contractor to gain site access.

ARTICLE 18 - DIVISION OF THE STATE ARCHITECT REQUIREMENTS

18.1 All addenda shall be signed by the Architect, in compliance with Title 24, Part 1, Section 4-338 and approved by D.S.A.

18.2 All work shall be in compliance with Title 24, parts 1 through 5 and Title 19 and copies kept on job site at all times by the Contractor. Copies shall be most recent editions.

18.3 The Project Inspector shall be employed by the Owner and approved by the Architect, Structural Engineer and D.S.A. The Inspector must be present during all work proceedings.

18.4 The Testing Laboratory shall be employed by the Owner and approved by the

Architect and D.S.A.

18.5 Changes, deletions or additions shall be documented by the Architect by means of Construction Change Documents, per DSA IR A-6 and approved by the Division of the State Architect.

ARTICLE 19 - ASBESTOS NOTIFICATION

19.1 Asbestos Hazard Emergency Response Act (AHERA) B regulations require that every firm doing contract work on a school site be informed of the presence of asbestos in the areas where they would be working. The attached "Short Term Worker Notification" provides that information. Contractors are hereby advised that their work must not disturb the asbestos and that certain health hazards are associated with exposure to asbestos fibers. Short Term Worker Notification form will be completed and signed by LEA Designee and Contractor at the Pre-Construction Conference.

ARTICLE 20
CONTRACTOR'S GUARANTEE

GUARANTEE FOR _____

_____

We hereby guarantee the _____

Which we have installed in the _____

at _____ for _____ years from date of final payment.
We Agree to repair or replace to the satisfaction of the Owner any and all such work that may prove defective in workmanship or materials within that period, ordinary wear and tear and unusual abuse or neglect excepted, together with any other work which may be damaged or displaced in so doing. In the event of our failure to comply with the above mentioned conditions within a reasonable time after being notified in writing, we collectively and separately do hereby authorize the Owner to proceed to have the defects repaired and made good at our expense, and we will pay the costs and charges therefore immediately upon demand.

_____
(Signature of Subcontractor)

_____
(Signature of Subcontractor)

Date_____

ARTICLE 21
CRIMINAL HISTORY CLEARANCE/
SITE PROTECTION CERTIFICATION

In accordance with statutory, regulatory and constitutional restrictions governing the use and dissemination of criminal offender record information, the above mentioned Education Code sections allow for exceptions from obtaining a criminal history clearance of all employees under the following conditions:

1. The installation of a physical barrier at the worksite to limit contact with pupils.

2. Continual supervision and monitoring of all employees of the contractor by an employee of the contractor whom the Department of Justice has ascertained has not been convicted of a violent or serious felony.

Construction contractors are not required to comply with the backgrounding requirements set forth in the Michelle Montoya School Safety Act if one or more of the above mentioned conditions exist.

I, the undersigned, agree to fulfill the terms and requirements of Education Code Sections 33192 and 45125.1 listed above and required that the employee agree to abide by the terms of that statement.

I also, understand that if the District determines that I have either;

(a) made a false certification herein, or

(b) violated this certification by failing to carry out the requirements of Sections 33192 and 45125.1,

that the contract awarded herein is subject to termination, suspension of payments or both. I further understand that, should I violate the terms of the Michelle Montoya Safety Act of 1997, I may be subject to punishment in accordance with the requirements of Sections 33192 and 45125.1 et seq.

I acknowledge that I am aware of the provision of Education Code Sections 33192 and 4512.1 et seq., and hereby certify that I will adhere to the requirements of the Michelle Montoya School Safety Act of 1997.

_____ _____

Signature Date

END OF SECTION

SUPPLEMENTAL GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS

1.1 MATERIALS - Materials incorporated in the project, or used, or consumed, in the performance of the work.

1.2 BUILDING - Includes the entire structure, drives, walks, steps, approaches, and site.

1.3 SIMILAR - Shall be taken in its general sense and not meaning identical, and all details of such work shall be in proper relation to the location and connection of other parts of the work.

1.4 PROVIDE - Shall mean, "Furnish and install in place".

1.5 (As Directed) (Acceptable) (Rejected) Or others of similar meaning which authorize any exercise of judgment shall be distinctly understood to mean that such power to direct, accept, reject, and approve shall be vested Only in the Owner and/or Architect.

1.6 N.I.C. - Where the indication, "N.I.C." is noted on the drawings or listed in the specifications, such item is shown or listed for the purpose of general information is, "Not in Contract." Installation and connection to services for such work are not in the contract.

1.7 O.F.C.I. - Where the indication, "O.F.C.I." is noted on the drawings or listed in the specifications, such item is shown or listed for information and will be, "Owner **furnished**, Contractor **installed**." The Contractor shall verify all dimensions and details necessary for the proper installation of this item.

1.8 TIME LIMITS - All time limits stated in the contract documents are of the essence of the contract.

1.9 CALLED FOR - As called for, shown, noted, and/or indicated in the specifications and/or drawings.

ARTICLE 2 - COMPLETION DATES AND LIQUIDATED DAMAGES

2.1 FIXED COMPLETION AND ESTIMATED COMPLETION DATE: The Work shall be commenced on the date stated in the Owner's, "Notice to Proceed" (which date will not be less than five (5) consecutive calendar days from and after the date of execution of the Contract) and shall be completed **within one hundred eighty (180) calender days**. Reference Paragraph 8.3 of the General Conditions. This fixed completion date is defined as the Estimate Completion Date.

END OF SECTION

CONTRACT FORM

This agreement made on the _____, at SHILOH ELEMENTARY SCHOOL DISTRICT, in Stanislaus County, California, by and between:

_____ and

SHILOH ELEMENTARY SCHOOL DISTRICT, 6633 Paradise Rd. Modesto, CA 95358, hereinafter called the Owner.

WITNESSETH: That the Contractor and the Owner for the consideration hereinafter named agree as follows:

ARTICLE I. The Contractor agrees to furnish all labor and materials, including tools, implements, and appliances required, and to perform all the Work in a good and worker-like manner, free from any and all liens and claims of mechanics, material suppliers, subcontractors, artisans, machinists, teamsters, drayers, and laborers required for:

SHILOH ELEMENTARY SCHOOL WATER TREATMENT PLANT

for
SHILOH ELEMENTARY SCHOOL DISTRICT

all in strict compliance with the plans, drawings and specifications therefore prepared by Timothy P. Huff, Architect, and other Contract Documents relating thereto.

ARTICLE II. The contractor and the Owner agree that the Advertisement (Notice to Contractors), the Wage Scale, the General Conditions of the Contract, the Supplemental General Conditions of the Contract, Instructions to Bidders, the Specifications, the Drawings and the Addenda and Bulletins thereto, together with this Agreement, form the Contract, and they are as fully a part of the Contract as if thereto attached or therein repeated. The specifications and drawings are intended to cooperate, so that any work exhibited in the drawings and not mentioned in the specifications, or vice versa, is to be executed the same as if both mentioned in the specifications and set forth in the drawings, to the true intent and meaning of the said drawings and specifications when taken together. But no part of said specifications that is in conflict with any portion of this Contract, or that is not actually descriptive of the work to be done thereunder, or of the manner in which the said work is to be executed, shall be considered as any part of this Contract, but shall be utterly null and void, and anything that is expressly stated, delineated or shown in or upon the specifications or drawings shall govern and be followed, not withstanding anything to the contrary in any other source of information or authority to which reference may be made.

ARTICLE III. The Owner agrees to pay to the Contractor in current funds for the performance of the Contract:

($ _____) Dollars

and to make payments or account thereof as provided for in the Contract Documents.

ARTICLE IV. In the event of a dispute between the Owner or Architect and the Contractor as to an interpretation of any of the specifications or as to the quality or sufficiency of material or workmanship, the decision of the Architect shall for the time being prevail and the Contractor without delaying the job, shall proceed as directed by the Architect without prejudice to a final determination by negotiation, arbitration by mutual consent or litigation, and should the Contractor be finally determined to be either wholly or partially correct, the Owner shall reimburse him for any added costs he may have incurred by reason of work done or material supplied beyond the terms of the Contract as a result of complying with the Architect's directions as aforesaid.

ARTICLE V. Pursuant to the provisions of Sections 1773 et seq. of the Labor Code of the State of California, which are hereby incorporated by reference and made a part thereof, the Director of the Department of Industrial Relations has determined the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality of which the Work is to be performed, for each craft, classification or type of workman needed to execute this contract. Per diem wages shall be deemed to include employer payments for health and welfare, pension, vacation, apprenticeship or other training programs, and similar purposes. The director of the Department of Industrial Relations has further determined that the rate of prevailing wage for any craft, classification or type of worker to be employed on the Project is the rate established by the applicable collective bargaining agreement on file at the Director of the Department of Industrial Relations principal office at San Francisco, phone, (415) 972-8846, which rate so provided is hereby adopted by reference and shall be effective for the life of this agreement or until the Director of Department of Industrial Relations determines that another rate be adopted. It shall be mandatory upon the Contractor and on any subcontractor to pay not less than the said specified rates to all workmen employed in the execution of this agreement.

There shall be paid to each worker needed to execute the work to be performed hereunto such travel and subsistence payments as are defined in the applicable collective bargaining agreements filed in accordance with the provision of Labor Code Section 1773.8.

The Contractor as a penalty to the Owner shall forfeit Twenty-five Dollars ($25.00) for each calendar day or portion thereof for each worker paid less than the stipulated prevailing rates for such work or craft in which such worker is employed.

The difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.

The Contractor and each subcontractor shall keep or cause to be kept an accurate record showing the names and occupations of all laborers, workers, and mechanics employed by him in connection with the extension of this Contract or any subcontract thereunder, and showing also the actual per diem wage paid to each of such workers, which records shall be open at all reasonable hours to inspection by the Owner, its officers and agents and to the representatives of the Division of Labor Law Enforcement of the State Department of Industrial Relations.

ARTICLE VI. It is further understood and agreed that in accordance with the provision of Sections 1810 to 1815, inclusive, of the Labor Code of the State of California, which are hereby incorporated and made a part hereof, the time of service of any worker employed by the Contractor or subcontractor doing or contracting to do any part of the work contemplated by this agreement is limited and restricted to eight hours during any one calendar day and forty hours during any one calendar week, provided, however, work may be performed by such employee in excess of said eight hour per day and forty hours per week provided that compensation for all hours worked in excess of eight hours per day and forty hours per week, is paid at a rate not less than one and one-half times the basic rate of pay. Every Contractor and subcontractor shall keep an accurate record showing the name of and the actual hours worked each calendar day and each calendar week by each worker employed by him in connection with the work. The records shall be kept open at all reasonable hours to inspection by representatives of the Owner and the Division of Labor Law Enforcement. The Contractor shall as a penalty to the Owner forfeit Twenty-five Dollars ($25.00) for each worker employed in the execution of this Contract by the Contractor or by any subcontractor for each calendar day during which such worker is required or permitted to work more than eight hours in any one calendar day and forty hours in any one calendar week, except as herein provided.

ARTICLE VII. Contractor agrees to comply with Chapter 1, Part 7, Division 2, Section 1777.5 and 1777.6 of the California Labor Code, which are hereby incorporated and made a part hereof. These sections require that contractors and subcontractors employ apprentices in apprenticeable occupations in a ratio of not less than one apprentice for each five journeymen (unless an exemption is granted in accordance with Section 1777.5) and that contractors and subcontractors shall not discriminate among otherwise qualified employees as indentured apprentices on any public works solely on the ground of sex, race, religious creed, national origin, ancestry or color.

Only apprentices as defined in Section 3077, who are in training under apprenticeship standards and who have signed written apprentice agreements will be employed on public works in apprenticeable occupations. The responsibility for compliance with these provisions is fixed with the prime contractor for all apprenticeable occupations.

ARTICLE VIII. The Contractor will indemnify the Owner against and hold it harmless of all and any liability for damages on account of injury to persons or damage to property resulting from or arising out of or in any way connected with the performance by the Contractor of his Contract and reimburse the Owner for all cost, expenses and loss incurred by it in consequence of any claims, demands, and causes of action which may be brought against it arising out of the performance by the Contractor of this Contract.

This indemnity shall be in addition to the other indemnification provisions contained in the Contract Documents.

By this statement the Contractor represents that he has secured the payment of Workers Compensation in compliance with the provisions of the Labor Code of the State of California and during the performance of the work contemplated herein will continue so to comply with said provision of said Code. The Contractor shall supply the Owner with certificates of insurance evidencing that Workers Compensation Insurance is in effect and providing that the Owner will receive 30 days notice of cancellation.

_____	Shiloh Elementary School District
Contractor	Owner
By_____	By_____
Signature	Signature
_____	_____
Print Name	Print Name
_____	_____
Title	Title

_____
Federal I.D.#

_____
Department of Industrial Relations #

Note: If a corporation is the contractor, state the capacity (i.e., President) of the corporate office signing and affix the corporation seal; if a partnership, all partners should sign under the partnership name.

END OF SECTION

ABBREVIATIONS AND DEFINITIONS
SECTION 007100

PART 1 – GENERAL

1.01 GENERAL

Whenever the following terms, titles, or abbreviations are used in these Specifications, or in any document or instrument where these Specifications govern, the intent and meaning shall be as herein defined. Working titles having a masculine gender, such as "workman" and "journeyman" and the pronoun "he", are utilized in the specifications for the sake of brevity and are intended to refer to persons of either gender.

1.02 ABBREVIATIONS

AA	Aluminum Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
AC	Asphalt Concrete
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
APA	American Plywood Association
ASA	American Standards Association
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gage
AWS	American Welding Society
AWWA	American Water Works Association
BW	Backwash
BWS	Backwash Supply
Cal-OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CL	Centerline
CSI	Construction Specifications Institute
CY	Cubic Yards
DDW	California State Water Resources Division of Drinking Water
DI	Drop Inlet
DIP	Ductile Iron Pipe
EA	Each
EP	Edge of Pavement
FS	Federal Specifications
FTW	Filter to Waste
Inv	Invert
ISA	International Society of Arboriculture

LB	Pound
LF	Linear Feet
LS	Lump Sum
NBFU	National Board of Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Act
Owner	Shiloh School District
PCC	Portland Cement Concrete
PVC	Polyvinyl Chloride Pipe
RW	Raw Water
PLC	Programmable Logic Controller
SD	Storm Drain
D	Drain
SF	Square Foot/Feet
S/O	Slip On
SS	Sanitary Sewer
STA	Station
Title 8	Title 8 (Construction Safety Orders) of the California Code of Regulations
Title 19	Title 19 (Public Safety) of the California Code of Regulations
Title 22	Title 22 (California Drinking Water – Related Laws)
Title 24	Title 24 (Building Standards) of the California Code of Regulations
TOC	Top of Curb
TOS	Top of Slab
Typ.	Typical
UL	Underwriters' Laboratories, Inc.
UBC	Uniform Building Code (latest edition)
USBR	United States Bureau of Reclamation
UMC	Uniform Mechanical Code (latest edition)
UPC	Uniform Plumbing Code (latest edition)
WCLA	West Coast Lumbermen's Association
WIC	Woodwork Institute of California
WTP	Plumas Lake Water Treatment Plant

1.03 DEFINITIONS

Abandonment of Work: Defined as, but not limited to, becoming unresponsive to time restraints as defined in the project schedule or leaving the site unsecured for more than one day.

Acceptance: means the formal written acceptance by the Owner of the entire Contract which has been completed in all respects in accordance with the Specifications and any approved modifications.

Agreement: The written contract (Contract) signed by the Owner and the Contractor covering the Work and the furnishing of labor, materials, tools, and equipment in the construction of the Work.

Architect: TPH Architects, John Heldlund, AIA, Phone: (209) 571-2232
As Approved: shall be understood to be followed by the words “by the Engineer," unless otherwise qualified.

As Shown, Etc.: Where "as shown", "as latest indicated", "as detailed", or words of similar import are used, the reference is to the Contract unless specifically stated otherwise. Where "as directed", "as permitted", "approved", or words of similar import are used, they shall mean the direction, permission, or approval of the Owner.

Bid: When submitted on the prescribed bid form, properly signed and guaranteed, the Bid constitutes the offer of the Bidder to complete the Work at the price shown on the Bidder’s bid form.

Bid Guarantee: Cash, cashier's check, certified check, or bidder's bond accompanying the bid submitted by the bidder, as a guarantee that the bidder will enter into a Contract with the Owner for the performance of work herein described.

Bidder: Any person, persons, firm, partnership, joint venture, corporation, or combination thereof, submitting a Bid for the Work, acting directly or through a duly authorized representative.

Bid Documents: The sum of the documents that comprise the Bid by a Bidder to perform the Work.

Board of Directors: The Shiloh School District’s Board of Directors. Also referred to as “Board”.

Bid Opening: The event conducted by the Owner during which the sealed Proposals submitted by Bidders to perform the Work are opened and publicly read.

Board Of Supervisors: The Board of Supervisors of the County of Stanislaus, a political subdivision of the State of California. Also referred to as “Board”.

Calendar Day: Every day shown on the calendar. When the Contract Time is stated in Calendar Days, every day will be charged toward the Contract Time.

Change Order: A Contract amendment approved by the Owner that includes, but is not limited to, alterations, deviations, additions to, or deletions from, the Contract which are required for the proper completion of the Work.

Contract: See Agreement, provided by the Architect.

Contract Documents: Any or all of the documents listed in the Agreement.

Contractor: The person or persons, firm, partnership, joint venture, corporation, or combination thereof, private or municipal, who (that, has, have) entered into a Contract, as defined in these Specifications, with the Owner.

Contract Time: The time stated in the Contract for completion of the Work. The Contract Time may be a single allotment of time, a group of times specific to portions of the Work, or a combination of the two, or a specified completion date.

County: The County of Stanislaus, a political subdivision of the State of California.

District: The Shiloh School District, acting through its authorized representatives.

Date of the Contract: The date on which the Contract is signed by the Owner's authorized representative.

Days: Calendar days unless otherwise designated.

Engineer: Affinity Engineering acting in the capacity of consultant to the Owner. The Engineer shall issue directions to the Contractor only through the Owner. When the Specifications require that approval be obtained from the Engineer, such approval shall be requested from and be given by the Owner.

Estimated Quantities: The list of items of work and the estimated quantities associated with the Work. The Estimated Quantities provide the basis for the Bid.

He: Includes "she" and "it" and his shall include "her" and "its."

Inspector: The person or persons authorized to act as agent(s) for the Owner in the inspection of the Work.

Legal Holidays: The following days are recognized as “legal holidays” by the Owner:

New Year’s Day	January First*
Martin Luther King, Jr. Day	Third Monday in January
President’s Day	Third Monday in February
Cesar Chavez Day	March Thirty-first*
Memorial Day	Last Monday in May
Independence Day	July Fourth
Labor Day First	Monday in September
Veteran’s Day	November Eleventh*
Thanksgiving Day	Fourth Thursday in November

Thanksgiving Friday	Friday after Thanksgiving
Christmas Eve	December Twenty-forth*
Christmas	December Twenty-fifth*
New Year's Eve	December Thirty-first

* Note: If the holiday falls on a Saturday, then the holiday is recognized on the Friday before. If the holiday falls on a Sunday, then the holiday is recognized on the Monday after.
Notice To Contractors: The written notice whereby interested parties are informed of the date, location, and time of the Bid Opening of a proposed Owner Project and the terms and conditions of submitting Bids to perform the Work.

Notice To Proceed: The written authorization by the Owner to the Contractor specifying the date the Work may begin and any conditions regarding the beginning of the Work.

Or Equal: The term "or equal" shall be understood to indicate that the "equal" product be the same or better than the product named in function, performance, reliability, quality, and general configuration. Determination of equality in reference to the project design requirements will be made by the Engineer.

Plans or Drawings: The plans, drawings, profiles, cross sections, Working Drawings, and Supplemental Drawings, or reproductions thereof, approved by the Owner, which show the locations, character, dimensions, and details of the Work.

Project: Shall mean the Work.

Proposal: Shall mean "Bid".

Record Drawings: Drawings prepared by the Contractor that document changes to, additions to, or deductions from the Plans, and which represent the Work as constructed.

Schedule of Values: A statement furnished by the Contractor to the Owner reflecting the portions of the Total Contract Price allotted for the various parts of the Work for each work activity contained on the project schedule. Unless otherwise indicated in the Specifications, the total of the Schedule of Values shall equal the full cost of the Work, including all labor, material, equipment, overhead, and profit. For lump sum contracts, the Schedule of Values is the basis for reviewing the Contractor's application for progress payments.

Special Provisions: The Special Provisions are specific clauses setting forth conditions or requirements peculiar to the Work and supplementary to the Standard Construction Specifications.

Shiloh: means Shiloh School District and is also referred to as the District/Owner.

Standard Construction Specifications: The directions, provisions, and requirements contained herein. When the term “Standard Specifications" or "Specifications" is used, it means the provisions as set forth herein, together with any amendments or revisions that may be set forth in the Special Provisions. The Standard Specifications are comprised of “General Provisions” and “Technical Provisions”. Where standard specifications, such as those of "ASTM", "AASHO", etc. have been referred to, the applicable portions of such standard specifications shall become a part of these Contract Documents.

State: The State of California.

State Specifications: The version of the State of California Standard Specifications for Construction of Local Streets and Roads, issued by the California Department of Transportation, in effect at the time of Notice to Contractors.

State Plans: The version of the State of California Standard Plans for Construction of Local Streets and Roads, issued by the California Department of Transportation, in effect at the time of Notice to Contractors.

Subcontractor: A properly licensed party under contract to and responsible to the Contractor for performing a specified part of the Work; or a properly licensed party under contract and responsible to a Subcontractor of the Contractor.

Supplemental Drawing: Supplemental Drawings define the Plans or Specifications in greater detail by providing additional information that may have not been specifically or clearly shown or called out on the Plans or in the Specifications.

Technical Provisions: The provisions of the Standard Construction Specifications that describe the technical aspects of the Work.

Time Limits: all time limits stated in the Contract Documents are of the essence of the Contract. Total Contract Price: The total price for the Work as bid by the Contractor, including any additions or subtractions made via Contract Change Orders.

Work: All actions which the Contractor is contractually required to do as specified, indicated, shown, contemplated, or implied in the Contract to construct the Work, including all alterations, amendments, or extensions made by Contract Change Order or other written orders or directives of the Owner. Unless specified otherwise in the Contract, the Work includes furnishing all materials, supplies, equipment, tools, labor, transportation, supervision, and all incidentals necessary to complete the Work.

Working Day: Any day except: (a) Saturdays, Sundays, and legal holidays; (b) days on which the Contractor is specifically required by the Special Provisions or by law to suspend construction operations; or (c) days on which the Contractor is prevented from proceeding with the current controlling operation or operations of the Work for at least five (5) hours per day due to inclement weather, or conditions resulting immediately therefrom.

Working Drawing: Working Drawings detail a particular item of work and the manner in which it is to be accomplished or performed. Working Drawings are prepared by the Contractor as a submittal or a portion of a submittal and may be specifically requested by the Owner or required in the Contract or a Field Instruction or other written directive.

Whenever in the Contract Documents or upon the Drawings the words DIRECTED, REQUIRED, PERMITTED, ORDERED, DESIGNATED, PRESCRIBED, or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation or prescription of the Engineer is intended, and similarly the words APPROVED, ACCEPTABLE, SATISFACTORY, or words of like import, shall mean approved or acceptable to, or satisfactory to the Engineer, unless otherwise expressly stated.

END OF SECTION

DVBE REQUIREMENTS
SECTION 010421

PART 1 – GENERAL

1.0 DVBE QUALIFICATION

A. **GENERAL**: The Owner requires that all contracts funded by the Office of Public School Construction include stated goals for Disabled Veteran Business Enterprise (DVBE) participation.

B. **GOALS**: State law requires that State contracts have participation goals of 3 percent for DVBE as defined in Public Contract Code 10115.1.

PLEASE READ THESE DVBE REQUIREMENTS CAREFULLY. FAILURE TO COMPLY WITH THE DVBE BID REQUIREMENT WILL CAUSE YOUR BID TO BE DEEMED NONRESPONSIVE AND INELIGIBLE FOR AWARD OF THIS CONTRACT.

C. **CONTRACT GOALS/GOOD FAITH EFFORTS**: In order to be responsive to the DVBE requirement, the bidder must be responsive to at least one of the following two alternatives. (Note: The bidder has the option of satisfying **both** (A) and (B) to maximize responsiveness to the goals):

1. **Alternative A**: The bidder meets or exceeds the participation goals of 3 percent DVBE participation for the proposed contract by one of the following:
   a. The bidder is a DVBE and committed to performing not less than 3 percent of the contract amount with its own forces. If a bidder meets these provisions, Box A of Part II on the Prime Bidder Certification Form should be checked. If DVBE status is claimed form OSMB11 must be completed and submitted.
   b. The bidder is committed to use DVBE's for not less than 3 percent of the contract amount. If bidder meets these provisions, Box C of Part II on the Prime Bidder Certification Form should be checked.

Please Note: DVBE main subcontractors declared by the prime bidder on the Prime Bidder Certification must also submit letter of certification from Department of General Services (DGS) to certify status. DVBE subordinate subcontractors must also submit letter of certification from DGS.

2. **Alternative B**: The bidder makes a good faith effort to meet the participation goals by performing all of the following by the bid/proposal submission date (if bidder meets this provision, the Prime Bidder Good Faith Effort Worksheet must be completed and submitted with the Prime Bidder Certification Form in the bidder's proposal):

a. The bidder contacts State Agencies, Federal Agencies, and local DVBE organizations for purpose of identifying DVBE and submits copies of all correspondence or listings of contact to the Owners. Also, the bidders substantiates that contacts were made with other State and Federal Agencies and with local DVBE organizations to identify potentially responsible and responsive DVBE contractors. (Refer to the Prime Bidder Good Faith Effort Worksheet, Part I).

b. The bidder advertises in published trade papers and papers devoted to DVBE contracting and provide copies of the same to school district, unless time constraints imposed by the school district, as permitted by law, do not allow for that advertising. (Refer to Prime Bidder Good Faith Effort Worksheet, Part II).

c. The bidder sends invitations to bid to available DVBE subcontractors and provides a list of the DVBE that were solicited. (Refer to Prime Bidder Good Faith Effort Worksheet, Part III).

d. The bidder shall include a statement indicating that available DVBE on the above list were considered and reasons for not selecting any of them. (Refer to Prime Bidder Good Faith Effort Worksheet, Part III).

Final determination of DVBE goal attainment or a good faith effort by the bidder shall be at the Owner's sole discretion.

D. **SUBSTITUTIONS**: If awarded the contract(s), the successful bidder/vendor must use the DVBE subcontractor and/or supplier proposed in its final bid/proposal unless the contractor requested substitution from the Owner prior to the execution of the contract and the district has approved such substitution. At a minimum, the request must include:

1. A written explanation of the reason for the substitution.
2. The identity of the person or firm substituted.
3. Satisfactory evidence that the DVBE participating goals certified in the original bid proposal will still be met after the substitution.

The Owner's approval or disapproval of a substitution request should not be construed as an excuse for noncompliance with any other provision of law, including but not limited to the Subletting and Subcontracting Fair Practices Act or any other contract requirements relating to substitution of subcontractors.

Failure to adhere to the DVBE participation proposed by the successful bidder/vendor may be cause for contract termination and recovery of damages under the rights and remedies due the Owner in the default section of the contract.

E. **CONTRACT AUDITS**: Contractor agrees that the Owner has the right to review, obtain and copy all records pertaining to performance of the contract. Contractor agrees to provide the Owner with any relevant information requested and shall permit the Owner access to its premises upon reasonable notice for purposes of interviewing employees and inspecting records. The Contractor shall maintain records for a period of at least three years after final payment under the contract.

2.0 DVBE FORMS

A. **GENERAL**: Complete the appropriate DVBE Certification Forms included on the following pages and submit as directed in Section 00042 – NOTICE TO CONTRACTORS.

DESCRIPTION	**TO BE COMPLETED BY**
Prime Bidder Certification	Prime Bidder of DVBE Participation
Subcontractor Certification	Subcontractor of DVBE Participation
Prime Bidder Good Faith Effort Worksheet	Prime Bidder

B. **FAILURE TO COMPLY WITH THE DVBE BID REQUIREMENT WILL CAUSE YOUR BID TO BE DEEMED NONRESPONSIVE AND INELIGIBLE FOR AWARD OF CONTRACT**.

C. **ADDITIONAL INFORMATION:**

1. Identification: Assistance in the identification of registered DVBE businesses is available through the Office of Small Business and DVBE Services at (800) 559-5529.

END OF SECTION

PRIME BIDDER CERTIFICATION OF DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION

To be completed by the Prime Bidder

PART I – IDENTIFICATION INFORMATION		
BIDDER'S NAME	BUSINESS ADDRESS	TELEPHONE NUMBER
SCHOOL DISTRICT	COUNTY	APPLICATION NO.

PART II – METHOD OF COMPLIANCE WITH DVBE PARTICIPATION GOALS – Include this form and any other applicable documents listed in this table with your bid/proposal. Read the three columns in the table below as sentences from left to right. Check the appropriate box to indicate your method of committing the contract dollar amount.

NOTE: *Architectural, engineering, environmental, land surveying or construction management firms must indicate their method of compliance by marking the appropriate box A, B, C, or D after selection by the District and before the contract is signed.*

YOUR BUSINESS ENTERPRISE	**AND YOU**	**AND YOU**
A. ☐ *is Disabled Veteran owned and your forces, will perform at least 3 percent of this contract*	*will include a copy of your DVBE letter from the Office of Small Minority Business (OSBCR).*	
B. ☐ *is Disabled Veteran owned* ***but is unable*** *to perform the 3 percent of this contract with your forces*	*will use DVBE subcontractors/ suppliers to bring the contract participation to at least 3 percent*	*will include a copy of each DVBE's letter from OSBCR (including yours, if applicable).*
C. ☐ *is* ***not*** *Disabled Veteran owned*	*will use DVBE subcontractors/ suppliers for at least 3 percent of this contract*	
D. ☐ *is unable to meet the required participation goals*	*will complete a Good Faith Effort to obtain DVBE participation*	*will include the Prime Bidder's Good Faith Effort Worksheet.*

Note: An Office of Small Business, Certification and Resources (OSBCR) letter must be attached for each DVBE participating in the contract. The DVBE letter is obtained by application through the OSBCR and must be provided at the time of bid opening. If the letter is not provided, the bid may be deemed nonresponsive and may be ineligible for award of the contract.

Continued on reverse side

PART III – DVBE DOLLAR PARTICIPATION OF BID/PROPOSAL – *Architectural, engineering, environmental, land surveying or construction management firms complete this part **after** selection by the district and before the contract is signed.*

Show deductive alternate(s) in parenthesis. For more alternates/base bids, use a separate page to show items.

A. If your business enterprise is a DVBE, list in the appropriate column the total dollar amount of your bid to be performed by your own participation.

B. List all your DVBE subcontractors/suppliers. Enter in the appropriate column the dollar amount for each of your subcontractors/suppliers.

C. Enter the total of Lines A and B for each column.

D. Enter the dollar amount of the bid/proposal to be performed by **non**-DVBE firms. Note: This line is the sum of the prime and subcontractor(s) **non**-DVBE dollar participation.

E. Enter the sum of the column totals from Line C and Line D. Note: Please be aware that the final determination of DVBE compliance is made based on the contract amount resulting from the district's acceptance or rejection of alternates.

	BASE BID/PROPOSAL	**ALTERNATE #1**	**ALTERNATE #2**	**ALTERNATE #3 OR BASE BID B**	**ALTERNATE #4 OR BASE BID C**	**ALTERNATE #5** (Modernization or Reconstruction Only)
A. Prime Bidder, *if DVBE (own participation)*	$	$	$	$	$	$
B. DVBE Subcontractor or Supplier						
1.						
2.						
3.						
4.						
C. Subtotal (A & B)						
D. Non-DVBE						
E. Total Bid						

PRIME BIDDER GOOD FAITH EFFORT WORKSHEET

This worksheet is to be used to assist the Prime Bidder in meeting the 3% DVBE participation goal

BIDDER'S NAME	BUSINESS ADDRESS	CONTACT PERSON
TELEPHONE NUMBER	OWNER	COUNTY

GENERAL INSTRUCTIONS:

This worksheet is to be used to assist you in meeting the 3 percent DVBE participation goal. If specific information is not provided for Parts I through III, you do not meet the test of the "Good Faith Effort" and cannot so certify. If you are qualifying based on a "Good Faith Effort" you must include this form with your bid/proposal to the Owner.

PART I – CONTACTS

To identify DVBE subcontractors/suppliers for participation in your bid/proposal, contact must be made with each of the following categories. It is recommended that you contact several DVBE organizations.

CATEGORY	TELEPHONE NUMBER	DATE CONTACTED	PERSON CONTACTED
1. Owner			
2. Office of Small Business and DVBE Services (OSDS). OSDS publishes a searchable list of Disabled Veteran Business Enterprises Internet address – http://www.bidsync.com/DPXRisCASB	(916) 375-4940		
3. DVBE Organizations (*List*):			
4. Write "recorded message" in this column, if applicable.			

PART II – ADVERTISEMENTS *You must make at least two (2) advertisements, one (1) in a paper that focuses on DVBE and one (1) in a trade paper. Advertisements should be published at least 14 days prior to bid/proposal opening; if you cannot advertise 14 days prior, advertise as soon as possible and provide an explanation. (Advertisements must be published in time to allow for a reasonable response). Advertisements must include that your firm is seeking DVBE participation, the project name and location, your firm's name, your firm's contact person, and phone number.*

Attach copies of advertisements to this form.

FOCUS/TRADE PAPER NAME	CHECK ONE		DATE OF ADVERTISEMENT
	TRADE	FOCUS	

PART III – DVBE SOLICITATIONS *List DVBE subcontractors/suppliers that were invited to bid. Use the following instructions to complete the remainder of this section (read the three columns as a sentence from left to right). If you need additional space to list DVBE solicitations, please use a separate page and attach to this form.*

IF THE DVBE…..	THEN…..	AND…..
Was selected to participate	Check "yes" in the "SELECTED" column, include the applicable dollar amount in Part III of the Prime Bidder Certification	Include a copy of their DVBE letter from OSBCR.
Was **not** selected to participate	Check "no" in the "SELECTED" column	State why in the "REASON NOT SELECTED" column.
Did not respond to your solicitation	Check the "NO RESPONSE" column	

DISABLED VETERANS BUSINESS ENTERPRISES CONTACTED	SELECTED		REASON NOT SELECTED *This section must be completed*	NO RESPONSE
	YES	NO		

IMPORTANT NOTE:

Please be aware that certification of the "Good Faith Effort" may only be made if you fully complete Parts I, II, and III on both sides of this form. A copy of this form must be retained by you and may be subject to a future audit.

CERTIFICATION

I, _____ certify that I am the bidder's Chief Executive Officer and that I have made a diligent effort to ascertain the facts with regard to the representations made herein. In making this certification, I am aware of Section 12650 *et seq.* of the Government Code providing for the imposition of treble damages for making false claims.

SIGNATURE OF CHIEF EXECUTIVE OFFICER	DATE

FIELD ENGINEERING
SECTION 011419

PART 1 – GENERAL

1.01 SUMMARY

The Contractor shall provide field surveying to make elevations and grades as well as locate the new facilities being constructed.

1.02 FIELD SURVEYING

A. Utilizing the District's reference points, the Contractor shall establish the initial control base line and all control bench marks to be utilized throughout the project. The base line shall be set in accordance with all lines, dimensions, reference points, and elevations given in the Contract Documents.
Should the Contractor detect a discrepancy between the information as presented in the Contract Documents and any existing survey grid work, bench marks, structures, etc., the Contractor shall notify the Engineer immediately. New construction shall not commence until accurate control base lines and bench marks have been established.

B. The Contractor shall, throughout the course of the project, set all additional stakes which are needed for offset stakes, reference points, slope stakes, pavement and grade stakes, stakes for structures, storm drains, utilities, fence, culverts, or other structures, supplementary bench marks, and any other horizontal or vertical controls necessary to secure a correct layout and construction of the work. Stakes for line and grade for storm drains, etc., shall be set at twenty-five (25) foot maximum intervals. Base lines shall be staked in such manner as to clearly define them for the project.

C. It shall be the Contractor's responsibility that the finished work conform to the lines, grades, elevations and dimensions called for in the Contract Documents. The Work shall be subject to checking by the Engineer, but any inspection or checking of Contractor's layout by the Engineer and the acceptance of all or part of it shall not relieve the Contractor of his responsibility to secure the proper dimensions, grades, elevations and locations on the several parts of the Work. The Contractor shall exercise care in the preservation of stakes, monuments and bench marks and shall have them reset at his expense when they are lost or displaced.

D. Prior to the commencement of any Work activity, the Contractor shall survey and layout the Work to be performed and advise the Engineer of any conflicts, obstructions, concerns, etc. which will prevent completion of such work in accordance with the requirements of the Contract Documents. If the Contractor fails to conduct such survey and layout or if the survey and layout fails to identify a conflict, obstruction, etc., which it reasonably should have, and a conflict, obstruction, concern, etc., is discovered, the Contractor shall bear the cost of any standby time for labor and/or equipment which

occurs pending the Engineer's direction and the cost of rework of any Work installed which is affected by the conflict, obstruction, etc. E. Where the dimensions and locations of existing structures are of importance in the installation or connection of any part of the Work, the Contractor shall verify such dimensions and locations in the field before the fabrication of any material or equipment which is dependent on the correctness of such information.

1.03 PRESERVATION OF REFERENCE POINTS AND PROPERTY CORNERS

The Contractor shall carefully preserve bench marks, reference points, lot corners, section corners and other stakes, and in case of destruction shall be charged for the resetting of such points and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance. Price for resetting such points will be deducted from Contractor's monthly pay request. Resetting of property or section corners shall be by a surveyor licensed to practice in California.

1.04 SURVEY NOTES

Contractor shall maintain survey notes in a neat and legible format. Contractor shall provide a duplicate set of survey notes for all staking operations to the Engineer for record purposes no later than twenty-four hours after the stakes are set. The Engineer reserves the right to monitor the work of survey crews as judged necessary to show conformance with this specification. However, such monitoring shall in no way relieve the Contractor of the responsibility for survey accuracy and adequacy to obtain a finished product fully conforming to the Contract Documents. Failure to provide adequate notes in the time specified shall be justification for immediate suspension of all work.

END OF SECTION

PRESSURE AND LEAKAGE TESTS
SECTION 012119

PART 1 – GENERAL

1.01 SCOPE OF WORK

The Contractor shall test all piping, valves, and appurtenances installed under these Contract Documents. Testing shall be performed concurrent with installation. Unless otherwise approved by the Engineer each pipe run and no more than 500 feet of continuous pipe shall be installed without being tested.

1.02 SUBMITTALS

The Contractor shall prepare and submit to the Engineer schedules and procedures for testing all parts of the water main installed in accordance with Section 01 33 13. The schedule shall be submitted seven days prior to any testing.

1.03 REFERENCES:

A. AWWA C600 – Installation of Ductile-Iron Water Mains

B. AWWA C605 – Underground Installation of PVC Pipe and Fittings

C. AWWA C200 – Steel Water Piping 6-in and Larger

PART 2 – PRODUCTS

2.01 EQUIPMENT

The pump, pipe connections, and all necessary apparatus for the pressure and leakage tests, shall be furnished by the Contractor. The Contractor shall make all excavations and backfills accessible for pressure testing by the District or Engineer and shall furnish all necessary assistance for conducting the tests.

PART 3 – EXECUTION

3.01 GENERAL

The Contractor shall follow the hydrostatic testing method in accordance with ANSI AWWA C600, Section 5.2 Hydrostatic Testing, and these specifications. Air shall be vented from all high points in the line. If required, the Contractor shall provide a corporation stop in a saddle at these points to provide venting. All valves controlling the section to be tested shall be closed. A test pressure of 150 psi minimum, or 1-1/2 times the normal working pressure, whichever is greater, shall be applied and held for a period of 2 hours. The tank overflow and drain lines shall be tested to the pressure of 40 psi. The Contractor shall provide the necessary pump and a calibrated container for measurement of make-up water required to replace leakage during this 2-hour period. Allowable

leakage in the section during this test shall conform to the following method:

$$L = ND(p1/2)/\ 74000$$

Where: L = allowable leakage, in gallons per hour N = number of joints D = nominal diameter of pipe, in inches P = average test pressure during test, in psig (gauge).
All defective items discovered during the pressure test shall be repaired or replaced by the Contractor at no additional cost to the Owner. The test shall be repeated after any repair until the system meets the above leakage requirement. The test will be witnessed by the Engineer.

3.02 FILLING AND TESTING

Each segregated section of pipeline will be slowly filled with water insuring that all air is expelled. Extreme care must be taken to insure all air is expelled from the pipeline during the filling of pipe with water. The line shall stand full of water for twenty-four hours prior to testing to allow all air to escape. If necessary, tap the main at points of highest elevation so that air can be expelled as the pipe is filled with water. After successful completion of filling and air expulsion, but prior to testing, the corporation stops shall be removed and the taps tightly plugged.

3.03 RAW AND TREATED WATER USED FOR PRESSURE TESTING

Initial pressure testing can be performed using untreated well water. Prior to the facility going online, all the raw water must be purged and treated water from the effluent of the treatment plant used for pressure testing.

END OF SECTION

CONTRACTOR'S REQUEST FOR INFORMATION
SECTION 01 2613

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes general requirements for Contractor's Requests for Information (RFI).
   1. Procedure for shop drawings, product data and samples submittals are specified in accordance with Section 01 3300.
   2. Procedure for substitutions are specified in accordance Section 01 2500.

1.2 CONTRACTOR'S REQUESTS FOR INFORMATION

A. Submit a Request for Information to the Architect when:
   1. An unforeseen condition or constructibility question occurs.
   2. Questions regarding information in the Contract Documents arise.
   3. Information not found in the Contract Documents is required.

B. When possible, request such clarification either verbally or in writing at the next scheduled Project meeting.
   1. When the RFI is answered at the Project meeting, number the RFI and enter the response into the meeting minutes.
   2. When the urgency of the need, or the complexity of the item makes clarification at the next scheduled Project meeting impractical, prepare and submit a formal written RFI to the Architect without delay.

C. RFI received directly from a subcontractor will be returned to the Contractor unprocessed.

D. RFI’s that affect structural safety, fire and life safety , access compliance or energy (as applicable) shall be submitted to the Division of the State Architect for review and approval.

1.3 SUBMITTAL

A. Submit RFI’s within a reasonable time frame so as not to interfere with, or impede the progress of the Work.
   1. Keep the number of RFI’s to a minimum.
   2. When the number and frequency of RFI’s submitted becomes unwieldy, the Architect may require the Contractor to abandon the process and submit requests as either submittal, substitution or requests for change.

3. When an answer to an RFI has an effect on cost or time, notify the Architect in accordance with the Contract Documents when the RFI is received. Notification shall occur prior to commencing such work, so that the change order process can be initiated.
4. When submitting an RFI, alert the Architect, in writing, to the time available before the response will cause an impact to the Project.

B. When submitted in writing, submit the RFI in quadruplicate as follows:
1. Submit a legible written request (FAX is acceptable) on a standard CSI or AlA preprinted form or another form approved in advance by the Architect. Include the following information:
a. Project name, as listed on the Contract Documents, Architect's project number or other identifying number, if any.
b. Date.
c. Name, address, telephone and FAX numbers of the Contractor.
d. Number and title of affected Specification Section or Sections.
e. Drawing numbers and detail references, as appropriate.
f. Clear, concise explanation of information or clarification requested.
g. Blank, lined spaces for Architect's written response.

C. Each page of each attachment to the RFI shall bear the RFI number in the lower right corner.

D. Number submitted RFI'S consecutively.

E. Sign and stamp all RFI forms. RFI from subcontractors or material suppliers shall be submitted through, and be reviewed by the Contractor prior to submittal to the Architect.

F. Unanswered RFI will be returned with a stamp or notation "NOT REVIEWED".

G. Prepare and maintain an RFI Log. Update on a weekly basis. Log RFI number, brief description of content or subject discussed, date submitted, and date answered. Keep log current and furnish copy when so requested by the Architect.

H. Allow a minimum of 5 working days for review and response time; the response time will be increased if more information is required, when the RFI is submitted out-of-sequence, or if in the opinion of the Architect, more time is needed to answer the RFI.

1.4 QUALITY ASSURANCE

A. Carefully study the Contract Documents to assure that the requested information is not available therein.
1. RFI which requests information available in the Contract Documents may not be answered by the Architect.

2. Before submitting RFI to the Architect, verify that the information requested is not indicated in the Contract Documents, or cannot be determined from a careful review of same.

B. In all cases where a RFI is issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay-out a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI which fails to include a suggested solution will not be answered.

C. Do not use RFI for the following purpose:
   1. To request approval of submittals.
   2. To request approval of substitutions.
   3. To request changes to the Contract Documents and to confirm action taken by the Contractor for requested changes/substitutions to the Contract Documents.

D. If the Contractor believes that a clarification by the Architect may result in a change in Contract price, the Contractor shall not proceed with the work indicated by the RFI until a Change Order or other acceptable tracking device is prepared and approved.
   1. If the Contractor believes that a clarification by the Architect results in additional cost, the Contractor shall identify in the RFI the basis of the Contractor's bid as it relates to the RFI.
   2. Answered RFI shall not be construed as approval to perform extra work.

END OF SECTION

APPLICATION AND CERTIFICATE FOR PAYMENT
SECTION 012900

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. This Section specifies administrative and procedural requirements governing applications for payment.

B. Related work:
   1. Division 1 for construction and submittal schedule.

1.2 SCHEDULE OF VALUES

A. Coordinate preparation of the schedule of values with preparation of the Contractor's construction schedule.

B. General:
   1. Correlate line items in the schedule of values with other required administrative schedules and forms, including:
      a. Construction schedule.
      b. Application for payment form.
      c. List of subcontractors.
      d. Schedule of allowances.
      e. Schedule of alternates.
      f. List of products.
      g. List of principal suppliers and fabricators.
      h. Schedule of submittals.

   2. Submit the schedule of values to the Architect at the earliest feasible date, but in no case later than 7 days before the date scheduled for submittal of the initial application for payment.

   3. Where the Work is separated into phases that require separately phased payments, provide sub-schedules showing values correlated with each phase of payment.

C. Format and content: Use the Project Manual table of contents as a guide to establish the format for the schedule of values.
   1. Include the following on the schedule of values:
      a. Project name and location.
      b. Contractor's name and address.
      c. Project number.

d. Architect's name.
e. Date of submittal.

2. Arrange the schedule of values in a tabular form with separate columns to indicate the following for each item listed:
   a. Generic name.
   b. Related Specification Section.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that have affected value.
   g. Dollar value.
   h. Percentage of Contract Sum to the nearest 1/100 percent, adjusted to total100 percent.

3. Provide a breakdown of the Contract sum in sufficient detail to facilitate continued evaluation of applications for payment and progress reports. Break principal subcontract amounts down into several line items.

4. Round amounts off to the nearest whole dollar. The total shall equal the Contract Sum.

5. For each part of the Work where an application for payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the schedule of values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

6. For unit cost allowances, show line item value of unit cost allowances as a product of unit cost times measured quantity as estimated from the best indication in the Contract Documents.

7. For margins of cost, show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in applications for payment. Each item in the schedule of values and applications for payment shall be complete including its total cost and proportionate share of general overhead and profit margin.
   a. At the Contractor's option, temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the schedule of values or distributed as general overhead expense.

8. Update and resubmit the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract sum.

1.3 APPLICATIONS FOR PAYMENT

A. General: Each application for payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the District.
   1. The initial application for payment, the application for payment at time of Substantial Completion, and the final application for payment involve additional requirements.

B. Payment application times: Unless otherwise indicated in the Agreement, the date for each progress payment is the 15th day of each month. The period of construction work covered by each application for payment is the period ending 15 days prior to the date for each progress payment and starting the day following the end of the preceding period.

C. Payment application forms: Unless forms are provided by the District, use AlA Document G702 and Continuation Sheets G703 as the form for application for payment.

D. Application preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the District. Incomplete applications will be returned without action.
   1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions have been made.

   2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.

E. Transmittal:
   1. Submit 3 executed copies of each application for payment to the Architect so that they are received within 24 hours; one copy shall be complete, including waivers of lien and similar attachments, when required.

   2. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.

F. Waivers of mechanics lien: With each application for payment, submit waivers of mechanics lien from every entity who may lawfully be entitled to file a mechanics lien arising out of the Contract, and related to the work covered by the payment.
   1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.

   2. When an application shows completion of an item, submit final or full waivers.

   3. The District reserves the right to designate which entities involved in the Work must submit waivers.

4. Waiver delays:
    a. Submit each application for payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.

    b. Submit final application for payment with or preceded by final waivers from every entity involved with performance of work covered by the application who could lawfully be entitled to a lien.

5. Submit waivers of lien on forms, and executed in a manner, acceptable to District.

G. Initial application for payment: Administrative actions and submittals that must precede or coincide with submittal of the first application for payment include the following.
1. List of subcontractors.

2. List of principal suppliers and fabricators.

3. Schedule of values.

4. Contractor's construction schedule (preliminary if not final).

5. Schedule of principal products.

6. Schedule of unit prices, when applicable.

7. Submittal schedule (preliminary if not final).

8. List of Contractor's staff assignments.

9. List of Contractor's principal consultants.

10. Copies of building permits.

11. Copies of authorizations and licenses from governing authorities for performance of the Work.

12. Initial progress report.

13. Report of pre-construction meeting.

14. Certificates of insurance and insurance policies.

15. Performance and payment bonds, if required.

16. Data needed to acquire District's insurance.

17. Initial settlement survey and damage report, if required.

H. Application for payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an application for payment reflecting any Certificates of Partial Substantial Completion issued previously for District occupancy of designated portions of the Work.

I. Administrative actions and submittals that shall precede or coincide with the application submitted for Substantial Completion, include the following:
   1. Occupancy permits and similar approvals.

   2. Warranties (guarantees) and maintenance agreements.

   3. Test/adjust/balance records.

   4. Maintenance instructions.

   5. Meter readings.

   6. Start-up performance reports.

   7. Change-over information related to District's occupancy, use, operation and maintenance.

   8. Final cleaning.

   9. Application for reduction of retainage, and consent of surety.

   10. Advice on shifting insurance coverages.

   11. List of incomplete work, recognized as exceptions to Architect's Certificate of Substantial Completion.

J. Final payment application: Administrative actions and submittals which must precede or coincide with submittal of the final payment application for payment include the following.
   1. Completion of Project closeout requirements.

   2. Completion of items specified for completion after Substantial Completion.

   3. Assurance that unsettled claims will be settled.

   4. Assurance that work not complete and accepted will be completed without undue delay.

5. Transmittal of required Project construction records to District.

6. Certified property survey.

7. Proof that taxes, fees and similar obligations have been paid.

8. Removal of temporary facilities and services.

9. Removal of surplus materials, rubbish and similar elements.

10. Change of door locks to District's access.

END OF SECTION

PROJECT COORDINATION
SECTION 013113

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination drawings.
4. Administrative and supervisory personnel.
5. Cleaning and protection.

1.3 COORDINATION

A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the work. Coordinate construction operations included under different Sections that depend on each other for proper sequence installation, connection and operation.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
3. Make provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work in required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the work. Such administrative activities include, but are not limited to the following:

1. Coordination with District requirements.
2. Preparation of schedules.
3. Installation and removal of temporary facilities.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Project closeout activities.

D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components. Prepare coordination drawings for underground utilities and submit to Architect for review.

1. Show the relationship of components shown on separate shop drawings.
2. Indicate required installation sequences.
3. Submit coordination drawings and comply with requirements contained in Section 01300 “Submittals”.

B. Staff Names: Within fifteen (15) calendar days of commencement of construction operations, submit a list of the Contractor’s principal staff assignments, including the superintendent and other personnel in attendance at the project site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.

1. Post copies of the list in the project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

A. Inspection of Conditions: Require the installer of each major component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at substantial completion.

B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.

C. Limiting Exposures: Supervise construction operations to assure that no part o f the construction, completed or in progress, in subject to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to the following:

1. Excessive static or dynamic loading.
2. Air contamination or pollution.
3. Solvents or chemicals.
4. Soiling, staining, and corrosion.
5. Bacteria or rodent and insect infestation.
6. Combustion.
7. Electrical current.
8. High-speed operation.
9. Contact between incompatible materials.
10. Destructive testing.
11. Unprotected storage.
12. Improper shipping or handling.
13. Theft or vandalism

END OF SECTION

CONSTRUCTION SCHEDULES
SECTION 013200

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Provide projected construction schedules for all work.

   2. Revise periodically as required.

B. Use the schedules for planning, coordinating and monitoring work under the Contract, including activities of all subcontractors, equipment vendors and suppliers.

1.2 FORM OF SCHEDULES

A. Prepare Construction Schedule in the form of a Critical Path Method (CPM).
   1. Provide diagram showing critical path, and a tabulation of activities.

   2. Indicate all significant activities of Project including each trade or operation, submittals of shop drawings, construction of mockups, equipment data, procurement of materials and required approvals, by the Contractor, District where appropriate, Architect, and government agencies.

1.3 SUBMITTALS

A. Within 15 days after issuance of Notice to Proceed, provide to Architect, for review, 2 copies of a preliminary construction schedule sufficiently complete to indicate sequence of operations and durations performed within the specified Contract time. Should proposed schedule be based upon less time than the maximum time allowed, this fact will not prejudice Contractor's right to time specified.

B. Within 30 days after issuance of Notice to Proceed, provide the Architect 2 copies of the construction schedule consisting of required functions or activities, tabulation of activities, and critical path.

C. Submit updated schedule with Application for Payment thereafter until the Project is completed, provide the Architect 2 copies of an updated, reconciled schedule showing work progress.

D. Submittal of the complete, reconciled, updated schedule must be attached with the request for payment and will be a condition for progress payments.

E. Prepare and submit revised schedule when:
   1. Changes to Contract affect Contract completion time.

   2. "Slippage" occurs because of procurement delays, rain, strikes and other delays.

   3. Activities are modified from previous submittal.

   4. Delay on initial non-critical items is of such magnitude as to change course of critical path.

1.4 PREPARATION OF SCHEDULE

A. Show sequence of activities planned, their interdependence, and time estimated to perform each activity. In developing schedule, each significant activity shall be represented and identified by number, giving start and finish of each. Clearly indicate the series of activities which determine duration of Project and referred to as "Critical Path."

B. Tabulation of activities, either manual or machine run, shall be furnished showing the following information for each activity.
   1. Designation.

   2. Duration.

   3. Earliest start time.

   4. Latest start time.

   5. Earliest finish time.

   6. Latest finish time.

   7. Identification of activities on critical path.

C. Based on work flow of activities, tabulation of activities and critical path, prepare schedule to horizontal scale of time accumulated from start to finish of work with calendar dates for events and with percentage of completion directly related to scheduled performance time.

D. Schedule shall be a composite reflection of exact job requirements needed to carry out all phases of work and to complete work in compliance with Contract Documents.

E. Provide a narrative report to define:
   1. Problem areas, anticipated delays, and impact on the schedule.

2. Corrective action recommended, and its effect.

1.5 REVIEW BY ARCHITECT, AND UPDATING

A. Submit 2 prints of the schedule for review within stipulated time limit. One print will be returned marked for correction.

B. After corrections (if required), submit 4 signed copies of construction schedule, marked in color to show current progress, monthly. Mark each activity on which work has been started to show actual progress. Show actual progress by drawing a line to the point on each activity to which work has progressed at the end of reporting period.

C. During course of Project, any change proposed by Contractor to accepted critical path shall be subject to review by the Architect.

END OF SECTION

SUBMITTALS
SECTION 013300

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including but are not limited to:

1. Contractor's construction schedule.
2. Submittal schedule.
3. Daily construction reports.
4. Shop Drawings and Product Data.

B. Administrative Submittals: Refer to other Division-1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

1. Applications for payment.
2. Performance and payment bonds.
3. Insurance certificates.
4. List of Subcontractors, including name, address and telephone number, and identify portion of work responsibility.

1.3 DEFINITIONS

A. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.

1. Preparation of Coordination Drawings is specified in Division 1 Section "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.

1.4 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
   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 elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
      a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
   3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
      a. Allow one (1) week for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
      b. If an intermediate submittal is necessary, process the same as the initial submittal.
      c. Allow one (1) week for reprocessing each submittal.
      d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
   1. Provide a space approximately 4" x 5" (100 by 125mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken. **The submittal will be returned to the Contractor, without action, if the Contractor does not indicate he has first reviewed the material.**
   2. Include the following information on the label for processing and recording action taken:
      a. Project name.
      b. Date.
      c. Name and address of Architect.
      d. Name and address of Contractor.
      e. Name and address of subcontractor.
      f. Name and address of supplier.
      g. Name of manufacturer.
      h. Number and title of appropriate Specification Section.
      i. Drawing number and detail references, as appropriate.

1.5 CONTRACTORS CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart type Contractor's construction schedule. Submit within 30 days after the date established for "Commencement of the Work".
   1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values."
   2. Within each time bar indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.
   3. Secure time commitments for performing critical elements of the Work from parties involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.
   4. Coordinate the Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests and other schedules.
   5. Indicate completion of the work within the allotted time of the contract.

B. Work Stages: Indicate important stages of construction for each major portion of the Work, including submittal review, testing and installation.

C. Area Separation: Provide a separate time bar to identify each major construction area for each major portion of the work. Indicate where each element in an area must be sequenced or integrated with other activities.

D. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, Project Inspector, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.
   1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

E. Schedule Updating: Update the schedule monthly or after an event or activity, when revisions have been recognized or made. Issue the updated schedule concurrently with next construction meeting.

1.6 SUBMITTAL SCHEDULE

A. Develop a complete schedule of submittals. Submit the schedule within ten (10) days of the contract.
   1. Coordinate submittal schedule with the list of subcontractors, schedule of values and the list of products as well as the contractor's construction schedule.

2. Prepare the schedule in chronological order. Provide the following information:
    a. Scheduled date for the first submittal.
    b. Related section number.
    c. Submittal category (Shop drawings, product data or samples).
    d. Name of the subcontractor.
    e. Description of the part of the work covered.

B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, Project Inspector, subcontractors and other parties required to comply with submittal dates indicated. Post copies in the project meeting room and field office.
    1. When revision are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.

1.7 DAILY CONSTRUCTION REPORTS

A. Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Architect at weekly intervals.
    1. List of subcontractors working on site.
    2. Approximate count of personnel at the site by trade.
    3. High and low temperatures, general weather conditions.
    4. Accidents and unusual events.
    5. Project meetings, coordinate meetings, and significant decisions.
    6. Stoppages, delays, shortages and losses.
    7. Emergency event and followup procedures (when appropriate).
    8. Orders and requests of governing authorities.
    9. RFI's, Change Orders, ASI's received, implemented.
    10. Services connected, disconnected.
    11. Visitor Log; name of company and purpose of visit.
    12. Equipment or system tests and startups.
    13. Partial completion, occupancies.

1.8 SHOP DRAWINGS

A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
    1. Dimensions.
    2. Identification of products and materials included by sheet and detail number.

3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" (215 by 280 mm) but no larger than 36" x 48" (890 by 1220 mm).

C. The Contractor shall review, approve and submit to the Architect Shop Drawings and submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work.

D. The Contractor shall not perform work requiring submittal and review of Shop Drawings until the respective submittal has been reviewed by the Architect. Such work shall be in accordance with submittals.

E. By approving and submitting Shop Drawings, the Contractor represents he has determined and verified materials, field measurements and field construction criteria and has checked and coordinated the information contained within the submittals with the requirements of the work and of the Contract Documents.

F. Initial Submittal: Submit six (6) blue- or black-line print for the Architect's review. The Architect will review and return three (3) copies print.

G. One of the prints returned shall be marked-up and maintained as a "Record Document".

H. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

1.9 PRODUCT DATA

A. Collect product data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves.
1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
a. Manufacturer's printed recommendations.
b. Compliance with recognized trade association standards.
c. Compliance with recognized testing agency standards.
d. Application of testing agency labels and seals.
e. Notation of dimensions verified by field measurement.
f. Notation of coordination requirements.
2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

3. Submittals: Submit seven (7) copies of each required submittal; submit four (4) copies where required for maintenance manuals. The Architect will retain one, and will return the other marked with action taken and corrections or modifications required.
    a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
4. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
    a. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
    b. Do not permit use of unmarked copies of Product Data in connection with construction.

C. The Contractor shall review, approve and submit to the Architect Shop Drawings and submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work.

D. The Contractor shall not perform work requiring submittal and review of Shop Drawings until the respective submittal has been reviewed by the Architect. Such work shall be in accordance with submittals.

E. By approving and submitting Shop Drawings, the Contractor represents he has determined and verified materials, field measurements and field construction criteria and has checked and coordinated the information contained within the submittals with the requirements of the work and of the Contract Documents.

1.10 ARCHITECT'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal and shop drawing, mark to indicate action taken, and return promptly.
    1. Compliance with specified characteristics is the Contractor's responsibility.

B. Action Stamp: The Architect will stamp each submittal and shop drawing with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
    1. Furnish as Submitted: When the Architect marks a submittal “Furnish as Submitted”: work covered by the submittal may proceed with the installation/component as shown.
    2. Furnish as Corrected: When the Architect marks a submittal “Furnish as Corrected”, the work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.

3. Revise and Resubmit: When the Architect marks a submittal “Revise and Resubmit”, do not proceed with work covered by the submittal. Do not purchase, fabricate, deliver or any other activity until submittal has been accepted. Revise or prepare a new submittal in accordance with the notations; resubmit without delay.
    a. Do not use or allow others to use, submittals marked “Revise and Resubmit" at the Project site or elsewhere where Work is in progress.
4. Rejected: When submittals or shop drawings are marked “Rejected”, do not proceed with that part of the work covered by the submittal. Prepare a new submittal in accordance with these Contract Documents and Specifications.
    a. Do not permit submittals marked "Rejected" to be used at the Project site, or elsewhere where Work is in progress.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

DEFINITIONS AND STANDARDS
SECTION 014200

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements pertaining to reference standards and specifications listed in the Project Manual.

B. Work specified by reference to a published standard or specification of a government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall comply with, or exceed the minimum standards of quality for materials and workmanship established by the designated standard or specification.

C. Unless the Contract Documents indicate otherwise:
   1. Where conflict exists between referenced documents and Contract Documents, or between referenced documents, the one having more stringent requirements applies.
   2. Refer requirements that are different but apparently equal and uncertainties as to which quality level is more stringent to the Architect for a decision before proceeding with the affected work.

D. Where both a standard and a brand name are specified for a product in the Project Manual, the proprietary product named shall conform to or exceed the requirements of the specified reference standard. The listing of a trade name in a Project Manual shall not be construed as warranting that such product conforms to the respective reference standard.

E. Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entities' construction activity.

F. Copies of standards:
   1. Copies of applicable referenced standards are not bound in the Project Manual.
   2. Where copies of standards are needed for superintendence and quality control of the Work, obtain a copy or copies directly from the publication source and maintain in an orderly manner at the Project Site, available to the Contractor's personnel, Subcontractors. District and Architect.

G. The applicable edition of the reference standard and specification, except as listed in subparagraphs 1 and 2 below, is the latest date of issue 30 days before bids are received, when bids are requested, or on effective date of the Agreement if there is no bid.
   1. Where a publication date follows the standard.
   2. Issues listed in governing building code and regulations supersede the above requirements.

H. No provisions of any referenced standards or specifications, whether or not specifically incorporated by reference in the Contract Documents, shall be effective to change the duties and responsibilities of the District, the Architect, or Contractor, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor to assign to any of them any responsibility, duty or authority for safety precautions or procedures, or to supervise or direct the performance of the Work.

I. When so required by the Architect during the course of the Work, or by the Contract Documents, deliver to the Architect 3 copies of an affidavit or certificate, signed by the material manufacturer or supplier, stating that the material furnished conforms to the specification or standard specified.

J. For acronyms and full name of same, and for addresses and telephone number of the associations, societies and institutes referenced in the Specifications, refer to "Sources of Construction Information" published by, and available from the Construction Specification Institute (703.684.0300), "Encyclopedia of Associations" by Gale Research, or "National Trade & Professional Associations of the US" by Columbia Books.

END OF SECTION

CONTRACTOR QUALITY CONTROL
SECTION 014500

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for quality control of the Work, including test and inspection procedures.

B. Related work:
   1. Divisions 2 through 16 for specific test procedures to be performed in compliance with this Section.

1.2 ADMINISTRATIVE STAFF

A. Provide a competent and adequate staff for the administration, coordination, supervision, and superintendence of the Work.

B. Do not change key members of this staff without the consent of the District, unless such staff members prove to be unsatisfactory to the Contractor and cease to be in his employ. If the Contractor intends to change a key staff member, he shall give the District written notice at least 15 days prior to the intended change.

C. Key staff members shall be full time employees, stationed at the site.

D. Project staff shall include, but shall not be limited to, the following:
   1. Project Manager: The person who has responsibility for the prosecution of the work and who has the authority to act in matters for the coordination, direction, and technical administration of the work. Prior to commencement of the work, provide the District with the name of the project manager.

   2. Superintendent: The person who shall be in attendance at the Project site during the performance of the work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

   3. Additional staff: In addition to the general project superintendent required above, provide the services of coordinating engineer for HVAC, Plumbing, Fire Protection, Electrical, and Pool Work: The full time person who has the responsibility for the coordination of the mechanical and electrical work with the work of other trades, for the review of mechanical and electrical shop drawings, for the resolution of conflicts and interferences between trades, for directing adjustments in the work that shall be required to comply with the Contract Documents, and for commissioning the

mechanical and electrical systems. This individual shall have previous experience in coordinating these areas of work on projects of similar scale and complexity.

1.3 CONTRACTOR QUALITY CONTROL SYSTEM

A. Establish a quality control system to perform sufficient inspections and tests of all items of Work, including that of all subcontractors, to ensure conformance with the Contract Documents for materials, workmanship, construction, finish, functional performance and identification.

B. Quality control system shall ensure that the Work complies with the requirements of the Contract Documents. Controls shall be adequate to cover all construction operations.

C. Apply, install, connect, erect, use, clean, adjust, and condition articles, materials and equipment in compliance with their manufacturer latest published instructions, unless more restrictive or stringent requirements are specified in the Specifications.
   1. When specified or requested, furnish the Architect 2 copies of such printed instructions prior to introduction of such items.

   2. If product manufacturer instructions are in conflict with the Contract Documents, notify the Architect for clarification before proceeding.

   3. Keep a clean, legible copy of the various product manufacturers instructions applicable to the Work at the Project site.

D. Certificates:
   1. When specified, deliver to the Architect 2 signed certificates from suppliers of materials, equipment and manufactured items stating that such materials and manufactured items meet or exceed the standards specified.

   2. In lieu of such certification, the Contractor may submit reports of current tests made and attested by a reputable and recognized testing laboratory.

1.4 CONTRACTOR ASSISTANCE

A. Cooperate with individual or firm performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the individual or firm sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
   1. Providing access to the work to be tested or inspected and furnishing incidental labor and facilities necessary to facilitate inspections and tests.

   2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.

3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.

4. Providing the individual or firm with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.

5. Providing security and protection of samples and test equipment at the Project site.

1.5 VERIFICATION OF CONDITIONS

A. Prior to installation of any product, inspect existing supports and assemblies to receive materials to be installed and arrange for correction of defects in the existing workmanship, material or conditions that may adversely affect work to be installed.

B. Installation of materials will constitute acceptance of existing conditions as being in proper condition to receive the materials to be applied and waiver of claim that existing conditions are defective as pertains to warranty requirements.

C. Where the Specifications require a product to be installed under the supervision or inspection of the material manufacturer or its representative, manufacturer or its representative shall also inspect the work in place and issue a letter to Architect verifying that this procedure was followed without exception.

1.6 INSTALLER QUALIFICATIONS

A. Where the Specifications dictate a certain level of experience or expertise from the subcontractor/installer by requiring a minimum number of years of experience in the successful installation of a product or a minimum number of successful installations for the product specified, it shall be the Contractor responsibility to verify the installer's competence and track record before signing a subcontract to perform the affected work.

1.7 MANUFACTURER FIELD SERVICES

A. An experienced, competent, and authorized representative of the manufacturer of each item of equipment for which field services are required in the Specifications shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation.

B. In each case, the representative shall revisit the job-site as often as necessary until all problems are corrected and the equipment installation and operation are satisfactory, in the opinion of the Architect.

C. Each manufacturer representative shall furnish to the Architect a written report certifying that the equipment has been properly installed, and lubricated; is in accurate alignment; is free from any undue stress imposed by connecting piping or anchor bolts; and has been operated under full load conditions and that it operated satisfactorily.

D. All costs for these services shall be included in the Contract.

END OF SECTION

TESTING AND INSPECTION
SECTION 014520

PART 1 - GENERAL

1.1 SUMMARY

A. Work included: Testing laboratory services and inspections required during the course of construction, as specified herein. The Conditions of the Contract and the other sections of Division 1 apply to this section as fully as if repeated herein.

1.2 TESTING LABORATORY

A. Testing and inspection will be performed by an independent testing laboratory selected by and paid for by the Owner and approved by the Architect and DSA.

B. Testing and inspection services which are performed shall be in accordance with requirements of the California Building Code, latest adopted edition, and as specified herein. Testing and inspection services shall verify that work meets the requirements of the Contract Documents.

C. Test reports shall be signed by a Registered Civil Engineer licensed in the State of California.

1.3 PAYMENTS

A. Costs of initial testing and inspection, except as specifically modified hereinafter, or specified otherwise in technical sections, will be paid for by the Owner, providing such testing and inspection indicates compliance with the Contract Documents. Initial tests and inspections are defined as the first tests and inspections as hereinafter specified.

B. In the event a test or inspection indicated failure of a material or procedure to meet requirements of Contract Documents, costs for retesting and reinspection will be paid by the Owner and back charged to the Contractor.

C. Additional tests and inspections are not herein specified but requested by Owner or Architect, will be paid for by Owner, unless results of such tests and inspections are found to be not in compliance with the Contract Documents, in which case the Owner will pay all costs for initial testing as well as retesting and reinspection and back charge the Contractor.

D. Costs for additional tests or inspections required because of change in materials being provided or change of source or supply shall be paid by the Contractor direct to the Testing Laboratory.

E. Costs for work which is required to correct deficiencies shall be borne by the Contractor.

F. Cost of testing which is required solely for the convenience of Contractor in his scheduling and performance of work shall be borne of the Contractor.

PART 2 - PRODUCTS

2.1 TESTING SERVICES

A. The Owner's representative may require that testing be performed to determine that materials meet specified requirements, such testing may include, but is not necessarily limited to:

1. Soil Compaction.

2. Concrete and Mix Design, aggregates and cement.

3. Weighmaster Certificate.

4. Concrete Compression Tests.

5. Rebar.

6. Post Installed Concrete Anchors - Epoxy and Expansion.

7. Steel Shop Fabrication Welding.

8. Steel Field Welding.

END OF SECTION

PERFORMANCE AND OPERATIONAL TESTING
SECTION 014523

PART 1 – GENERAL

1.01 DESCRIPTION

This section contains requirements for the Contractor's to develop and perform startup and testing facility components as required under this contract. Datumpin will be providing the start up and testing of the overall plant and treatment system with the assistance of the contractor.

This section supplements but does not supersede specific testing requirements found elsewhere in the contract documents.

1.02 QUALITY ASSURANCE

A. Quality Assurance Program – The Contractor shall prepare a quality assurance program that includes the following:

1. A testing plan setting forth the sequence in which all testing work required under this project will be implemented.
2. A documentation program to record the results of all equipment tests.
3. A testing program for all instrumental, mechanical, electrical, and instrumentation.
4. A calibration program for all instruments, gages, meters, and thermometers used for determining the performance of equipment and systems.
5. A testing schedule conforming to the requirements specified in paragraph 2.02 C.

B. Calibration – all test equipment (gages, meters, thermometers, analysis instruments, and other equipment) used for calibrating or verifying the performance of equipment installed under this contract shall be calibrated to within plus or minus 2 percent of actual value at full scale. Test equipment used for individual test runs shall be selected so that expected values as indicated by the detailed performance specifications will fall between 60 and 85 percent of full scale. Pressure gages shall be calibrated in accordance with ANSI/ASME B40.1.

Liquid flow meters installed in pipelines shall be calibrated in situ using a strap on ultrasonic meter. Flow meter calibration work shall be performed by individuals skilled in the techniques to be employed. Calibration tests for flow metering systems shall be performed over a range of not less than 10 percent to at least 75 percent of system full scale. At least five confirmed valid data points shall be obtained within this range. Confirmed data points shall be validated by no less than three test runs with results which agree within plus or minus 2 percent.

C. References – This section contains references to the following documents:

Reference	Title
ANSI/ASME B40.1	Gauges Pressure Indicating Dial Type-Elastic Element
ASTM E77	Method for Verification and Calibration of Liquid-in Glass Thermometers
ASJRAE 41.8	Standard Methods of Measurement of Flow of Gas Flow Measurement in Open Channels and Closed Conduits, Vol. 1, U.S. Department of Commerce, National Bureau of Standards, pg. 361 Techniques of Water-Resource Investigations of the United States Geological Survey, Chapter 16, Measurement of Discharge Using Tracers

1.03 SUBMITTALS

All submittals shall be provided in accordance with Section 01 33 13 and shall include:

A. Factory instrumentation calibration

PART 2 – PRODUCTS

2.01 GENERAL

2.02 DEVELOPMENT OF TEST PLANS

The Contractor shall develop test plans describing the coordinated, sequential testing of each item to be tested. Test plans shall identify the equipment to be manipulated or observed during the testing and the specific results to be observed or obtained. The test plans shall also be specific as to support systems required to complete the test work, temporary systems required during the test work, and subcontractors' and manufacturers'

representatives to be present and expected test duration. As a minimum, the test plans shall include the following features:

A. Step-by-step proving procedure for all control and electrical circuits by imposing low voltage currents and using appropriate indicators to affirm that the circuit is properly identified and connected to the proper device and yields the proper response for the imposed signal.

B. Calibration of all field instruments.

C. Preoperational checkout procedures for all mechanical and electrical equipment.

D. Performance testing of each individual item of mechanical, electrical, and instrumentation equipment. Performance tests shall be selected to duplicate the facilities' operating conditions.

2.03 TESTING SCHEDULE

The Contractor shall produce a testing schedule for performing the test work. The schedule shall show the start date and duration of each test. The test schedule shall be submitted no later than 2 weeks in advance of the date testing is to begin.

2.04 WITNESS TESTING

The Engineer may require at their option to witness any testing under this Section. The Engineer shall provide the Contractor with a 24-hour notice of any required witness testing based on the Contractor's testing schedule.

PART 3 – EXECUTION

3.01 GENERAL

The Contractor shall organize teams made up of qualified representatives of equipment suppliers, subcontractors, the Contractor's independent testing laboratory, and others, as appropriate, to efficiently and expeditiously calibrate and test the equipment and systems installed and constructed under this contract. The objective of the testing program shall be to demonstrate, to the Engineer's satisfaction, that the structures, systems, and equipment constructed and installed under this contract meet all performance requirements and the facility is ready for the commissioning process to commence. In addition, the testing program shall produce baseline operating conditions for the Owner's Operator to use in a preventive maintenance program.

3.02 INSTRUMENTATION CALIBRATION

Calibration of analysis instruments, sensors, gages, and meters installed under this contract shall proceed on a system-by-system basis. No equipment or system performance acceptance tests shall be performed until instruments, gages, and meters to be installed in that particular system have been calibrated.

3.03 TEMPORARY FACILITIES FOR TESTING

The Contractor shall install temporary connections, piping, and valves as well as make other provisions to simulate anticipated operating conditions during the facility testing as required.

3.04 PERFORMANCE TESTS

In general, performance tests for any individual system shall be performed in the order listed below. The order may be altered only on the specific written authorization of the Engineer after receipt of a written request, complete with justification of the need for the change in sequence.

The Owner's Operator must oversee and approve of any water produced to the School's water system. The Contractor must provide a written request to the Engineer and receive approval from Owner's Operator at least one week in advance for any planned discharge into the School's water system.

The performance testing shall include the following:

A. Pressure and leakage testing as specified in Section 01 21 19.

B. Operational Simulation:

1. Operational Simulation Testing Procedures – The Contractor shall coordinate with Datumpin on the operational testing procedures that will cover the operation of the well, treatment system, and booster pumps.
2. Testing – Once all affected equipment has been subjected to the required preoperational checkout procedures and the Engineer has witnessed and has no found deficiencies in that portion of the work, individual items of equipment and systems shall be started and operated under simulated operating conditions to determine as nearly as possible whether the equipment and systems meet the requirements of these specifications.

   The equipment shall be operated for a sufficient period to observe performance characteristics, and to permit initial adjustment of operating controls. When testing requires the availability of auxiliary systems such as piping, electrical power, or instrumentation which have not yet been placed in service, the Contractor shall provide acceptable substitute sources capable of meeting the requirements of the machine, device, or system at no additional cost to the Owner. Disposal methods for testing water shall be subject to review by the Engineer. Test results shall be within the tolerances set forth in the detailed specification sections of the specifications. If no tolerances have been specified, test results shall conform to tolerances established by recognized industry practice. Where any doubt, dispute, or difference should arise between the Engineer and the Contractor regarding the test results or the methods or equipment used in the performance of such test, then the Engineer may order the test to be repeated. If the repeat test, using such modified methods or equipment as the Engineer may require, confirms the previous test, then all costs in connection with the repeat test

will be paid by the Owner. Otherwise, the costs shall be borne by the Contractor. Where the results of any functional test fail to comply with the contract requirements for such test, then such repeat tests as may be necessary to achieve the contract requirements shall be made by the Contractor at his expense.
The Contractor shall provide, at no expense to the Owner, all power, fuel, compressed air supplies, chemicals, all labor, temporary piping, heating, ventilating, and air conditioning for any areas where permanent facilities are not complete and operable at the time of functional tests, and all other items and work required to complete the functional tests. Temporary facilities shall be maintained until permanent systems are in service.

3. Retesting – If any equipment should fail during operational testing, the equipment shall be adjusted, altered, renewed, or replaced for the equipment to pass its operational test. The Contractor shall pay to the Owner all reasonable expenses incurred by the Owner, including the costs of the Engineer or Owner's Operator because of repeating such tests.
4. Post-Test Inspection – Once operational simulation testing has been completed all equipment shall be rechecked for proper alignment and realigned, as required. All equipment shall be checked for loose connections, unusual movement, or other indications of improper operating characteristics. Any deficiencies shall be corrected to the satisfaction of the Engineer. Any defects found during the inspection shall be repaired or the equipment replaced to the satisfaction of the Engineer at no cost to the Owner.

3.05 OPERATIONAL TEST

After completion of all performance testing, Datumpin (under a separate contract) with the assistance of the Contractor shall conduct an operational test of the entire facility in conjunction with the Owner's Operator to confirm facilities are operating as intended. The Owner's Operator, with support from the Contractor, shall operate the facility as intended for a period of no less than one week. During this time, all parts of the facility shall be operated at various loading conditions, as directed by the Engineer.
Should the operational testing be halted for any reason related to the facilities constructed or the equipment furnished under this contract, or the Contractor's temporary testing systems, the operational testing program shall be repeated until the operational period has been accomplished without interruption. All process units shall be brought to full operating condition, including pressure and flow.
After the operational period has been completed, the commission of the facility shall take place in accordance with Section 33 08 10 Commissioning.

END OF SECTION

TEMPORARY FACILITIES
SECTION 015000

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish required temporary facilities as shown or specified herein plus such facilities as required for proper performance of the Contract. Locate temporary facilities where directed and maintain in a safe and sanitary condition at all times until completion of the Contract. The Conditions of the Contract and the other sections of Division 1 apply to this section as fully as if repeated herein.

1.2 QUALITY ASSURANCE

A. Comply with governing regulation and utility company regulations and recommendations. Comply with pollution and environmental protection regulations for use of water and energy, for discharge of wastes and storm drainage from project site, and for control of dust, air pollution and noise.

PART 2- PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TEMPORARY SANITARY FACILITIES

A. Provide adequate temporary sanitary conveniences for the use of employees and persons engaged on the work, including subcontractors and their employees, as required by law, ordinances, or regulation of public authorities having jurisdiction.

B. Maintain sanitary facilities in a clean and sanitary condition during the entire course of the work.

3.2 TEMPORARY ELECTRIC FACILITIES

A. Provide and maintain during the progress of the work, electrical power and wiring requirements to facilitate the work of all trades and services connected with the work. Coordinate with District power source.

B. Contractor is to provide temporary electrical service or generators for power during construction until building panels are energized. Work is to conform with C.E.C. requirements.

3.3 TEMPORARY WATER

A. Make arrangements and pay costs for water required for construction purposes. Furnish and install piping or hoses to carry water to points needed on the project. Water used on the project shall be potable water. Closest availability of water shall be coordinated with the District and located on site.

B. Provide adequate fire protection for the duration of work in accordance with local codes, ordinances and Governing Regulations.

C. The Contractor shall take necessary precaution to guard against and eliminate possible fire hazards and to prevent damage to construction work, building materials, equipment, and public property. The Contractor shall be responsible for providing, maintaining and enforcing fire protection methods.

3.4 CONSTRUCTION EQUIPMENT

A. Contractor shall erect, equip, and maintain construction equipment in accordance with applicable statutes, laws, ordinance, rules and regulations of authority having jurisdiction.

B. Contractor shall provide, maintain and remove upon completion of the work all temporary rigging, scaffolding, hoisting equipment, rubbish chutes, barricades around openings and excavations, ladders, fences and other temporary work as required for all work hereunder.

C. Temporary work shall conform to requirements of State, County, and local authorities and underwriters which pertain to operation, safety and fire hazard. Contractor shall furnish and install items necessary for conformity with such requirements, whether or not called for under the separate divisions of these specifications.

3.5 FENCES AND BARRICADES

A. Construct and maintain fences, planking, barricades, lights, shoring, and warning signs as indicated on the drawings and as required by local authorities and State safety ordinances and as required to protect the Owner's property from injury or loss and as necessary for the protection of the public as follows:

1. Enclosure Fence: Before excavation begins, install an enclosure fence with lockable entrance gates. Install in a manner that will prevent people from easily entering the site, except by the entrance gates.
    a. Provide open mesh, chainlink fencing 6' high (minimum) with posts set in a compacted mixture of gravel and earth. Enclose the entire construction site including the staging area.

3.6 STORAGE

A. Operations of the contractor, including storage of materials, shall be confined to areas approved. Contractor shall be liable for damage caused by him during such use of property of the Owner or other parties. Contractor shall save the Owner, its officers and agents, and the Architect and his employees free and harmless from liability of any nature or kind arising from any use, trespass, or damage occasioned by his operations on premises of third persons.

B. Provide lockable storage containers for the security of materials and equipment as deemed appropriate by the Contractor.

3.7 TEMPORARY JOB OFFICE

A. Contractor shall provide and maintain, in good condition, on the site two (2) temporary job offices of suitable size (minimum 8' x 20') for himself, Owner's Representative and Inspector of Record. Job office shall be weatherproof and secure and shall be provided with adequate lighting, heat and ventilation.

3.8 TEMPORARY TELEPHONE SERVICE

A. Contractor shall make arrangements and pay costs, including service and toll charges, until final acceptance of the project, for temporary telephone service in the temporary job offices, for use by the Contractor, the Owner, the Architect, the Inspector and their representatives for purposes related to the work.

3.9 PROJECT IDENTIFICATION AND TEMPORARY SIGN

A. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.

1. Project Identification Signs: Engage an experienced sign painter to apply graphics. Sign to be 4' x 8' x 3/4" MDO plywood.

SHILOH ELEMENTARY SCHOOL DISTRICT

SHILOH ELEMENTARY SCHOOL

Kindergarten Building

OWNER
Shiloh Elementary School District
6633 Paradise Rd.
Modesto, CA 95358

Superintendent:

Board Members:

ARCHITECT
TPH Architects.
519 McHenry Avenue
Modesto, CA 95354

Electrical Engineer

Mechanical Engineer

Civil Engineer

Structural Engineer

Landscape Architect

Contractor

3.10 ENVIRONMENTAL PROTECTION

A. Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted or that other undesirable effects might result. Use of tools and equipment that produce noise shall comply with OSHA regulations.

3.11 FIRE AND SAFETY PLAN

A. Contractor is responsible for development of fire safety for personnel and property during the course of construction. Comply with CFC Chapter 33 for precautionary action and safety measures as needed.

3.12 REMOVAL AT COMPLETION

A. Upon completion of the work, or prior thereto, when so directed by the Architect, Contractor shall remove temporary facilities, structures and installation from the Owner's property. Similarly, return exterior areas utilized for temporary facilities to substantially their original state, or when called for on the drawings, complete the areas as shown or noted. Sanitary facilities shall be properly disinfected and evidence removed from the site.

END OF SECTION

CONSTRUCTION WASTE MANAGEMENT
SECTION 015240

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for the following:
   1. Recycling nonhazardous construction waste.
   2. Disposing of nonhazardous construction waste.

1.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

C. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

1.3 ACTION SUBMITTALS

A. Construction Waste Management Plan: Submit plan to the Local Jurisdiction at the time of permit pickup.

B. Waste Management Worksheet: Submit worksheet to the Local Jurisdiction at the time of permit final.

C. Construction Waste Management Acknowledgment: Submit Acknowledgment to the Local Jurisdiction at permit final.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Conduct construction waste management activities in accordance with 2022 California Green Building Standard Code Section 5.408, the local jurisdictions' Solid Waste Division Requirements, and all other applicable laws and ordinances.

B. Preconstruction Conference: Review methods and procedures related to waste management including, but not limited to, the following:
   1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
   2. Review requirements for documenting quantities of each type of materials that will be salvaged, recycled, or disposed of as waste.
   3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
   4. Review procedures for periodic waste collection and transportation of recycling and disposal facilities.
      a. King County Solid Waste Divisions Report of Co-mingled Recycling Facilities.

1.5 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
   1. Material category.
   2. Generation point of waste.
   3. Total quantity of waste in tons.
   4. Quantity of waste salvaged, both estimated and actual in tons.
   5. Quantity of waste recycled, both estimated and actual in tons.
   6. Total quantity of waste recovered (salvaged plus recycled) in tons.
   7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Recycling and Processing Facility Records: Indicated receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

C. Landfill Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts and invoices.

1.6 CONSTRUCTOIN WASTE MANAGEMENT PLAN (CWM)

A. Waste Identification: Indicate on form included at the end of Part, anticipated types and quantities of construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

B. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
3. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

C. The Contractor is to divert from land fill a minimum of 65% (by weight) of construction waste by means of recycling, compost and/or salvage of the non-hazardous construction debris.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste managment plan during the entire duration of the Contract.

B. Training: Train workers, subcontractors, and supplies on proper waste management procedures, as appropriate for the Work occurring at Project site.
1. Distribute waste management plan to everyone concerned within three (3) days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

3.2 RECYCLING CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
   1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
      a. Inspect containers and bins for contamination and remove contaminated materials if found.
   2. Stockpile processed materials on-site without intermixing with other materials. Place grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   3. Stockpile materials away from construction area. Do not store with in drip line of remaining trees.
   4. Store components off the ground and protect from the weather.
   5. Remove recyclable waste off Owners's property and transport to recycling receiver or processor.

3.3 RECYCLING CONSTRUCTION WASTE

A. Packaging:
   1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in dry location.
   2. Polystyrene Packaging: Separate and bag materials.
   3. Pallets: as much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
   4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:
   1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
   2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

3.4 DISPOSAL OF WASTE

A. General: Except for items or materials to be recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
   1. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION

Construction Waste Management (CWM) Plan

Note: This sample form may be used to assist in documenting compliance with the waste management plan.

Project Name: _____
Job #: _____
Project Manager: _____
Waste Hauling Company: _____
Contact Name: _____

All Subcontractors shall comply with the project's Construction Waste Management Plan.
All Subcontractor foremen shall sign the CWM Plan Acknowledgment Sheet.

Subcontractors who fail to comply with the Waste Management Plan will be subject to backcharges or withholding of payment, as deemed appropriate. For instance, Subcontractors who contaminate debris boxes that have been designated for a single material type will be subject to backcharge or withheld payment, as deemed appropriate.

1. The project's overall rate of waste diversion will be ____ %.
2. This project shall generate the least amount of waste possible by planning and ordering carefully, following all proper storage and handling procedures to reduce broken and damaged materials and reusing materials whenever possible. The majority of the waste that is generated on this jobsite will be diverted from the landfill and recycled for other use.
3. Spreadsheet 1, enclosed, identifies the waste materials that will be generated on this project, the diversion strategy for each waste type and the anticipated diversion rate.
4. Waste prevention and recycling activities will be discussed at the beginning of weekly subcontractor meetings. As each new subcontractor comes on-site, the WMP Coordinator will present him/her with a copy of the CWM Plan and provide a tour of the jobsite to identify materials to be salvaged and the procedures for handling jobsite debris. All Subcontractor foremen will acknowledge in writing that they have read and will abide by the CWM Plan. Subcontractor Acknowledgment Sheet enclosed. The CWM Plan will be posted at the jobsite trailer.
5. Salvage: Excess materials that cannot be used in the project, nor returned to the vendor, will be offered to site workers, the owner, or donated to charity if feasible.
6. [HAULING COMPANY] will provide a commingled drop box at the jobsite for most of the construction waste. These commingled drop boxes will be taken to [Sorting Facility Name and Location]. The average diversion rate for commingled waste will be ____%. As site conditions permit, additional drop boxes will be used for particular phases of construction (e.g., concrete and wood waste) to ensure the highest waste diversion rate possible.
7. In the event that the waste diversion rate achievable via the strategy described in (6) above, is projected to be lower than what is required, then a strategy of source-separated waste diversion and/or waste stream reduction will be implemented. Source separated waste refers to jobsite waste that is not commingled but is instead allocated to a debris box designated for a single material type, such as clean wood or metal.

   Notes:

   1. Waste stream reduction refers to efforts taken by the builder to reduce the amount of waste generated by the project to below four (4) pounds per square foot of building area.
   2. When using waste stream reduction measures, the gross weight of the product is subtracted from a base weight of four (4) pounds per square foot of building area. This reduction is considered additional diversion and can be used in the waste reduction percentage calculations.
8. [HAULING COMPANY] will track and calculate the quantity (in tons) of all waste leaving the project and calculate the waste diversion rate for the project. [HAULING COMPANY] will provide Project Manager with an updated monthly report on gross weight hauled and the waste diversion rate being achieved on the project. [HAULING COMPANY's] monthly report will track separately the gross weights and diversion rates for commingled debris and for each source-separated waste stream leaving the project. In the event that [HAULING COMPANY] does not service any or all of the debris boxes on the project, the [HAULING COMPANY] will work with the responsible parties to track the material type and weight (in tons) in such debris boxes in order to determine waste diversion rates for these materials.
9. In the event that Subcontractors furnish their own debris boxes as part of their scope of work, such Subcontractors shall not be excluded from complying with the CWM Plan and will provide [HAULING COMPANY] weight and waste diversion data for their debris boxes.
10. In the event that site use constraints (such as limited space) restrict the number of debris boxes that can be used for collection of designated waste the project Superintendent will, as deemed appropriate, allocate specific areas onsite where individual material types are to be consolidated. These collection points are not to be contaminated with non-designated waste types.
11. Debris from jobsite office and meeting rooms will be collected by [DISPOSAL SERVICE COMPANY]. [DISPOSAL SERVICE COMPANY] will, at a minimum, recycle office paper, plastic, metal and cardboard.

Construction Waste Management (CWM) Worksheet

Note: This sample form may be used to assist in documenting compliance with the waste management plan.

Project Name: _____

Job Number: _____

Project Manager:_____

Waste Hauling Company: _____

Construction Waste Management (CWM) Plan

WASTE MATERIAL TYPE	DIVERSION METHOD:		PROJECTED DIVERSION RATE
	COMMINGLED AND SORTED OFF SITE	SOURCE SEPARATED ON SITE	
Asphalt			
Concrete			
Shotcrete			
Metals			
Wood			
Rigid insulation			
Fiberglass insulation			
Acoustic ceiling tile			
Gypsum drywall			
Carpet/carpet pad			
Plastic pipe			
Plastic buckets			
Plastic			
Hardiplank siding and boards			
Glass			
Cardboard			
Pallets			
Job office trash, paper, glass & plastic bottles, cans, plastic			
Alkaline and rechargeable batteries, toner cartridges, and electronic devices			
Other:			
Other:			
Other:			
Other:			

Construction Waste Management (CWM) Acknowledgment

Note: This sample form may be used to assist in documenting compliance with the waste management plan.

Project Name: _____

Job Number: _____

Project Manager:_____

Waste Hauling Company: _____

CWM Plan Acknowledgment

The Foreman for each new Subcontractor that comes on site is to receive a copy of the Construction Waste Management Plan and complete this Acknowledgment Form.

I have read the Waste Management Plan for the project; I understand the goals of this plan and agree to follow the procedures described in this plan.

DATE	SUBCONTRACTOR COMPANY NAME	FOREMAN NAME	SIGNATURE

CLEANING
SECTION 017423

PART 1 - GENERAL

1.1 SUMMARY

A. Throughout the construction period, maintain the site in a standard of cleanliness as described in this Section.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

2. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.

B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 DUST CONTROL

A. Take appropriate actions daily to check the spread of dust and dirt to avoid the creation of a nuisance within the construction area (fenced area) and surrounding area. Do not use water if it results in hazardous or objectionable conditions, such as ice, flooding or pollution. Comply with all dust regulations imposed by local air pollution agencies.

B. Coordinate all clean up operations outside of the construction are with District through the Inspector.

3.2 PROGRESS CLEANING

A. General:

1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.

2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.

3. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.

4. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.

5. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

6. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Re-stack, tidy, or otherwise service arrangements to meet the requirements of subparagraph 3.2-A-1 above.

7. Maintain the site in a neat and orderly condition at all times.

3.3 FINAL CLEANING

A. "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Section 017423, Part 3.2 above.

C. Site:

1. Unless otherwise specifically directed by the Architect, broom clean paved areas on the site and public paved areas adjacent to the site.

2. Completely remove resultant debris.

D. Interior Surfaces:

1. Interior:
   a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges and other foreign matter.
   b. Remove all traces of splashed material from adjacent surfaces.
   c. Remove paint droppings, spots, stains and dirt from finished surfaces.

2. Glass: Clean inside and outside.

3. Polished Surfaces: To surfaces requiring routine application of buffed polish, apply the polish recommended by the Manufacturer of the material being polished.

4. Tile floors shall be mopped clean.

5. Carpets are to be vacuumed.

E. Schedule final cleaning as approved by the Architect to enable Owner to accept a completely clean Work.

3.4 CLEANING DURING OWNER'S OCCUPANCY

A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Architect in accordance with the General Conditions of the Contract.

END OF SECTION

PROJECT CLOSEOUT
SECTION 017700

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to the work of this section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:

1. Inspection procedures
2. Project record documents submittal.
3. Operation and maintenance manual submittal.
4. Submittal of warranties.
5. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Sections in Division 2 through 33.

1.3 COMPLETION AND FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting inspection for completion complete the following. List exceptions in the request.

1. Advise the Owner of pending insurance changeover requirements.

2. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.

3. Obtain and submit releases enabling the Owner unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates and similar releases.

4. Submit record documents and similar final record information.

5. Deliver tools, spare parts, extra stock and similar items.

6. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.

7. Complete startup testing of systems and submit all testing reports and complete instructions of the Owner's operation and maintenance personnel.

8. Complete final cleanup requirements, including touch up painting.

9. Touch up and otherwise repair and restore marred, exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the certificate of completion following inspection or advise the contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Architect will repeat inspection when requested and assured that the work is substantially complete.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

A. Submit the final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

B. Submit a copy of the Architect/Engineer's final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and has been endorsed and dated by the Architect/Engineer.

1.5 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire resistant location. Provide access to record documents for the Architect's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where shop drawings are used, record a cross-reference at the corresponding locations on the contract drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the work.
2. Mark new information that is important to the Owner but was not shown on the contract drawings or shop drawings.
3. Not related change order numbers where applicable.
4. Organize record drawing sheets into manageable sets (ie.: plumbing, mechanical and electrical). Bind sets with durable paper cover sheets; print suitable titles, dates and other identification on the cover of each set.

C. Maintenance Manuals: Organize operation and maintenance data into suitable sets of manageable size (two copies of all information). Bind properly indexed data in individual, heavy duty, two inch (2"), three (3) ring, vinyl covered binders with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information.

1. Emergency instructions.
2. Spare parts list.
3. Copies of warranties.
4. Wiring diagrams.
5. Recommended “turn around” cycles.
6. Inspection procedures.
7. Shop drawings and product data.
8. Fixture lamping schedule.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

A. Operations and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner’s personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer’s representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.
4. Tools.
5. Identification systems.
6. Control sequences.
7. Warranties and bonds.

8. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Startup.
2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.

3.2 FINAL CLEANING

A. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

END OF SECTION

OPERATION AND MAINTENANCE MANUAL
SECTION 017823

PART 1 - GENERAL

1.01 SUMMARY

This section describes the post construction operating instructions, manual description, submittal requirements, submittal of final operation and maintenance (O&M) Manuals, equipment Manuals, format and technical content for System Manuals, printed Manual requirements, electronic version of Manual (e(manual) for System Manuals, and Manual revision control.

1.02 O&M MANUAL DESCRIPTION

A. Manuals shall be provided for all equipment and systems furnished under the Contract that require maintenance, operation, or modification including testing and training equipment. Manuals shall also be provided for other items, such as finishes, when specified in the Contract Specifications. Provide manuals for each item of equipment and its component parts.

B. Manuals shall be written in English.

C. Manuals shall be subject to revisions, updates, and other alterations at the Engineer's discretion.

D. Manuals shall be provided in one of the following formats:
   1. Equipment Manuals
      a. Equipment Manuals shall be provided for off-the-shelf items. Such equipment includes sub-assemblies and components that will be replaced instead of repaired or has no need for modifications, drawings, or manual revisions.
   2. System Manuals
      a. System Manuals shall include the crane, fire sprinkler and electrical systems.
      b. System Manuals shall be specific and not include copies of the manufacturer's operation and maintenance instructions and catalog cuts.
      c. Submit manufacturer's operation and maintenance instructions, if required, separately.

1.03 SUBMITTALS

A. All submittals shall be in accordance with Section 01 33 13 Submittals

B. Submit three (3) sets of hard copy originals for review of each draft manual and for Owner's Operator's use of each final approved manual. At the Owner's discretion, the number of hardcopy originals may be reduced, but shall not be less than one set.

C. Manuals shall be sent to the Engineer for distribution.

D. Concurrently submit electronic files in accordance with requirements in Section 1.04C.

E. All text, including notes, manufacturer-supplied information such as cut sheets, specifications and other related material shall be clearly legible. All data and text incorporated in illustrations and drawings shall be legible.

F. Handwritten edits of content are prohibited. Alterations to content shall be legible and noted with detailed explanations reflected in the manual's Appendix.

G. System Manuals shall be submitted in accordance with the following requirements:
   1. Submit Outline, Complete Draft, and Pre-Final submittals for review before submitting final version.
      a. Outline – Submit manual layout, sections, and headings after final design of system or equipment has been approved.
      b. Complete Draft – Submit all text and illustrations with a sample of the binder and electronic files prior to first delivery of system or equipment.
      c. Pre-Final – Submit complete manual in accordance with criteria specified herein.
   2. Pre-Final O&M Manual Review: Submit for approval prior to final acceptance tests for the particular system or equipment and no later than 30 Days prior to initial training course for Owner's Operator personnel.
      a. Information gathered during final acceptance testing and training shall be incorporated to develop the final version of the manual.

H. Equipment Manuals shall be submitted in accordance with the following requirements:
   1. Submit Complete Table of Contents and Complete Draft for review before submitting final version.
      a. Complete Table of Contents – Submit and obtain approval of the proposed Table of Contents, including volumes, chapter numbers, section titles setup, list of figures, list of tables, list of drawings and warranty information.
      b. Complete Draft – Submit all text and illustrations, with a sample of the binder and electronic files prior to first delivery of system or equipment.

I. One set of each manual will be returned to the Contractor, marked with review-stamp-action-block marks as described in Section 01 33 00, Submittal Procedures.

J. Any non-compliant section of the manual will be identified and communicated to the Contractor in writing by the Engineer.

K. A manual returned to the Contractor marked “Not Approved” shall be revised and six sets resubmitted to the Engineer for review within 60 Days.

L. If the Engineer returns a manual to the Contractor that does not require resubmittal, the Contractor will make any noted corrections and resubmit copies of manual to the Engineer per paragraph 1.04.

1.04 SUBMITTAL OF FINAL OPERATION AND MAINTENANCE MANUALS

A. Schedule: Submit final manuals no later than 60 Days following the satisfactory completion of Acceptance tests for the subject system or equipment.

B. The requirements specified in this Article apply to both System and Off-the-Shelf Equipment Manuals.

C. Electronic submission of each manual in its final form shall include:
   1. System Manuals: In addition to submittal requirements above, one CD-ROM or USB drive of the electronic version (eManual) containing all native (MS Word) and Adobe (pdf) files required to create the submitted manual. Native and Adobe (pdf) files will be assembled in separate folders.
   2. Off-the-Shelf Manuals: One CD-ROM or USB drive of the Adobe (pdf) files used to create the submitted manual.
   3. Electronic files shall include a matrix or document showing how the files are set up and how to access them.
   4. The content of all files, native or Adobe (pdf), shall be identical to hardcopy manual submitted to the Owner. All manuals shall be submitted as one eManual pdf file, as well as separate pdf files representing each volume and chapter.
   5. Extraneous files or information should not be submitted with or incorporated in manuals.

1.05 EQUIPMENT MANUALS

A. The Engineer shall provide a book number provided by the Owner for each manual. The Contractor shall identify each manual using the assigned book number.

B. Manuals shall consist of a legible copy of the manufacturer’s operating instructions and other operation and maintenance information available from the manufacturer.

C. Manuals shall include legible copies of manufacturer’s catalog cuts with specific items bubbled or clearly marked with arrows.

1. When it would be clearer to cross out irrelevant portions of a page, neatly cross-out irrelevant information. Handwritten notes are not accepted. Notes shall be typewritten and inserted into the pdf file or added to the manual's Appendix.
2. Manuals shall include the following, as applicable and as required by the Engineer:
    a. Catalog pages.
    b. Manufacturer's pre-printed maintenance and operations instructions.
    c. Wiring diagrams.
    d. Parts lists.
    e. Warranty slips.
    f. Manufacturer's certificates, as applicable and as required by the Engineer.

D. Table of Contents that reflects all volumes, chapters, sections, procedure numbers, list of figures, list of tables, list of drawings, warranty information and corresponding page numbers.

E. Divide each chapter or section of the manual using divider pages that comply with the requirements.

F. Manuals for Plumbing and Fire Protection equipment shall list the following information:
1. Equipment identification
2. Make and model
3. Location of equipment
4. Filter sizes and quantities
5. Service and dealer directory including the authorized dealer name, phone number, address, email address, and web site for each piece of equipment.
6. Valve directory including the valve number, type, size, location, and function.
7. Controls operation and maintenance data with wiring diagrams.
8. Approved seismic restraint inspection report, certified by professional licensed Seismic Engineer, or approved representative.
9. Warranties: Submit effective date, expiration date, extent of warranty, and name and contact information of firm providing warranty.

1.06 NATIVE ELECTRONIC FILE FORMAT FOR SYSTEM MANUALS

A. The native electronic file formats are the programs used to create the Operation and Maintenance Manual.

B. Text pages shall be created using the latest release of MS Word.

C. Parts Lists shall be created using the latest release of MS Excel.

D. Illustrations and drawings, including technical illustrations, shall be created using AutoCAD 2014.

E. Text pages containing illustrations shall have the AutoCAD files inserted into the MS Word file as an object. AutoCAD files shall have a white background.

1.07 FORMAT AND TECHNICAL CONTENT FOR SYSTEM MANUALS

A. Each Manual shall meet the following requirements.
   1. Developed in conjunction with maintainability requirements.
   2. Organized so that each major subsystem is treated as an integrated system and not as a grouping of disassociated parts.
   3. Contain data required to maintain equipment during equipment service life.
   4. Contain data required to operate and maintain test equipment during equipment service life.
   5. Contain no extraneous information, such as general communications, advertisements or company or manufacturer's logos. Any reference to the manufacturer or contractor, other than necessary references to the equipment in the text, is considered an advertisement. Manufacturer or contractor's name shall not appear on binder covers or in the page titles, headers, footers or anywhere else in the document.
   6. Include all operating instructions. If required, provide a separate operating manual.
   7. Contain drawings and illustrations that include necessary details for the installation, maintenance, and repair of equipment provided.

B. Numbering and Content Minimum Requirements:
   1. Obtain a book number assigned for each manual from the Engineer.
   2. Each Manual shall be composed of one or more volumes titled and organized by subject matter.
      a. Each volume may be contained in one or more binders, if necessary, and shall be designated accordingly (i.e., Volume 1A, Volume 1B, Volume 1C, etc.).
      b. Manuals for complex, multi-component systems may be organized into volumes with each volume covering a subsystem or component of the greater system. Multiple volumes shall be used when specified in the Contract Specifications, when required by the Engineer, or when proposed by the Contractor and accepted by the Engineer.
   3. Each volume shall be consecutively numbered (i.e., Volume 1, Volume 2, Volume 3, etc.).

C. Manual (or Volume in the case of multi-volume Manuals) shall contain a Table of Contents and be organized into nine specific chapters as outlined herein.
   1. Chapter 1 – General Information and Specification
   2. Chapter 2 – Theory of Operation
   3. Chapter 3 – Troubleshooting
   4. Chapter 4 – Primary Repair

5. Chapter 5 – Secondary Repair (Component Level)
6. Chapter 6 – Preventive Maintenance
7. Chapter 7 – Illustrated Parts Catalog
8. Chapter 8 – Miscellaneous
9. Chapter 9 – Wiring Diagrams

D. Table of Contents shall reflect procedure numbers, figure numbers, table numbers and corresponding page numbers, as well as the volumes, chapters, and sections of each manual, as applicable. Table of Contents shall list and contain the following:
1. Chapter titles
2. Section titles
3. Sub-section titles and corresponding page numbers
4. List of drawings, including titles, numbers, and corresponding page numbers
5. List of figures, including figure titles, figure numbers and corresponding page numbers
6. List of tables, including titles, numbers, and corresponding page numbers
7. Procedure numbers and corresponding page numbers

E. Each chapter shall have a Table of Contents which include the following:
1. Section Titles
2. Sub-section titles and corresponding page numbers
3. List of drawings, including titles, numbers, and corresponding page numbers
4. List of figures, including figure titles, figure numbers and corresponding page numbers
5. List of tables, including titles, numbers, and corresponding page numbers
6. Procedure numbers and corresponding page numbers

F. Chapters shall comply with the following requirements:
1. Chapter 1 – "General Information and Specifications" shall provide a general overview of the system, including:
    a. A "List of Acronyms and Abbreviations" in the form of a table.
    b. General non-technical description of equipment, including interface relationships and general functions.
    c. Pictorial views of the subassembly components and parts described.
    d. Tables listing the performance specifications of equipment.
2. Chapter 2 – "Theory of Operation" shall provide a technically detailed description of equipment, by subsystem, including:
    a. Location of parts in subassembly or component being discussed.
    b. Location, function, and operation of pertinent controls, gauges, indicators, and switches.
    c. Subsystem setup and shutdown procedures.
    d. Trouble symptoms and first-response diagnostic methods.
    e. Emergency procedures and safety requirements.

f. Electrical wiring diagrams, electronic schematics, and mechanical configurations.
g. Block diagrams of provided subsystems, signal flow diagrams, including interface connections to other subsystems.
h. Applicable charts, figures, and drawings to be located at the end of text for each subsystem.

3. Chapter 3 – "Troubleshooting" shall contain:
   a. Necessary information for troubleshooting and fault isolation.
   b. Charts and tables as applicable listing symptoms, probable causes of improper operation or failure of subsystem and probable remedies.
4. Chapter 4 – "Primary Repair" shall contain the following information to allow maintenance to be performed at equipment location site:
   a. Detailed corrective maintenance procedures to be performed on equipment shall include particulars on testing alignment along with adjustments and tuning. Include detailed views of mechanical parts or schematics for tests.
   b. Step-by step procedures of installation and removal of components and subassemblies (field replaceable units).
   c. Procedures for use of special test equipment.
   d. Warning and caution notes as required.
   e. Applicable charts, figures, and drawings to be located at the end of text for each subsystem.
5. Chapter 5 – "Secondary (Component) Repair", shall contain the following regarding maintenance to be performed in a shop other than the equipment location site:
   a. Detailed corrective maintenance procedure to be performed on subassemblies and components shall include particulars on testing alignment and tuning. Include detailed views of mechanical parts or schematics.
   b. Step-by-step procedures for installation and removal of parts in assemblies and components.
   c. Procedures for use of special test equipment.
   d. Incorporate warning and caution notes, as required.
   e. Applicable charts, figures, and drawings to be located at the end of text for each subsystem.
6. Chapter 6 – "Preventive Maintenance", shall contain:
   a. Preventive maintenance procedures, schedules, and tables including lubrication requirements and frequency of application.
   b. Inspection and maintenance standards, including wear limits, settings, tolerances, and criticality of tolerances.
   c. Storage instructions for spare parts, special tools, and test equipment.
7. Chapter 7 – "Illustrated Parts Catalog", shall contain:
   a. Instructions for use of Illustrated Parts Catalog.
   b. Index by subassembly.

c. Illustrations which are exploded views of assemblies, components, and parts with leader lines and circled callout numbers to each item.
d. Detailed Parts List, including:
1) Figure Number.
2) Part index number, not to exceed 19 alphanumeric characters.
3) Description of part, including manufacturers and vendor's part number.
4) Equivalent parts available from other manufacturers.
5) Disposition of part (repairable, non-repairable, etc.).
6) Quantity required per assembly.

8. Chapter 8 – "Miscellaneous" shall contain information that is deemed inappropriate for any other chapter including descriptive brochures, manufacturer's certificates and warranty slips.
9. Chapter 9 – "Wiring Diagrams", shall contain:
a. Applicable electrical, electronic, pneumatic, and schematic diagrams.
b. Wiring diagrams, including wire color code, size, and rating; terminal and connector pin numbers; and plug and socket numbers.
c. Pin-to-pin description of each wire, using wire-marking format. Additionally, wires at each terminal block and each connector shall be independently identified and cross-referenced at the next terminating point.
d. Diagram size in accordance with that previously stated in these specifications.

G. Front Cover Page Specifications
1. The title on the cover page shall clearly describe the contents of the manual.

H. Paper, Page Layout and Page Numbers
1. Paper shall be standard white copy paper
2. Printing shall be typically double sided
3. Page Numbers shall be at the bottom center of each page with the Chapter than page number (i.e., 4-1)

I. Technical Illustrations:
1. Draw illustrations, including "exploded" views and illustrated part breakdowns. Use illustrations to facilitate descriptions of assemblies and the relationships of components, subsystems, and systems. Illustrations shall conform to the requirements and the recommendations of referenced ANSI Standards.
2. Technical illustrations shall comply with the following requirements:
a. Illustrations shall include details necessary for the installation, maintenance and repair of all equipment provided. Details shall be readable.

b. Each illustration shall be designated as a “figure”. The word “Figure,” accompanying numerical designation and caption shall be the same size, style, and type as the written text. Its physical location shall be the same on each page.
c. Figure numbers and descriptions of figures shall be readable in the horizontal position as you read the page from left to right.
d. Figures containing graphics, illustrations, diagrams, and similar drawings, shall be readable and appear at the end of the applicable section or procedure.
e. Whenever callout numbers are used in an illustration, they shall be circled and readable.
f. Graphic symbols used for electrical, and electronics shall conform to ANSI Y32.2. All symbols shall be readable.
g. Graphic symbols used for logic diagrams shall conform to ANSI Y14.5. All symbols shall be readable.

J. Revisions to Text and Drawings:
1. Revisions shall be made for design changes, retrofits, and errors as required, and based upon changes generated during testing. These revisions shall be listed on a List of Effective Pages to be issued with each review submittal and revision of the manuals until expiration of the Contract.
2. Include at the beginning of each completed manual or volume, a Configuration Control Record form adhering to the format provided by the Engineer. Form shall include columns for the chapter, page number, revision date, and revision description.
3. Refer to paragraph 1.10 entitled “Manual Revision Control” herein for revision requirements applicable to revisions to final draft and approved manuals.

1.08 PRINTED MANUAL REQUIREMENTS

A. Binder Specifications:
1. The front cover will include the project name, title of the manual, book number, and volume number if warranted.
2. The spine will include the project name, title of the manual and book number.
3. Cover and spine shall be printed on white cardstock paper.
4. Divider Page Specifications: Each chapter including the Table of Contents shall have divider tabs.

B. Final Assembly: All hard copies shall be printed out, assembled, and placed in binders.

C. The first section for each volume or book shall contain the cover sheet for that volume/book and the master Table of Contents listing all the chapters for the entire volume/book. When a volume is contained in more than one binder, each binder shall include a cover sheet, and master Table of Contents for the entire volume/book.

1.09 ELECTRONIC VERSION OF MANUAL (eMANUAL) FOR SYSTEM MANUALS

A. The eManual shall be created from the native electronic files, as specified in paragraph 1.06, herein, using Adobe Acrobat.

1.10 MANUAL REVISION CONTROL

A. Revisions of final draft and approved Manuals shall be listed on a Configuration Control Record form in the front of each Manual.
   1. Contractor shall maintain updated lists and revisions in the Manuals until the warranty period expires. Revisions shall be prepared prior to the arrival of altered components, and as soon as possible after procedures are changed or errors are found.
   2. Contractor shall provide revisions to the approved Manuals on a not less than quarterly basis during the first 12 months after the final Manuals are delivered, and then on a not less than semi-annual basis for the duration of the warranty period.
   3. Contractor shall issue revisions related to major alterations of principal subsystems or assemblies prior to the arrival of components.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

PROJECT RECORD DOCUMENTS
SECTION 017823

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general requirements for preparation, maintenance and delivery of record documents.

1.2 SUBMITTALS

A. Deliver record documents and transparencies to Architect at completion of Project.

B. Accompany submittal with transmittal letter, in duplicate, containing date, Project title and number, Contractor's name and address, title and number of each record document, certification that each document as submitted is complete and accurate, and signature of Contractor or its authorized representative.

PART 2- PRODUCTS NOT USED.

PART 3 - EXECUTION

3.1 DOCUMENT MAINTENANCE

A. Maintain one copy of the following in Contractor's field office at the site:
   1. Contract Drawings, including the Building Department stamped set.
   2. Specifications and Addenda.
   3. Reviewed shop drawings.
   4. Bulletins and change orders, field change authorization and notice of clarification, and other modifications to Contract.
   5. Field test records.

B. File record documents apart from constructions documents and maintain in clean, dry, legible condition. Make record documents available for review by the District and Architect during regular business hours.

C. Do not use record documents for construction purpose.

D. Record documents will be subject to a monthly review by the Architect prior to approval of each progress payment.

3.2 RECORDING

A. Clearly label each document "PROJECT RECORD".

B. Keep record documents current.

C. Record and properly dimension deviations on the record drawings within 24 hours after work in affected area is completed. Dimensions shall be accurate to within 1 -inch
   1. Use a fine felt or nylon tip pen with waterproof colored ink for marking.

   2. Legibly mark to record actual construction of the following:
      a. Depths of various elements of foundation in relation to first floor level.

      b. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements. Cut-off points and point of connections of utilities.

      c. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.

      d. Field changes of dimension and detail.

      e. Changes made by Change Order, Field Change Authorization and Notice of Clarification.

      f. Details not on original Contract Drawings.

      g. Do not permanently conceal any work until required information has been recorded.

D. Legibly mark-up each Section of the Specifications to record the following:
   1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment installed.

   2. Changes made by change order, field change authorization and notice of clarification.

   3. Other matters not originally specified.

E. Maintain shop drawings as record documents. Legibly annotate to record changes made after approval.

3.3 RECORD TRANSPARENCIES

A. At completion of Project, obtain from Architect and pay for a set of Mylar transparencies of all affected Contract Drawings.

B. Incorporate on transparencies, all changes noted on record set in black ink. This requirement applies to all the disciplines. An experienced, competent draftsman shall perform work.

C. Identify documents as "RECORD DRAWINGS".

3.4 CAD FILES

A. For the work listed below, submit record shop drawings prepared electronically using the latest version of AutoCAD.

B. Each of the work listed below shall be included in its own layer (or layers) within the electronic file. Provide CD with these files to the Architect for forwarding to the District.

C. Index each files with layering reference guide and reference file matrix.

D. Work to be included in CAD files:
   1. HVAC.
   2. Plumbing.
   3. Fire protection.
   4. Lighting.
   5. Fire alarm.
   6. Electrical power.

END OF SECTION

WARRANTIES AND BONDS
SECTION 017833

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes:
   1. Compile specified warranties and bonds, and specified service and maintenance contracts.

   2. Review submittals to verify compliance with Contract Documents.

   3. Submit to Architect for review and forwarding to District as specified in Section 017700.

B. Related work:
   1. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.

   2. General closeout requirements are included in Section 017700.

   3. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in Sections of Divisions 2 through 33.

   4. Certifications and other commitments and agreements for continuing services to District are specified elsewhere in the Contract Documents.

C. Disclaimers and limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers and subcontractors required to countersign special warranties with the Contractor.

1.2 WARRANTY REQUIREMENTS

A. Related damages and losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.

B. Reinstatement of warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement cost:
   1. Upon determination that work covered by a warranty has failed, replace or rebuild the affected work to an acceptable condition complying with requirements of Contract Documents.

   2. Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the District has benefited from use of that work through a portion of its anticipated useful service life.

D. District's recourse:
   1. Written warranties made to the District are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on obligations, rights, or remedies.

   2. The District reserves the right to reject warranties and to limit selections to products with warranties not in confiict with requirements of the Contract Documents.

E. The District reserves the right to refuse to accept work for the Project where a special warranty, certification, or similar commitment is required on such work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.3 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds, and service and maintenance contracts executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Submit 2 original signed copies required.

C. Furnish a typed table of contents, in orderly sequence, with the following complete information for each item:
   1. Product or assembly.

   2. Firm, with name of principal, address and telephone number.

   3. Scope.

   4. Date of beginning of warranty, bond or service and maintenance contract.

   5. Duration of warranty, bond or service maintenance contract.

6. Provide information for proper procedure to be followed in case of failure, and in instances which may affect the validity of warranty or bond.

7. Name of responsible principal of Contractor, and address and telephone number.

1.4 FORM OF SUBMITTALS

A. Prepare and bind in commercial quality D-ring type 3-ring binders with durable vinyl covers.

B. Format:
   1. Size: 8-1/2 -inch by 11 -inch; punch sheets for standard 3-ring binder. Refer to warranty sample form below. Fold larger sheets to fit into binders.

   2. Cover: Provide spine label clearly identified with WARRANTIES AND BONDS, title of Project and Contractor's name typed or printed.

1.5 TIME OF SUBMITTALS

A. For equipment or component parts of equipment put into service during construction, submit documents within 10 days after inspection and acceptance. Otherwise make submittals as specified in Section 017700.

B. For items whose acceptance is delayed materially beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.6 WARRANTY FORM

A. Submit warranties on the form attached to this Section; this applies to Contractor and all subcontractors.

WARRANTY FORM
(Contractor's or Subcontractor's Letterhead)

Warranty for _____
We hereby warrant that all materials and equipment for the _____
which we have installed at: _____
are new unless otherwise specified, and that all work is of good quality, free from faults and defects and in conformance with the contract documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective.

If, within one year after the date of substantial completion of the work or designated portion thereof or within one year after acceptance by the District of designated equipment or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the contract documents, any of the work is found to be defective or not in compliance with the contract documents, we agree to correct it promptly after receipt of a written notice from the District to do so unless the District has previously issued a written acceptance of such condition. This obligation shall survive termination of the contract.

If we fail to comply with the above paragraph within 7 days after receipt of written notice from the District to do so, or fail to pursue such compliance with diligence we, jointly and severally, do hereby authorize the District to proceed to have the defects repaired and made good at our sole expense including compensation for the architect's additional services made necessary by such default, and we will honor and pay the costs and charges for it together with interest at the maximum rate then permitted by governing state law, upon demand. If we fail to fulfill the preceding obligations, and if the District brings action to enforce this warranty, we agree to pay the District's reasonable attorney's fees incurred in connection therewith.

This warranty is for _____ year(s).

SUBCONTRACTOR:_____
Business Name

Signed: _____ Print Name: _____
Date: _____

COUNTER SIGNED
GENERAL CONTRACTOR: _____
Business Name

Signed: _____ Print Name: _____
Date:_____

END OF SECTION

CONCRETE FORMWORK
SECTION 031000

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes:
   1. Forms for cast-in-place concrete.

   2. Shoring, bracing, accessories and form coating.

B. Work installed but furnished in other Sections:
   1. Inserts, bolts, anchors and other items furnished by other trades for installation in formed concrete.

C. Related work:
   1. Division 3 for concrete finishing.

1.2 SYSTEM DESCRIPTION

A. Design requirements: Engineer, fabricate, assemble and install concrete formwork to meet or exceed the criteria indicated and specified, to conform to the profiles indicated and to other requirements of the Contract Documents, to satisfy the requirements of the authorities having jurisdiction, and to provide a watertight, structurally sound, self-draining assembly.

1.3 SUBMITTALS

A. Submit manufacturer's product data, specifications, typical installation details and other data as necessary to demonstrate compliance with the specified requirements for form materials, including coatings, release agents, ties and accessories.

B. Closeout: Submit Contractor's form and shoring removal record.

1.4 QUALITY ASSURANCE

A. Grading: Provide lumber and plywood grade-marked by a grading agency acceptable to the authorities having jurisdiction.

B. Installer's qualifications: Firm and individuals with a minimum of 3 consecutive years experience in the fabrication and erection of concrete formwork on projects similar in material, design, complexity and extent to this Project, and whose work has resulted in applications with a record of successful in-service performance.

1.5 HANDLING

A. Store materials outdoors, off the ground on pallets, protected with breathing type covers.

B. Handling: Handle form facing materials to prevent damages that could be transferred to finished concrete work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lumber forms: Douglas Fir or Hemlock.

B. Plywood forms: Simpson "B-Matte FormGuard" or equal overlaid plywood complying with US Product Standard PS-1, exterior grade and edge sealed, APA grade-stamped, or ABS, PVC, steel or FRP forms.

2.2 ACCESSORIES

A. Chamfer strips: Basis of design is for extruded PVC with 3/4-inch diagonal face, unless otherwise indicated, by one of the following:
   1. The Burke Co.
   2. Chemrex, lnc./Sonneborn Building Products
   3. Or equal.

B. Form ties and spreaders:
   1. Provide cone or snap ties designed to be completely removed from wall, or to break off and provide minimum 1-1/2-inch coverage over ends of the portion of snap tie remaining in the concrete, and which will not leave a hole larger than 1-inch in diameter in the concrete surface.
   2. Do not use wire ties, wood spreaders, or embedded types in which embedded portion is less than 1-1/2-inch from exterior face of concrete.

C. Form coating: Basis of design is for "Crete-Lease 880" by Cresset Chemical Co., or equal.

D. Prefabricated construction joint keyways: Basis of design is for "Key-Lac" joint system with all accessories by Form-A-Key Concrete Specialties Products. Other acceptable materials/manufacturers include the following:
   1. SJ-7 Screed Joint by MedCo.
   2. Or equal.

E. Sealants: As specified in Section 079200.

2.3 FORMWORK REQUIREMENTS

A. General:
   1. Form contact surfaces shall be clean, free from dents, holes and other imperfections.

   2. Establish and maintain benchmarks, lines and controls necessary to achieve specified tolerances.

   3. Take an accurate survey of the form location just prior to concrete pour.

B. Earth bank:
   1. Except for exterior face of wall footings and grade beams that must be formed, earth banks may be used to form footings and grade beams if the soil is firm, neatly trimmed, and will retain concrete in the required size and shape.

   2. Increase the concrete coverage as required by the authorities having jurisdiction when concrete is cast against earth.

C. Wood forms: Construct with plywood panels as large as practicable.

D. Re-use of forms:
   1. Form materials may be re-used if they produce finished surfaces equal to finished surfaces where new form materials are used.

   2. Before reuse, thoroughly clean, recondition in every respect, suitable for their re-use purpose.

E. Tolerances: To obtain cast-in-place concrete not exceeding the tolerances specified in Section 033000, except support form facing material to limit deflection to L/360 between supports for concrete exposed to view, and L/270 for all other concrete.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct detrimental conditions before proceeding with installation.

3.2 FORMWORK INSTALLATION

A. Construction:
   1. Comply with the applicable provisions of ACI 347, Guide to Formwork for Concrete, and APA Design/Construction Guide "Concrete Forming."

   2. Rigidly support and construct forms to the lines, surfaces and profiles necessary to produce concrete to the design indicated.

   3. Construct forms to be removable without prying against concrete.

   4. Form stakes shall not buried in concrete or installed in trenches or footings.

   5. Make forms tight, without cracks or holes, to prevent leakage of mortar or loss of fine particles from concrete.

   6. Cover or fill holes that are not used, and cracks that have opened up, flush with adjacent surfaces.

B. Wales and studs: Provide wales and studs of adequate size and spacing to prevent form failure and to obtain concrete within the tolerances specified.

C. Ties and spreaders: Place ties as indicated on approved shop drawings, spaced and aligned as indicated, in plumb columns and level rows. Do not permit wood, other than built-in treated bucks or nailing blocks, to permanently remain in forms.

D. Form contact surfaces: As specified above, except that the plywood form facing material specified must be used for concrete permanently exposed to view. Forms for all other concrete may be constructed of plywood, fiberglass, plastic, or steel.
   1. To eliminate joint offsets, block plywood edges that do not occur at bearing points.

   2. Do not expose plywood edges to concrete.

E. Special features:
   1. Corners: Miter or cope corners accurately and attach securely to the form facing material with adhesive or nails driven fiush with the item being fastened. Avoid hammer marks.
      a. Provide sharp, clean corners, without visible edges or offsets at intersecting planes. Back joints with extra studs or girts to maintain square intersections.

   2. Concrete details: Form offsets, keys, reglets, seats, pockets, anchorages, moldings, chamfers, blocking, screeds, drips, bulkheads and other required features as indicated or as necessary to receive or engage the work of other trades.

3. Openings, chases and recesses: Form as indicated or necessary to receive, pass and clear other work.
    a. Verify sizes and locations with other trades before forming. Closely coordinate the location of boxes, cans and sleeves furnished by other trades.
    b. Seal edges of cutouts and holes in plywood.

F. Form release agent: Thoroughly clean forms and coat with release agent prior to initial use (except when mill-oiled) and before each reuse.
    1. Apply form coating before reinforcement is placed.

    2. Apply form coating in accordance with its manufacturer's instructions and coverage rates. Do not over-apply.

    3. Provide a coating of uniform thickness.

3.3 FORMWORK REMOVAL

A. Remove forms after concrete has developed sufficient strength to safely sustain its own weight and superimposed loads, as determined by testing field-cured concrete cylinders, but not sooner than specified in ACI 347, Paragraph 3.6.2.3. Remove forms no less than 12 hours after pour as per ACI 318, 6.2, and ACI 318, 26.11.2.

B. Take care when removing forms that concrete surfaces are not marred or gouged, that corners are true, sharp and unbroken. Do not pry against concrete when removing forms.

C. Cut nails flush on concealed surfaces. Cutback tie wires and nails in exposed concrete surfaces at least 1-1/2-inch.

D. Where used, remove rod and cone ties and separators or similar devices and pull.

END OF SECTION

CONCRETE REINFORCING
SECTION 032000

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes:
   1. Reinforcing steel for cast-in-place concrete.

   2. Supplementary parts and components, such as clips, fasteners, chairs, tie wires, and other miscellaneous accessories required for a complete installation.

1.2 SUBMITTALS

A. Shop drawings:
   1. Submit shop drawings showing fabrication, bending, and placement of concrete reinforcing.

   2. Submit bar drawings and schedules with the corresponding placing diagrams.
      a. Comply with ACI SP-66.
      b. Indicate bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcing.
      c. Include special reinforcing required for openings through concrete structures.

   3. Drawings shall be complete for any specific area of Project when submitted.

B. Certificates: Submit copies of mill reports prior to starting this work.
   1. Mill reports shall contain the steel source, description, heat number, yield point, ultimate tensile strength, elongation percentage, bend test and chemical analysis.
      a. If the reports show material is satisfactory no tests will be required.
      b. For foreign steel, perform testing as specified below by a testing laboratory acceptable to the authorities having jurisdiction.
      c. Certification from any other sources is not acceptable.

   2. Ensure material delivered for use is that represented by mill reports.

   3. Obtain copies of mill reports, examine them, certify whether the material represented complies with Specifications requirements, and make distribution of reports as required. Report chemical composition of each heat, as determined by ladle analysis.

C. Test reports: Submit test data for reinforcing steel sampled and tested prior to starting this work.
   1. Where materials proposed for use cannot be identified, pay for an approved testing laboratory to make one series of tests (tensile and bend) from each 2.5 tons, or fraction thereof, of each size and kind of reinforcing steel.

   2. Include minimum 2 samples of sufficient length to allow tests to be made on the as-rolled bar.

1.3 HANDLING

A. Delivery:
   1. Deliver reinforcing to the site bundled, tagged and marked; handle to prevent damage to material.

   2. Use metal tags indicating size, length and other markings shown on placement drawings. Maintain tags after bundles are broken.

PART 2- PRODUCTS

2.1 MATERIALS

A. Reinforcing steel: ASTM A 615, Grade 40 for #4 bars and smaller; Grade 60 for #5 bars and larger.

B. Welded wire mesh: ASTM A 185. Provide in flat sheets, not rolls.

C. Tie wire: ASTM A 82, 16-gage (minimum) annealed steel wire.

D. Supports for reinforcing: Provide bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire mesh in place. Use wire-bar-type supports complying with Concrete Reinforcing Steel Institute (CRSI) specifications.
   1. Slabs-on-grade: Provide supports with sand plates or horizontal runners where base material will not support chair legs, or precast concrete block chairs with embedded wire ties.

   2. Exposed concrete surfaces: Where legs of supports are in contact with forms, provide supports with legs that are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

   3. Over vapor retarder: Provide precast concrete chairs to prevent puncturing of membrane.

2.2 FABRICATION

A. General: Except as modified by the Contract Documents, comply with Chapter 7 of CRSI Manual of Standard Practice for fabrication of reinforcing steel.

B. Bending and forming:
   1. Fabricate steel bars, wire and welded wire mesh to sizes, lengths and gages indicated.

   2. Accurately form to shapes by methods that will not damage the materials.

   3. Heating of reinforcing for bending is not permitted.

C. Tolerances: Comply with ACI 117.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 PREPARATION

A. Clean reinforcing of loose mill scale, excessive rust, oil, and other coating that might destroy or reduce its bond before placing it.

3.3 PLACING

A. Place reinforcing under the continuous inspection of the Inspector of Record.

B. Placing: Comply with the listed reference standards as applicable. Do not install bars with unscheduled kinks or bends.

C. Spacing of reinforcing: Space reinforcing to maintain proper distance and clearance between parallel bars and between bars and forms.

D. Splices:
   1. Do not splice reinforcing bars except where indicated.

   2. At lapped splices, bars shall be in contact, unless noted otherwise on the Drawings, and shall be firmly wired together before placing concrete.

3. Extend stubs and dowels required to receive and engage subsequent work a sufficient length to develop the strength of the bar.

4. Place dowel and stub bars in the forms and secure against displacement during placing of concrete.

E. Welded wire mesh reinforcing:
   1. Straighten and cut to required size where required and lay flat in place.
      a. Lap welded wire mesh one full mesh plus 2 inches.
      b. Securely wire together and to other reinforcing at approximately 24 inches o.c.

   2. In concrete slabs-on-grade, extend welded wire mesh to within one inch of expansion, construction and contraction joints. As concrete is placed, chair welded wire mesh to ensure proper embedment at position indicated.

F. Clearance: Maintain clear distances between reinforced steel and face of concrete indicated on the Drawings.

END OF SECTION

CAST-IN-PLACE CONCRETE
SECTION 033000

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Cast-in-place concrete (CIPC).

B. Related work:

   1. Division 3 for concrete forms, and concrete reinforcing.

   2. Division 3 for concrete finishing.

   3. Division 9 for interior concrete floor sealer.

1.2 SUBMITIALS

A. Data:
   1. Product data: Submit manufacturer's product data, specifications, typical installation details and other data as necessary to demonstrate compliance with the specified requirements for all manufactured products.

   2. Design data:
      a. Submit pit source and characteristics of each type aggregate to Architect prior to designing mixes.
      b. Submit mix designs, and any subsequent changes in mix designs, prepared by a testing laboratory acceptable to the authorities having jurisdiction.

B. Certificates: Submit cement certificates, admixture certificates (including chloride ion content) and batch plant tickets and non-shrink grout test data.

1.3 QUALITY ASSURANCE

A. Uniformity: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

B. Installer's qualifications: Firm and individuals with a minimum of 3 consecutive years experience in the installation of cast in place concrete on projects similar in material, design, complexity and extent to this Project, and whose work has resulted in applications with a record of successful in-service performance.

C. Manufacturer's qualifications:
   1. Firm experienced in manufacturing ready-mixed concrete products and complying with the requirements of ASTM C 94 for production facilities and equipment.

   2. Firm certified according to the NRMCA Certification of Ready Mixed Concrete Production Facilities.

D. Pre-installation meeting:
   3. At least one week prior to ordering specified materials or the start of concrete work, arrange a pre-installation meeting between the Contractor, Architect, Project superintendent, concrete supplier, and concrete finisher to review finishing techniques of concrete, use of additives, application of curing compounds and coordination with other trades.

   4. Include inspection of the vapor retarder for proper joint seals, and no unsealed penetrations.

   5. Record minutes of the meeting, decisions made, and corrective measures to be taken before installation/application starts. Send copy of the minutes to the Architect no later than 3 days following the meeting.

E. Coefficient of friction: Exposed concrete flatwork shall have a coefficient of friction of 0.6 minimum for level areas and 0.8 minimum on ramps.

1.4 PROJECT CONDITIONS

A. Do not place concrete when the temperatures of the materials in contact with the concrete, the concrete temperature, and the ambient temperature exceed the ranges recommended in ACI 305 and 306, or if it is likely to exceed these temperature before the concrete has taken its initial set, unless special precautions recommended by ACI 305 and 306 are provided.

1.5 SCHEDULING

A. Allow sufficient time in the construction schedule for appropriate slab drying, in accordance with the finish manufacturer's recommendations, for slabs to receive a moisture-sensitive deferred finish.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland cement: ASTM C 150, Type I or II. Do not change brand or type of cement without Architect's written approval.

B. Aggregates:
   1. Hard rock aggregates: ASTM C 33, graded so that coarse aggregate nominal size is not larger than 1/5 of the narrowest dimension between form faces, nor 3/4 of the minimum clear spacing between individual reinforcing bars or bundles of bars, whichever is less, but never greater than 3/4-inch in any dimension for slabs 4 inches thick or less; 1-1/2 inches maximum at all other locations.

C. Admixtures:
   1. May be used only with the Architect and DSA approval.

   2. Submit manufacturer's data for products proposed for use to the Architect in compliance with the requirements of Division One.

D. Pozzolan: If used, shall comply with ASTM C618, Class F or N and conform to ACI 318-19 26.4.1.1.1 (a) and IR 19-3.

E. Water: Fresh, clean, and free of oil and other materials injurious to concrete.

F. Dry-pack and grout: One of the following:
   1. Masterfow 713 by Master Builders.

   2. Five Star Grout by US Grout Corp.

   3. Fondag Non-shrink Grout by Specrete Products, Ltd.

2.2 ADHESIVES

A. Structural adhesive: Basis of design "Sikadur Hi-Mod" by Sika Chemical Corp. Other acceptable materials/manufacturers include the following:
   1. "Patch and Bond Epoxy" by The Burke Co.

   2. "Thiopoxy" by WR Grace.

   3. "Rezi-Weld 1000" by WR Meadows.

2.3 SOURCE QUALITY CONTROL

A. Employ a testing laboratory, acceptable to the District and Architect, to test the materials for conformance with these Specifications before concrete mixes are established, and when source is changed, unless recent test results of materials to be used on the Project, performed by an acceptable testing laboratory, are accepted by the Architect.

B. Testing coarse aggregates:
   1. Test aggregates before and after concrete mix is established and whenever the character source of material is changed, but not less than one test for each 500 cu. yards.

   2. Perform a sieve analysis to determine conformity with limits of gradation. Perform sampling and testing according to ASTM C 33, and as follows:
      a. Sampling of aggregates: ASTM D 75. Take samples of aggregates at source of supply, or if source of supply has been approved, from storage bunkers at ready- mixed concrete plant.
      b. Testing of aggregates shall include:
         1) Sieve analysis: ASTM C 136.
         2) Organic impurities: ASTM C 40. Fine aggregate shall develop a color not darker than the referenced standard color.
         3) Soundness: ASTM C 88. Loss after 5 cycles not over 8 percent for coarse aggregate, nor 10 percent for fine aggregate.
         4) Abrasion: ASTM C 131. Weight loss not over 10-1/2 percent after 100 revolutions, nor 42 percent after 500 revolutions.
         5) Deleterious materials: ASTM C 33.
         6) Materials passing No. 200 sieve: ASTM C 117, not over 1 percent for gravel, 1.5 percent for crushed aggregate per ASTM C 33.
         7) Reactive materials: ASTM C 289. Aggregates shall indicate no potential deleterious reactivity.
         8) Definitions: ASTM C 125.

   3. Cement test:
      a. The cement mill laboratory will be acceptable as testing laboratory for this purpose when approved by DSA. Submit evidence to show that the cement mill laboratory is qualified to perform tests. The laboratory shall make tests for every 500 barrels or fraction thereof of cement used, in compliance with ASTM C 150.
      b. Make tensile strength test at 7 days. Tag the cement for identification at the location of sampling. A representative of the Testing Agency shall certify that materials being used are taken from the lots sampled and tested for this report.

2.4 MIXES

A. Mix design:
   1. Employ a testing laboratory, acceptable to the District and Architect, to design structural concrete mixes required for the Project to provide:
      a. Concrete compressive strength is to be a minimum 3,000 PSI at 28 days for the footings and 4,000 psi at 28 days for the interior slab-on-grade.

b. Adequate workability and proper consistency to permit concrete to be worked readily into the forms and around reinforcement without segregation and excessive bleeding.
c. Other requirements noted on the Drawings and specified herein

2. Determine proper proportions for design mixes in compliance with ACI 211 or ACI 318.

3. Determine proper water-cement ratio by preliminary test made in compliance with ASTM C 192.

4. Proportion and design mixes to result in concrete slump(s) at point of placement not exceeding the maximum recommended by ACI 301 and as accepted in the mix design.

5. Use air-entraining admixture in all concrete, unless otherwise shown or specified. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within 4 percent to 8 percent.

6. Tests shall be conducted in compliance with ASTM C 39.

B. Submit reports showing results of sieve analysis, mix design and results of compression tests.
1. Make test specimens from not less than 3 batches of each design mix.

2. The trial batch strength for each mix shall exceed indicated fc by 25 percent or a lesser amount based on standard deviations of strength test records according to ACI 318.

3. Do not start concrete production until mixes have been reviewed and are acceptable to the Architect.

C. For each batch, weigh the fine and coarse aggregate separately, measure cement and water separately and introduce separately into the mix so that proportions can be accurately controlled and easily checked.

D. Do not change proportions established by the accepted mix design without the Architect's written approval.
1. Cement: If concrete develops less than required minimum strength, adjust mix proportions and increase the amount of cement, as necessary.

2. Water: Do not exceed predetermined amount of water because of slowness of discharge from mixer or any other reason, but reduce water to minimum necessary to produce concrete that will work readily into corners and angles of forms and around reinforcements, without segregation of materials and without free water collecting on the surface.

3. Aggregates: Reasonable variations in grading will be allowed by the Architect because of characteristics of available materials and the need for workability and strength.

E. Concrete mixing:
   1. Mixing and delivery shall comply with ASTM C 94, these Specifications, and Building Code requirements.

   2. District's Testing Agency will perform check sieve analysis of the aggregates being used, check compliance with mix design and the cement being used against mix design; check that water has been removed from the drum before adding mix ingredients for the following load and shall witness the loading of mixing trucks. The District's Testing Agency will send a written report of each inspection to Architect indicating compliance with these Specifications.

   3. In addition to the requirements of ASTM C 94 section 16.1, provide the following information on delivery tickets signed by an authorized representative of the batching plant with each mixer truck of concrete delivered to the site.
      a. Type and brand of cement.
      b. Cement content per cubic yard of concrete.
      c. Maximum size of aggregate.
      d. Total water content expressed as water/cement ratio.
      e. Time batched.

   4. Deliver batch tickets to Inspector at the site when concrete is delivered.

   5. Maintain equipment in proper operating condition, with drums cleaned before charging each batch. Schedule rates of delivery in order to prevent delay of placing the concrete after mixing, or holding dry-mixed materials too long in the mixer before the addition of water and admixtures.

   6. Remove all materials, including water remaining in the ready-mix truck drum, completely before ingredients for the following loads are introduced in the drum.

   7. Do not use concrete that has not been placed 30 minutes after leaving the mixer, or concrete that is not placed within 60 minutes after water is introduced into the mix.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. As applicable for each placing operation, verify accuracy of lines, levels, elevations and dimensions for excavations, subgrade, vapor retarder and formwork.

C. Verify reinforcing and accessories for proper position, sizes, clearances, fastenings, laps and splices.

D. Verify that no vapor retarder damage has occurred since the pre-installation conference Inspection.
   1. Repair damage to achieve complete and continuous vapor barrier membrane.

   2. Grade sand covering the vapor retarder to provide a layer of uniform thickness. Wet so that concrete is placed on damp sand.

E. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 PREPARATION

A. Place items to be embedded in concrete, including but not limited to, conduits, sleeves, nailers, anchors and rough hardware, built into concrete as indicated or required.
   1. Do not embed piping and conduits, other than steel electrical conduits, in structural concrete. Locate conduits so as to reduce strength of the structure the least amount, as approved by the Architect, and as indicated on the Drawings.

   2. Embed bolts, inserts and other items in the concrete. Secure accurately so that they are not displaced during concrete placing, compacting and finishing operations. Wire tie, nail or bolt embeds securely to forms.

   3. Set embedded bolts for materials and equipment attached to concrete to template, layouts and shop drawings. Verify size, length and location of electrical conduits with respect to equipment supports.

   4. Fill voids in sleeves, inserts and anchor slots temporarily with readily removable material to preent entry of concrete in the voids.

   5. Install expansion joint fillers where indicated, and as required to isolate concrete slabs- on-grade from other building elements such as walls and equipment pads. Cover filler with plastic joint cap and leave in place until ready to receive sealant.

B. Moisten, do not saturate, earth subgrade and bearing surfaces. Do not place concrete on muddy subgrade.'

C. Wet wood forms thoroughly when they are not treated with form release agent. Wet other materials sufficiently to reduce suction and maintain concrete workability.

D. Mask areas to receive sealants, caulking compounds or waterproofing/coatings before application of curing or sealing agents.

E. Do not proceed with placement of concrete until conditions are satisfactory.

3.3 CONVEYING

A. Rapid handling: Transport concrete from the mixer to location of placing as rapidly as practical to avoid separation or loss of ingredients.

B. Transporting methods: Use pipes, cranes, carts, buggies or other approved means to deliver concrete to final locations. Do not use delivery systems (pipe, chutes, etc.) formed of aluminum for transporting concrete.

C. Free fall:
   1. As dictated by job conditions at each location, but not more than 4ft. where concrete will be exposed in the Work and 6ft. at all other locations.

   2. Avoid large concentration of concrete in one location that would produce unacceptable deflection in supporting formwork.

D. Concrete flow:
   1. Keep surface of concrete level during placing with a minimum of concrete allowed to flow from one position to another.

   2. Carry concrete up uniformly for the length of walls being placed to reduce lateral flow of concrete to 5 ft. maximum.

E. Runways: Construct substantial runways and scaffolding to avoid movement and vibration in the forms and reinforcing steel as a result of transporting and placing concrete.

3.4 PLACING

A. General: Comply with ACI 304. Do not place concrete in or under water.

B. Consolidation: Thoroughly consolidate concrete and work it around reinforcement and embedded items and into corners and angles of forms, by spading, redding and tamping to exclude rock pockets, air bubbles and "honeycombs" and to obtain required density and strength.

C. Internal vibration:
   1. Use mechanical vibrators to consolidate each layer with that previously placed, to completely embed reinforcement and fixtures, and to bring fine materials to the faces and top surfaces to produce the proper finish.

   2. Assign at least one workman at each location where concrete is being placed to vibrate and consolidate the concrete in forms. Do not "over-vibrate" to prevent separation of ingredients.

   3. Keep extra operable standby vibrator at the site.

   4. Do not use vibrator to move concrete.

D. Flow of concrete:
   1. Keep surface of concrete level during placing, with a minimum of concrete allowed to flow from one position to another.

   2. Place concrete in a continuous operation until each section or panel has been completed.

E. Record: Keep records showing location, date and time of placement and quantity of concrete placed on the Project.

F. Floor slabs: Shape slabs to the levels, slopes and elevations indicated and accurately pitch or grade to drainage fittings and fixtures installed in them. Where indicated, depress slabs to receive other finishes.

G. Construction joints:
   1. Location: Locate joints to least impair the strength and appearance of the structure. Obtain the Architect's approval of construction joint locations before casting concrete. In general construction joints shall be located as follows, unless otherwise indicated on the Drawings.

      a. In slabs-on-grade locate joints where shown on the Drawings; offset not less than 5 ft., with a minimum of 2 offsets. Allow proper time lapse in placing of floor sections adjoining prior placings.
      b. In all cases make construction joints perpendicular to the main reinforcement. Continue reinforcement across joints, unless otherwise indicated.

2. Provide keyways at least 1-1/2-inch deep in construction joints in slabs, and between walls and footings; use prefabricated bulkheads specified for slabs in Section 03100.

3. Keep exposed face of construction joints continuously moist from time of initial set until subsequent placing of concrete against them, but not to exceed the curing period. When not damp, wet (do not saturate) the contact surface of joints for a minimum of 24 hours before placing adjoining concrete.
   a. Before placing adjoining concrete, clean contact surfaces to remove laitance, loosened particles of aggregate or damaged concrete, and expose sound, coarse aggregates solidly embedded in the matrix.
   b. To achieve the above, the contact surface may be washed with clean water under pressure wet blast), may be sandblasted, or in areas which will be concealed from view when the building is completed an approved structural adhesive may be used on clean, structurally sound concrete. Remove wash water entirely from surface.
   c. If a contact surface becomes coated with foreign materials of any nature after being cleaned, clean again to suitable condition.

H. Site tolerances: Finish surfaces to a tolerance of 1/8 inch in 10 feet when measured with a 10- foot straightedge placed anywhere on the surface, except as specified in Section 03370 for polished concrete floors. Variation from /eve/likewise shall not exceed 118-inch overall.

3.5 FINISHING

A. As specified in Section 033500.

3.6 CURING

A. As specified in Section 033500.

3.7 MISCELLANEOUS CONCRETE WORK

A. Provide all other concrete work indicated or required to complete the Work, even though not specifically specified, including the following.

B. Equipment bases and foundations:

1. Provide machine, and equipment bases and foundations where indicated on Drawings.

2. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates by the manufacturer furnishing the machines and equipment.

C. Construct pits, trenches, curbs, integrally cast equipment pads and other miscellaneous concrete work to the profiles and dimensions indicated.

D. Grouting and dry-packing: Comply with the grout manufacturer printed instructions and the following.
   1. Mix material with sufficient water so it flows under its own weight for grout, and to just moisten and bind the material together for dry-pack.

   2. Place dry-pack by forcing and rodding to fill all voids and provide complete bearing under plates. Place fluid grout from one side only and puddle to completely fill voids; do not remove dams or forms until grout attains initial set. Finish exposed surfaces smooth and damp cure at least 3 days.

3.8 FIELD QUALITY CONTROL

A. Site tests: The following will be performed by the District's Testing Agency.
   1. Samples will be taken during progress of the work to determine slump, compression strength, aggregate sieve analysis, and grout-mix tests, with assistance furnished by the Contractor.

   2. 3 cylinders will be made for each day's pour or for each 50 cu. yards or once for each 2,000 sq. ft. of surface area, whichever is less, for each type of concrete being cast, per 2022 CBC 1905A.1.16.

   3. One cylinder will be tested at 7 days, and one cylinder at 28 days. The remaining cylinder will be kept in reserve in case tests are unsatisfactory.

   4. Samples will be made in compliance with ASTM C 172.

   5. Specimens will be made and laboratory cured in compliance with ASTM C 31.

   6. The 28-day values will be the criteria for acceptance of concrete regarding strength only.
      a. 7-day tests may be regarded as indicative of compliance or non-compliance with the 28-day strength requirements, and the Contractor should be guided accordingly in matter of adjusting proportions, if necessary, and notify the Architect.
      b. 7-day tests shall also be a guide to the Contractor regarding time for form removal.

7. Slump tests will be made for each set of tests cylinders in compliance with ASTM C 143.

B. Tests evaluation:
   1. Concrete cylinder test will be evaluated in compliance with ACI 214 and 318.

   2. If 28-day test results indicate that concrete strength is not as specified, core concrete as directed by the Architect in compliance with ASTM C 42.
      a. Plug core hole solid as specified in Article 3.4 above.
      b. The cost of cores, tests and patching shall be borne by the Contractor.

   3. In the event that additional core tests do not show strength required, or as determined by load tests made in compliance with ACI 318, the defective concrete shall be removed and replaced, or shall be reinforced as directed by the Architect, at the Contractor's expense.

   4. If core tests results fall below design strength specified, adjust the concrete mix or water content for future batches, at no additional cost to the District.

C. Defective concrete:
   1. Concrete which does not meet the requirements of the Contract Documents will be deemed defective.

   2. Remove defective concrete as directed by Architect and replace with concrete meeting the requirements of the Contract Documents, at no additional cost to the District.

3.9 PROTECTING/CLEANING

A. Take suitable precautions in compliance with applicable ACI requirements to secure satisfactory concrete in either hot or cold weather.

B. Restrict construction vehicular traffic on slabs-on-grade to prevent damage and staining.

C. Protect concrete to prevent damage and staining.

D. Protect work of other trades from damage by work of this Section with heavy Kraft paper securely taped in place.
   1. Maintain protection in effective condition for as long as need for protection exists.

   2. Control use of water within the building so that no damage to previously installed work or existing structure and finish will occur.

E. Upon completion, wash and clean exposed concrete and leave free of oil, paint, plaster and foreign substances, ready to receive applied finishes or to be left exposed.

END OF SECTION

CONCRETE FINISHING
SECTION 033500

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   a. Finishing concrete surfaces.

   b. This Section supplements Section 033000.

B. Related work:
   a. Division 7 for sealants.

   b. Division 9 for interior concrete floor sealer.

1.2 SUBMITTALS

A. Data: Manufacturer's data, including installation instructions where applicable, for the following items before proceeding with this work.
   a. Curing and curing/hardening compounds.

   b. Curing paper.

   c. Bonding agents.

   d. Patching and surfacing compounds.

   e. Expansion joint filler.

1.3 QUALITY ASSURANCE

A. Mockups: Provide 4-foot by 4-foot mockups of the each concrete finish specified for the Architect's approval prior to commencing concrete work. Repeat mockups if first ones prove unsatisfactory. Locate mockups where directed at the site.
   a. Broom, float and trowel finishes.

1.4 HANDLING/PROJECT CONDITIONS

A. Protection: Protect adjacent surfaces from staining and damage by covering them with impermeable coverings securely taped in place.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. As specified in Section 033000.

B. Water: Fresh, clean, and free of oil and other materials injurious to concrete.

2.2 CURING COMPOUNDS

A. General: Curing, hardening and sealing agents to be applied sequentially shall be products of single manufacturer. Where products of different manufacturers are used including proprietary topping and surfacing materials, confirm their compatibility with respective manufacturers.

B. Mask areas to receive sealants, caulking compounds or coatings before application of curing or sealing agents.
   a. Compound shall produce a uniform, continuous, adherent film that does not check, crack, or peel and is free from pinholes or other imperfections. Cure permanently exposed surfaces with a clear-type membrane-forming curing compound containing a fugitive dye.

   b. Curing compound used on exposed concrete surfaces shall be non-discoloring, fast drying and shall be conclusively demonstrated not to darken or yellow with age.

   c. Curing compound for use on concrete floors to receive adhered covering shall be specially formulated for such use and shall be certified by the manufacturer not to inhibit the bonding qualities of fiooring adhesives. Refer to the Finish Schedule on the Drawings for specific finish materials and areas of application.

C. Compatibility: Use compound guaranteed not to affect the appearance of the concrete surfaces, and the bond, adhesion, or effectiveness of finishes and surface treatment specified herein to be applied to concrete.

D. Type I, moist cure only: Rollout waterproof covering complying with ASTM C 171, "SK-10" by Fortifiber Corp. or equal.

E. Type II cure only: ASTM C 309 Type 1, Class A and B, liquid membrane-forming, non-penetrating, fugitive dyed compound for interior or exterior use.
   a. Horncure 30D, AC Horn, Inc.

   b. Hydrocide Curing 309 Resin-Base, Sonneborn-Rexnord.

   c. Kurez E-100S, Euclid Chemical Co.

d. Day-Chem Rez Cure, Dayton Superior.

e. Or equal.

E. Type Ill, cure and seal: Apply one coat for curing and second coat for sealing.
a. Dekote, WR Grace.

b. Polyclear, Upco Co., Division of USM.

c. Eucocure, Euclid Chemical Co.

d. Sure-Kiean Cure & Seal by ProSoCo, Inc.

e. Kure-N-Seal, Sonneborn-Rexnord.

f. Or equal.

F. Type IV, Moist Cure, Hardener & Sealer:
a. Ashford Formula, Curecrete Chemical Co., Inc.

b. Lapidolith hardener, Sonneborn-Rexnord.

c. Hornolith hardener, AC Horn, Inc.

d. Saniseal 100 hardener, Master Builder.

e. Day-Chem Sure Hard by Dayton Chemical.

f. Euco Diamond Hard; Euclid Chemical Co.

g. Surfhard hardener, The Euclid Chemical Co.

h. Or equal.

2.3 MISCELLANEOUS MATERIALS

A. Bonding agent (non-structural)): ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

B. Bonding agent: As specified in Section 03300.

C. Surface retarder: Top Cast by Grace Construction Products, Lithotex Paneletch by LM Scofield, Rugasol C/S by Sika Chemical Corp. or True Etch Surface Retarder by Burke Co.

D. Expansion/contraction joint materials:
   a. Joint filler: Homex Expansion Joint by Homasote Co. or equal non-bituminous product compatible with sealant specified in Section 07920. Use in combination with plastic joint cap made by Greenstreak or equal.

   b. Joint sealant and back-up rod: As specified in Section 07920.

PART 3- EXECUTION

3.1 EXAMINATION

A. Joints in flatwork:
   a. Set premolded expansion joint strip below finished surface with a slightly tapered, dressed, wood strip, temporarily secured to top of expansion strip to provide space for sealant, or use an extruded plastic strip, approved by the Architect.

   b. Install expansion joints in straight or curved lines as indicated.

   c. After concrete finishing operations are completed, and concrete is cured, fill void formed by the strip with sealant as specified in Section 07920. Provide joints where indicated and in all cases where concrete flatwork abuts vertical elements such as walls, columns and curbs.

3.2 GENERAL REQUIREMENTS

A. Finish concrete surfaces to produce a uniform appearance throughout area involved and throughout adjacent areas with the same treatment.
   a. Finish and measure surface so gap at any point between concrete surface and an unleveled freestanding 10-foot long straightedge, resting on 2 high spots and placed anywhere on the surface, does not exceed the following:
      a. 1/4 inch (ACI 301 Class B) for exterior locations.
      b. 1/8 inch (ACI Class A) for interior locations.

B. Where concrete finishing occurs adjacent to finished metal and similar surfaces, particularly where serrated or indented surfaces occur, remove all traces of cement film before allowing concrete to harden.

C. Use no troweling machines within 12-inch of electrical junction and outlet boxes set to finish flush with concrete floors.
   a. Float and trowel such areas by hand with wood floats and steel trowels, using caution so that concrete is finished flush with box cover and matches adjacent surfaces.

D. Concrete finish will be considered defective and shall be repaired, when the repairs are acceptable to the Architect, or removed and replaced with proper work conforming to Contract Documents, at no additional cost to District, when:

a. It does not match approved mockups.

b. It is not true to lines and planes.

c. It is not properly troweled and surfaced as required, and varies in excess of 1/8-inch along a 10-foot straightedge (except for surfaces to receive a topping slab).

d. Is scuffed or has a rough surface, except where required.

e. Does not connect properly to adjoining work.

f. Does not slope to drains.

g. Is not properly cured.

3.3 MARKINGS

A. At expansion joints and elsewhere as indicated, provide markings with a rounded edging or marking tool, to a 1/4-inch radius. In textured work, edge and mark with a combination edging and smoothing tool approximately 1-1/2-inch wide.

B. Where indicated, provide cut markings sawn into surface of cured concrete with a diamond tipped or other abrasive saw within 12 hours after placing slabs. Coordinate this work with the work of other Sections to avoid damage to adjacent vertical or horizontal surfaces.

C. Make marking lines straight, or curved where required by the Drawings, equally spaced and parallel to adjacent lines and walls, edges and other construction, and of uniform depth and cross section, with intersections accurately formed.

3.4 BUILT IN ITEMS

A. Set items furnished under this or other Sections and finish to fioor fixtures and other floor features as indicated. Adjust finish to properly connect and fit to other work. Slope fioor to drain where indicated.

B. Floor drains and other items furnished and installed under other Sections: Finish concrete surface fiush with rims unless detailed otherwise.

C. Exercise particular care with respect to drains to ascertain that they are installed at proper elevations to permit drainage. Do not proceed until corrective work has been performed and accepted.

3.5 FINISHING FORMED SURFACES

A. General:
   a. Remove fins, laitance and loose materials from concrete surfaces when forms are removed.

   b. Repair honeycombs, rock pockets, sand runs, spalls and other damaged surfaces by removing the damaged or unsatisfactory area to sound concrete, with slightly undercut edges, and filling-in with the same mix as the adjacent concrete minus the coarse aggregate.

   c. Fill-in tie holes with the same mix as the adjacent concrete minus the coarse aggregate.

   d. Tamp and float, or trowel patches flush with adjacent surface and to match adjacent concrete texture.

B. Smooth form finish:
   a. Provide as-cast smooth form finish for formed concrete surfaces that will remain exposed-to-view, or that will be covered with a material applied directly to the concrete, or a material bonded to the concrete such as waterproofing, painting, and similar system.

   b. Provide smooth form finish by selecting form material to impart a smooth, hard, uniform texture and arranging forms in an orderly and symmetrical pattern, with a minimum of seams.

   c. Repair and patch defective areas with fins or other projections completely removed and smooth.

C. Related unformed surfaces:
   a. At tops of wall, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with textured matching the adjacent formed surfaces.

   b. Continue the final surface treatment of formed surfaces uniformly across the adjacent unformed surface, unless otherwise shown.

D. Curing:
   a. Wet the tops and exposed portions of formed concrete and keep moist until forms are removed.

b. If forms are removed before 14 days after concrete is cast, coat concrete with curing compound Type II applied as specified for curing compound Type Ill for flatwork below.

3.6 COMPACTING AND FLOATING FLATWORK

A. Bring slabs with monolithic finish to proper level using screeds and strike off with a straightedge. Remove excess water and laitance.
   a. Compact and consolidate to embed coarse aggregates.

   b. Float and test surfaces with a 10-foot straightedge and eliminate high and low spots to comply with tolerances specified.

   c. From this point, use methods and tools necessary to produce surface finish specified.

B. Use continuous screeds of such type and construction and so spaced and located as to produce surface tolerances specified.

3.7 METHODS OF FINISHING AND CURING FLATWORK

A. Water Curing Type 1: For surfaces to receive concrete topping, bonded cementitious setting beds, thin-set ceramic and paver tiles, and elastomeric floor coating.
   1. After troweling and as soon as it can be done without marring finish, lay curing paper, lap seams 3 inches and seal with pressure-sensitive tape.

   2. Keep concrete continuously moist for 14 days minimum. Leave paper in place as temporary protection as long as possible.

B. Curing/hardening compound Type IV: For interior slabs not scheduled to receive a deferred finish.
   a. After troweling or finishing and as soon as it can be done without marring the finish, spray curing and hardening compound uniformly in compliance with its manufacturer instructions submitted to the Architect, as specified in Article 1.3 of this Section.

   b. When the manufacturer recommends a coverage range, use the heavier application unless otherwise permitted by the Architect.

   c. Examine at regular intervals that the compound film is intact. If damaged, moisten the concrete and apply additional compound.

C. Curing compound Types II and Ill: For all other concrete flatwork.
   a. Promptly after troweling or finishing, apply curing compound uniformly by spray as described above for sealer.

b. Examine at regular intervals that the compound film is intact. If damaged, moisten the concrete and apply additional compound.

D. Protection: Unless otherwise recommended by the curing compound manufacturer, restrict traffic on treated slabs for a minimum of 8 hours under normal conditions.

3.8 MOISTURE CONTROL

A. In addition to finishing requirements specified, use a water fog spray to reduce plastic shrinkage cracks during flatwork finishing operations when conditions of low humidity and high temperature exist, or use evaporation retarder specified.
   a. Immediately after wet concrete has been leveled, or sloped as required, and the shiny film of moisture disappears, start fog spraying and continue until final troweling, by applying a light film of moisture with an atomizing type sprayer.

   b. Use frequent light applications of moisture rather than excessive amounts at any one time. Adjust the amount and frequency of fog spray as required by variable conditions of weather, wind, temperature and humidity.

3.9 FLATWORK FINISHES

A. Integral Float Finish:
   a. Use for curbs, gutters, surfaces to receive roofing and waterproofing membrane, and ceramic and paver tile whether on conventional setting bed over a cleavage membrane or dry-set over concrete slab.

   b. After screeding and compacting, finish with a wood float using a rotary or darbied circular motion to produce a uniform texture and finish throughout.

B. Integral smooth steel trowel finish:
   1. Use for surfaces to receive carpet, resilient fiooring, and surfaces that have no other specific finish specified.

   2. Trowel surface until the slabs are finished to a smooth, hard, burnished surface.

   3. Consolidate the concrete surface by final hand troweling operation, free of trowel marks, uniform in texture and appearance, and with surface plane tolerance specified. Grind smooth surface defects that would telegraph through applied fioor covering system.

4. Where surfaces will receive elastomeric coating and thin set tiles, in lieu of the final troweling, brush surface lightly with a broom or fioor brush as recommended by the coating manufacturer. Coordinate finishing operations with the trades applying the elastomeric coating and performing the tile work.

C. Raked or scratched finish:
   1. Use for surfaces to receive a bonded topping slab or cementitious setting bed.
   2. After screeding and compacting, roughen finish with a garden rake or other appropriate tool to provide a mechanical bond for topping slabs.

3. Broom finish: Use where indicated on the Drawings.
   1. After screeding, compacting and floating, sweep the finish with a coarse broom, against a straightedge at right angle to the slope or direction of travel, to produce a uniform non- skid surface with the depressions parallel and at a uniform depth.
      a. Medium Broom Finish: At slopes less than 6%.
      b. Heavy Broom Finish: At slopes less than 6%.
   2. Time this operation to texture slabs at the same age to obtain a uniform finish throughout.

3.10 ADJUST/CLEAN

A. Protect exposed concrete work as necessary to prevent damage resulting from impact or from subsequent work or rubbish.

B. Protect adjacent work from damages by this work with heavy Kraft paper or polyethylene film.

C. Maintain protection in effective condition for as long as need for protection exists.

D. Control use of water within the building so that no damage to previously installed work or existing structures and finish occurs.

END OF SECTION

ROUGH CARPENTRY
SECTION 061000

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes:
   1. Wood framing and furring.
   2. Plywood sheathing.
   3. Wood grounds, nailers and blocking.
   4. Rough hardware and fasteners.
   5. Miscellaneous accessories required for a complete installation.

B. Work furnished but installed in other Sections:
   1. Division 3 for anchor bolts.

1.2 DEFINITIONS

A. Board: Lumber that is less than 2 inches nominal in the lesser dimension and 2 inches nominal or more in the greater dimension.

B. Dimension lumber: Lumber that is 2 inches nominal or more but less than 5 inches nominal in the lesser dimension.

C. Exposed framing: Dimension lumber not concealed by other construction and indicated to receive a stained or natural finish.

1.3 SUBMITTALS

A. Data: Submit wood treatment manufacturer's product data, specifications and instructions for proper use for each type of treated material.

B. Certificates:
   1. For each type of pressure treatment specified, submit a letter from the treating plant indicating chemicals and process used and net amount of preservative retained; and degree of corrosiveness; and stating that all materials meet or exceed the specified requirements.

2. For water-borne preservatives, include statement that moisture content of treated materials was reduced to a maximum of 19 percent for lumber and 15 percent for plywood prior to shipment of wood products to the project site.

1.4 QUALITY ASSURANCE

A. All wood required to be preservative treated shall bear the quality mark of an inspection agency that maintains continuing supervision, testing and inspection over the quality of the preservative- treated wood. Inspection agencies for preservative-treated wood shall be listed by an accreditation body that complies with the requirements of the American Lumber Standards Treating Wood Program or equal. The quality mark shall be on a stamp or label affixed to the preservative-treated wood and shall include the following information:
   1. Identification of treating manufacturer.

   2. Type of preservative used.

   3. Minimum preservative retention.

   4. End use for which the product is treated.

   5. AWPA standard to which the product was treated.

   6. Identity of accredited inspection agency.

1.5 HANDLING

A. Storage: Keep materials dry.
   1. Do not store materials in wet or damp areas.

   2. Protect against exposure to weather and contact with damp or wet surfaces.

   3. Stack materials to provide for air circulation within and around stacks and under temporary coverings.

   4. Protect plywood from moisture by covering with waterproof coverings until the plywood has been covered with a finish material, or the building has been completely enclosed.

   5. Protect materials from damage during unloading and storage. Do not use damaged materials, or plywood panels with damaged corners, except after removing damaged portion.

B. Handling: In accordance with American Wood-Preservers' Association (AWPA) recommendations for storage and protection of pressure-treated wood.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Framing lumber: Unless otherwise indicated, provide S4S, grade-marked Douglas Fir/Larch, manufactured and graded according to West Coast Lumber Inspection Bureau (WCLIB) or Western Wood Products Association (WWPA) rules, of the sizes and grades indicated.

1. Sizes: Sizes indicated are nominal. Actual sizes shall conform to American Lumber Standard Committee (ALSC) publication DOC PS 20.

2. Grading: Provide each piece of lumber factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

3. Season lumber to a moisture content of 19 percent or less and stamp "S-Dry".

B. Plywood: Unless otherwise indicated, provide grade-stamped Douglas Fir plywood, of the sizes and grades indicated, complying with American Plywood Association (APA) publication US Product Standard PS 1.

2.2 ACCESSORIES

A. Metal framing accessories: Provide standard galvanized or cadmium-plated steel joist hangers, framing anchors, fasteners and other such connection devices indicated that are acceptable to the Division of the State Architect. Use offset and skewed hangers, as required.

B. Builder's rough hardware: Use fasteners to attach pressure-treated wood that will not corrode due to treatment materials used in the manufacture, present at time of use or when in the presence of moisture. Use hot-dip galvanized fasteners complying with ASTM A 153, or stainless steel fasteners, where carpentry will remain exposed to the weather and where used in roofing assemblies.

1. Nails and staples:
   a. Hot-dipped galvanized common nails complying with ASTM F1667, unless otherwise indicated.

   b. Nails to be used with framing accessories shall be those furnished by the manufacturer with the framing accessories.

2. Bolts, washers, lag bolts and wood screws:
   a. Galvanized or cadmium-plated steel of standard manufacture.

b. Anchor bolts: ASTM F 1554, Grade 36.

C. Adhesive: Basis of design is for products by Franklin International, or equal.
1. Construction adhesive: Titebond Premium Polyurethane Construction Adhesive.

D. Flexible flashing membrane: As specified in Section 076500.

E. Sill sealer: Basis of design is for "Triple Guard Energy Sill Sealer" self-adhering closed cell polyethylene foam by the Protecto Wrap Co. or equal.

2.3 PRESERVATIVE TREATED WOOD

A. Basis of design is for "Preserve" or "Preserve Plus" ACQ wood preservative materials by Chemical Specialties, Inc., Charlotte, NC. Other materials, when approved by the Architect shall be CCA (chromium copper arsenate)-free.

B. Preservative treatment by pressure process for above ground use:
1. Comply with AWPA U1.

2. Retention: In compliance with AWPA C2 for lumber and C9 for plywood except that lumber not in contact with the ground, and continuously protected from liquid water, may be treated with inorganic boron (SBX).

3. Kiln dry after treatment to 19 percent maximum moisture content for lumber and 15 percent for plywood.

4. Application: Treat wood in the following locations:
a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in contact with roofing and metal flashings, vapor barriers or waterproofing.

b. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with concrete. Each sill plate piece shall bear stamp of approved agency.

c. Wood within 4 inches of grade.

d. Decking, fence boards and other wood exposed to weather.

5. Treatment of wood nailers used in conjunction with built-up roofing shall be compatible with the roofing bitumen; oil-based preservatives are not acceptable.

2.4 FIRE-RETARDANT TREATED WOOD

A. Basis of design is for "D-Biaze" fire retardant by Chemical Specialties, Inc., Charlotte, NC, or equal.
   1. Use products for which fire-retardant manufacturer publishes physical properties of treated wood after exposure to elevated temperatures when tested, by a qualified independent testing agency, in compliance with ASTM D 5664 for lumber and ASTM D 5516 for plywood.

   2. Use products that do not promote corrosion of metal fasteners.

B. Fire-retardant treatment by pressure process: AWPA C20 for structural lumber and AWPA C27 for plywood .
   1. Use exterior type wood for exterior locations.

   2. Use Type A High Temperature (HT) wood for interior locations.

C. Application: Treat wood in the following locations:
   1. Roof trusses, roof decks and sheathing.

   2. Beams and purlins, architectural millwork and trim.

PRT 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 PREPARATION

A. Carefully select all members.
   1. Select individual pieces so that knots and defects will not interfere with placement of bolts, with nailing or when making connections.

   2. Cutout and discard pieces with defects that make the piece unable to serve its intended function.

B. The Architect may reject lumber for excessive warp, twist, bow, crook, mildew, fungus or mold, as well as for improper cutting or fitting, whether or not it has been installed.

3.3 INSTALLATION

A. Nailing:
   1. Fasten framing anchors and steel bridging with galvanized special nails furnished with hardware in every nail hole, except where noted to be welded to structural steel supports in which case comply with AWS requirements.

   2. Where possible, nailed joints shall be assembled such that load is acting at right angle to the nail (shear).
      a. Where nailing at right angle is impossible, toe-nailing at an angle approximately 30 degree to the wood grain is an acceptable method of fastening wood members together.

      b. Penetrated nail points are not allowed in exposed construction.

B. Screw fasteners: Install wood screws and lag bolts with complete penetration up to head. Bore lead holes approximately 3/4-screw diameter and same depth as shank; continue holes to a depth equal to length of the screw but with diameter approximately 3/4-thread root.
   1. Drill holes in pieces where splitting may occur.

   2. Remove split lumber and replace with new members.

C. Bolted connections:
   1. Make bolt holes in wood 1/16 in. larger in diameter than the bolt diameter. After tightening, nick bolt threads to prevent nut loosening.

   2. Provide bolts and lag screws with washers under heads and nuts that bear on wood.

   3. Where a finish material will be installed over the bolt, recess the bolt head or the nut so that they are recessed or flush with the face of the member being bolted.

   4. Tighten bolts and re-tighten shortly before being covered.

D. Treat field cuts and penetration in pressure-treated lumber in compliance with AWPA M4.

3.4 FRAMING MEMBERS

A. Erect framing neatly and substantially to best trade standards, including preparatory work for subsequent trades and conditions not actually detailed.

B. Do not cut or notch structural members, except as indicated or directed by the Architect.
   1. Splices are permitted in structural members.

   2. Reinforce interrupted members as detailed.

C. On framing and furring members to receive a finished wall or ceiling, align the finish framing so that finish surface will not vary not more than 118-inch from a theoretical plane or surfaces of the room or space, unless more stringent tolerance is specified. Make corners square.

D. Install joists, lintels, beams and rafters with crown up, unless otherwise noted with cut members making structural contact with bearings or each other for full bearing.

E. Anchor sills with fasteners of the size and spacing shown.
   1. Provide 2 fasteners per piece minimum.

   2. Install sill plates on continuous layer of sill sealer.

F. Extend wall and partition studs and mullions continuously from sill to plate, unless otherwise indicated. Provide double plates unless a lintel replaces the lower member. Stagger plate joints at least 4-feet (unless otherwise shown in the Structural Drawings).
   1. Where 2 or more studs are cut, provide header beams over the opening.

   2. In stud walls and partitions, extend at least one stud from sill to plate on each side of interior openings and 2 studs on each side of exterior openings. In addition, place one stud trimmer to support each end of lintels over openings.

   3. Frame walls and partitions at corners and intersections so that wall material cannot extend from one room to another.

G. Frame stud partitions, furring or walls containing electrical panels, plumbing, or other pipes to give required clearance for piping and fixtures.
   1. Place approved piping in center of plates using a neat hole. Notching is not permitted.

   2. Do not place pipes exceeding 1/3 the plate width in partitions used as bearing or shear walls.

   3. Pipes shall not pass through plates less than 5-1/2-inch wide.

H. Do not shim sills, joists, short studs, trimmers, headers, lintels and other framing members.

I. Make joints accurately and neatly for a square, tight fit. Remove and replace defective work.

3.5 PLYWOOD SHEATHING

A. Layout and nail plywood as indicated.

B. Install plywood with 1/16-inch space between panels for expansion and contraction. Do not force panels in place.
   1. Place end joints over supports with face grain running perpendicular to supports except as otherwise shown.

   2. Solid block unsupported panel edges where indicated.

C. Provide minimum 6-inch wide flashing membrane at the perimeter of exterior openings. Membrane must be solidly supported at all locations.
   1. Where no solid backing exists to support the flashing membrane, provide either plywood, or tight and solid blocking between studs.

   2. Lap in the direction of water flow.

D. Cover roof sheathing with roofing material as soon as possible after installation. Do not leave exposed to the elements longer than 2 days.

3.6 BLOCKING/FURRING/BRIDGING/NAILERS

A. Blocking:
   1. Solid block joists and rafters over all supports with blocking of the same size and material as the joist or rafter.

   2. Provide fire blocking and draft stops where required by Division of the State Architect.

   3. Locate other blocking to facilitate installation of finishing materials, fixtures, trim and soffits.

B. Furring: Provide continuous spaced at 16-inches o.c. maximum.
   1. Install furring plumb and level. Shim where necessary to provide a true, even plane suitable to receive the finish required.

   2. Attach to concrete and masonry with shot pins in pre-drilled holes.

C. Bridging:
   1. Use nominal 2-inch by 3-inch cross bridging, 2-inch solid bridging or 16-gage galvanized metal bridging.

   2. Nail bottom ends of bridging only after sheathing has been nailed.

D. Nailers: Provide nailers at connections of wood materials, and other finish materials, to concrete, CMU and metal framing.
   1. Template and drill nailers to match holes provided in steel framing.

2. Furnishing necessary bolts and washers.

3.7 CLEAN-UP

A. Dispose of pressure-treated wood in an authorized disposal area.

B. Do not bury wood of any type on the jobsite.

END OF SECTION

BUILDING INSULATION
SECTION 072100

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Thermal insulation at following locations unless otherwise indicated or specified:
      a. In all exterior walls above grade, except parapet walls, and where louvers, vision glass and doors occur.
      b. Under roof sheathing as shown on Drawings.

   2. Supplementary parts and components, such as clips, wires, fasteners, supplementary framing, and other miscellaneous accessories required for a complete installation.

B. Related work:
   1. Division 22 for pipe and duct insulation.

1.2 SUBMITTALS

A. Data: For materials specified below.

B. Samples:
   1. Of each type of insulation, 24 inches square.

   2. 12 inches long samples of tape.

1.3 HANDLING

A. Packaging: Provide unopened containers and packages with labels bearing producer(s) name and source of product and date of manufacture, with UL classification on package.

B. Storage:
   1. Keep insulation protected while stored; keep dry during application.

   2. Outdoors, store off ground on pallets, protected with breathing type covers.

   3. Insulation shall be dry when installed.

   4. Remove insulation that becomes wet or damp immediately from the job site.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Install insulation in dry weather, unless building is enclosed.

B. If insulation will be exposed to the elements after installation, cover with waterproof membrane each day.

PART 2 - PRODUCTS

2.1 THERMAL INSULATION

A. "R" value: Minimum of R-15 at 2x4, R-21 at 2x6, and R-25 at 8" walls, and R-38 at roofs.
   1. Type:
      a. Concealed: Kraft-faced, glass fiber or mineral wool batt or blanket insulation complying with ASTM C 665, Type II, Class C category 1, formaldehyde-free by Johns Manville, Knauf, or equal and have stapling tabs.
      b. Exposed: Unfaced, glass fiber or mineral wood batt or blanket insulation complying with ASTM C 665, Type I, ASTM E136, with a flame spread of 25 and a smoke developed of 50 or less, formaldehyde-free by Johns Manville, Knauf, or equal.

   2. Width: Batt width shall match the stud or rafter spacing.

2.2 INSTALLATION MATERIALS

A. Staples, zinc-coated wires and other devices for fastening insulation: As recommended by the insulation manufacturer.

B. Insulation tape: "FSK Copolymer" by Compac Corp., (800. 631.9347), General Purpose FSK Facing Tape by Venture Tape, (800.343.1076) or equal FSK-faced cold weather tape a minimum of 2 inches wide.

C. Supplementary wood framing where required for insulation support: As specified in Section 061000.

PART 3- EXECUTION

3.1 EXAMINATION/PREPARATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct detrimental conditions before proceeding with installation.

C. Before installing insulation in stud walls, thoroughly clean space of debris.

3.2 INSTALLATION

A. Install insulation where shown and specified. Cut to fit irregular spaces, butt edges into firm contact with each other and adjoining surfaces.

1. Hand pack around pipes, ducts, conduits, electrical boxes, and other penetrations as required to thoroughly fill all voids and spaces between framing members and to form a continuous thermal barrier.

2. Do not compress insulation more than 10 percent.

3. Where door and window frames occur in insulated assemblies, cut additional strips of insulation and hand-pack to fill all voids in and around the frames.

4. Comply with the California Electrical Code (CEC) for installation in proximity to light fixtures. Do not install insulation closer than recommended by CEC.

5. Install kraft-faced insulation with kraft facing the building interior.

B. Where insulation in stud walls or roof space is not self-supporting, hold it in place with wires spaced not more than 16 inches o.c. horizontally or by other methods acceptable to the Architect.

C. After installation is complete, tape penetrations and ruptures in kraft facing.

3.3 FIELD QUALITY CONTROL

A. Prior to closing-in of insulated assemblies, or prior to Substantial Completion for insulation that will remain exposed in the building, refit, reinstall and/or replace wet, damaged and displaced insulation.

END OF SECTION

ASPHALT SHINGLES
SECTION 073113

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Fiberglass-Based Asphalt shingles.

   2. Roof underlayment.

   3. Supervise installation of sheet metal items installed in conjunction with the work of this Section.

B. Related work:
   1. Division 7 for flashing and sheet metal.

1.2 QUALITY ASSURANCE

A. Roof classification: Minimum Class A rating when tested in accordance with UL 790.

1.3 HANDLING

A. Storage:
   1. Store materials on raised platforms and protect with coverings at outdoor locations.

   2. Do not stack bundles of shingles more than 3-foot high.

   3. Store rolled goods on end.

1.4 JOB CONDITIONS

A. Do not install underlayment or shingles on wet surfaces.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Owens-Corning, Oakridge Cool Roof Shingles - Color: Amber
fiberglass asphalt shingles:
   1. ASTM D 3462.

2. 39-3/8-inch long by 13-1/4-inch wide with 5 in. exposure.

3. Minimum weight 235 lb./square.

4. Self-sealing strip.

5. Minimum initial solar reflective of 0.24.

6. Cool Roof Rating by Cool Roof Rating Council.

B. Timberline Z Ridge ridge and hip cap shingles to match field.

C. Roof underlayment: Typar RoofWrap30 by Fiberweb to meet or exceed ASTM D 226 and ASTM D 4869.

D. Nails: Galvanized material, 10-gage ring shank, 3/8-inch head, 1-1/4-inch minimum length. Fasteners shall comply with ASTM F 1667. Length to be sufficient to penetrate through the sheathing a minimum of 1/8 inch or into solid wood at least 3/4 inch.

E. Bituminous plastic cement: FS SS-C-153 B., Type 1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Verify that installation of metal fiashings and work of other trades that penetrates roof deck has been completed satisfactorily.

C. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 APPLICATION

A. Felt underlayment:
1. Lay 2 layers of felt horizontally over roofed area, lapping each course over lower course 19-inch minimum at horizontal joints, and 4-inch side lap at end joints. Each layer shall be laid individually with overlaps of top layer not being within 12 in. of laps of preceding layer.

2. Nail or staple underlayment to deck with sufficient fasteners to hold in place until shingles are installed.

B. Shingles:

1. Starter strip: Apply 9-inch minimum wide mineral surfaced roll roofing even with lower edge of eave or apply row of inverted shingles along lower eave edge, tabs facing up roof. Nail 3-inch in from eave edge, nail heads concealed.

2. First and succeeding courses (regular spacing):
   a. Start first course with full shingle at break. Cutout break joints on halves.
   b. Start second course with full shingle minus 1/2 first tab. Start third course with full shingle minus first tab. Start fourth course with full shingle first 1-1/2 tabs. Center cutouts on tabs of course below.
   c. Align lower edges of butt with top of underlying course cutouts.

3. Nailing: Nail as recommended by shingle manufacturer. When nail fails to penetrate solid decking, use additional nail in adjacent unexposed area.

4. Open valleys: Cut and fit asphalt shingles at open valleys, trimming upper concealed corners of shingle strips. Maintain uniform width of exposed open valley from highest to lowest point.
   a. Set valley edge of asphalt shingles in a 3-inch wide bed of asphalt roofing cement.
   b. Do not nail asphalt shingles to metal open-valley flashings.

5. Ridge cap shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.

3.3 ADJUST/CLEAN

A. Replace damaged shingles. Remove excess shingles and debris from Project site.

END OF SECTION

COMPOSITE TRIM
SECTION 074646

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Fiber-cement trim.
   2. Fasteners.

B. Related work:
   1. Division 6 for wood framing.
   2. Division 9 for finish painting.

1.2 SUBMITTALS

A. Samples: Submit full size samples of sidings in texture and widths selected.

B. Data: Submit copies of specifications, installation data and other pertinent manufacturer's literature.

1.3 QUALITY ASSURANCE

A. Mockup:
   1. Construct a mockup of panels mounted on joists on the building. The mockup shall be approximately 8-foot wide by full width of canopy and shall show typical conditions to be found in the finished Work.

   2. The Architect will inspect the mockup. Make corrections required until Architect's approval is secured.

   3. Promptly remove disapproved mockup(s) from the jobsite and dispose of it (them) off the site. The approved mockup may be left in place and become a part of the finished work.

   4. The remainder of the panels installed on the job shall match the approved mockup.

1.4 HANDLING

A. Storage: Store panels flat on a smooth, level surface. Protect edges and corners from chipping.

1.5 WARRANTY

A. Provide the District with the manufacturer limited product warranty against manufacturing defects in siding for 30 years.

PART 2- PRODUCTS

2.1 MATERIALS

A. Trim: Harditrim HZ10, smooth;
   1. Fascia Boards, 5/4" x 8" width or as detailed on the drawings.

B. Fasteners: Hot dipped galvanized 6d common nails at 8" o.c. at edges and 12" o.c. at field.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine conditions, surfaces and supports under which the work of this Section will be installed.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

END OF SECTION

METAL FLASHINGS AND SHEET METALWORK
SECTION 076000

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Sheet metal roof valley flashings and perimeter flashings for shingle roofing.

   2. Sheet metal gutters and downspourts.

   3. All other flashings and sheet metal items shown or required to make the building weathertight and not specified in other Sections.

B. Related work:
   1. Division 7 for shingle roofing.

   2. Division 9 for finish painting flashings and sheet metalwork.

   3. Division 23 for mechanical sheet metal work, and flashings and collars for mechanical and electrical work, except as specified herein for roof drains.

1.2 PERFORMANCE REQUIREMENTS

A. General: Install the work of this Section to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Thermal movements:
   1. Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

   2. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements.

   3. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

   4. Temperature change (range) of 120-degree F ambient; 180-degree F, material surfaces.

C. Water infiltration: Provide sheet metalwork and flashings that do not allow water infiltration to building interior, and to damage materials, such as insulation, in exterior walls.

1.3 SUBMITTALS

A. Data: Printed specifications, installation instructions and general recommendations for installation of prefabricated assemblies.

B. Shop drawings:
   1. Show typical and atypical details, material weight, methods of joining and attachment, and relationship with adjacent materials and supports.

   2. Detail interface with adjacent materials. For interface between flashings with different profiles and conditions difficult to illustrate in 2-dimension, furnish isometric drawings.

C. Samples: Assembled samples of the following. Make samples at least 6 inches long, except as otherwise specified. Mount on plywood and include all components to be installed under this Section for each sample.
   1. Counterfiashing with receiver.

1.4 HANDLING

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

B. Protect strippable protective covering on sheet metal fiashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal fiashing and trim installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pre-Furnished: MBCI Steel Sheet ASTM C645, with ASTM A653, G60 hot-dip galvanized zinc coating. Color: colonial rep, 24-gage minimum unless otherwise indicated on Drawings.

B. Nails for attaching sheet steel to wood: Large fiat head "stronghold" type roofing nails with barbed point, formed of hot-dip galvanized steel of sufficient length to penetrate a minimum of 1- inch into the wood nailer.

C. Hot dip galvanized self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
   1. Fasteners for flashing and trim: Blind fasteners or self-drilling screws, gasketed with hex washer head.

   2. Blind fasteners: High-strength aluminum or stainless-steel rivets.

D. Solder and flux:
   1. For galvanized sheet metal: 50-50 lead/tin solder complying with ASTM B 32, used with a non-corrosive flux.

   2. For lead: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

E. Burning rod for lead: Same composition as lead sheet.

F. Sealing tape:
   1. Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing.

   2. Provide permanently elastic, nonsag, non-toxic, non-staining tape.

G. Expansion-joint sealant: For hooked-type expansion joints, which must be free to move, provide non-setting, non-hardening, non-migrating, heavy-bodied polyisobutylene sealant.

H. Bituminous coating:
   1. Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat.

   2. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.2 PREFABRICATED ASSEMBLIES

A. Counterflashing assemblies: Formed of 24-gage galvanized sheet steel, of the profiles shown on the Drawings, complete with factory-formed internal and external corners, and end closures by one of the following.
   1. Basis of design is for Fry Reglet Corp. Type ST (stucco).

   2. Keystone Flashing Co.

   3. CF Cheney Flashing Co.

   4. MM Systems Corp.

2.3 FABRICATION

A. General:
   1. Shop fabricate fiashings and sheet metal work to comply with profiles and sizes indicated on the Drawings and standard Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) detail plates of the "Architectural Sheet Metal Manual".

   2. Form sheet metal on bending brake with straight, sharp edges. Shape, trim, and hand seam sheet metal on bench; keep job site forming to a minimum.

   3. Comply with metal producers' recommendations for tinning, soldering, and cleaning flux from metal.

   4. Fabricate with joints and corners accurately machined, filed and fitted, and rigidly framed together and connected.

B. Fabricate in as long length as possible to minimize field joints.

C. Prefabricate intersections, including counterfiashings, with mitered, riveted joints. Make corners and intersections with legs a minimum of 24-inch long extending in each direction.

D. Tinning and soldering:
   1. Tin edges on both sides of sheet steel to be soldered.

   2. Perform soldering slowly, thoroughly heating seams and completely sweating solder through full width of seams.

E. Exposed edges: Neatly double back sheet metal 1/2 inch to stiffen edges and to provide a finished appearance.

F. Provisions for attachment to structure: Furnish supports, hangers, bracing, anchors and other devices shown, specified or necessary for reinforcement and proper attachment of flashings and sheet metal to building.

G. Open-valley fiashings: Fabricate with 1 in. high, inverted-V profile at center of valley and equal fiange widths of 12 inches.
   1. Sheet steel used for valley fiashing shall be finished with a siliconized polyester to match color of shingles. Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.

H. Drip edges: Fabricate with dimension shown on Drawings with minimum 3/8 in. drip at lower edge. Exposed surfaces shall be prefinished to match color of adjacent painted surface.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 GENERAL REQUIREMENTS

A. In addition to the assemblies listed above, provide required prefinished sheet metal flashings, counterflashings, transitional and interface flashings required to achieve a properly weatherproofed, flashed and counterflashed building envelope, including sheet metal flashings in the angles formed where exterior waterproofed decks abut walls, and as well at curbs, platforms, ventilators, pipes, roof hatches, and other vertical and horizontal surfaces, where indicated and necessary to make the Work weatherproof. Flashings in contact with single-ply roofing is specified in Section 07544.

B. Comply with manufacturer's installation instructions, where applicable, and applicable SMACNA and NRCA details, except as indicated and specified.

C. Install counterflashing assemblies at a constant height above the roof.
   1. Anchor counterflashing securely into reglet by friction, or provide lead wedges spaced 2- foot o.c. maximum.

   2. Use manufacturer's standard splice plates and preformed corners for a weathertight assembly.

D. Coordinate this work with other trades whose work penetrates, intersects and adjoins flashings and sheet metal work, to permit the correct sequencing and the watertightness of the assemblies.

3.3 INSTALLATION

A. General:
   1. Install sheet metal work in accordance with the approved shop drawings.

   2. Attach work securely to supporting construction, plumb, level, with tight, flush joints allowing for thermal movements.

   3. Install work with lines, arises, and angles sharp and true.

4. Fold exposed edges neatly to form a 1/2-inch hem on the concealed side; hem all exposed edges, unless otherwise indicated.

5. Assemble work so that face of metal in contact has hairline joints, except where required for expansion or fitting. Provide back-up plates at joints.

6. Conceal fastenings and reinforcement where they would be visible by the public and the building occupants.

7. Finish work shall be straight, smooth and continuous, without dimples, dents and other damage.

B. Soldering: Solder all joints not intended for expansion and contraction.
   1. Clean material and tin prior to soldering.

   2. Solder slowly. Heat the seams thoroughly, and completely fill with solder.

   3. Make exposed soldering on finish surfaces neatly, full flowing and smooth.

   4. Wash acid flux with a soda solution after soldering and remove soldering flux on exposed surfaces.

C. Nailing:
   1. Confine nailing of sheet metal generally to sheet metal having a maximum width of 18 inches. Nailing of fiashings shall be confined to one edge only.

   2. Space nails evenly not over 12 inches o.c., and approximately 2 inches from the edge.

   3. Face nailing is not permitted. Do not nail sheet metal assemblies on horizontal surfaces.

   4. Where sheet metal is applied to surfaces other than wood, furnish detailed shop drawings showing locations of required sleepers and nailing strips specified in Section 06100.

D. Bolts, rivets, and screws:
   1. Install bolts, rivets, and screws where indicated or required.

   2. Provide compatible washers to protect surface of sheet metal and to provide a watertight connection.

E. Dissimilar material protection:
   1. Protect sheet metal in contact with dissimilar metals, concrete, masonry and plaster with a heavy coating of bituminous paint, approved separation tape, or building felt or paper.

   2. Set sheet metal assemblies supported by pressure-treated wood on building paper or felt attached to the wood nailer, except set copings on flexible fiashing specified. Lap on vertical surfaces at least 2 inches.

F. Seams- general: Make seams straight, and uniform in width and height with no solder showing on the face.
   1. Flat-lock seams: Finish not less than 3/4 inch wide made in the direction of water flow.

   2. Lap seams: Finish soldered seams not less than 1 inch wide. Overlap seams not soldered at least 3 inches.

   3. Loose-lock expansion seams: No less than 3-inch wide, designed to provide minimum 1 inch movement within the joint. Fill joint completely with sealant applied at not less than 1/8 inch thick bed.

   4. Standing seams: Not less than 1 inch high, double locked without solder.

G. Expansion and contraction:
   1. Provide for thermal and building movement without over-stressing the material, breaking connections or producing wrinkles and distortion in finished surfaces. Make sheet metal installations weathertight at all locations.

   2. Provide expansion and contraction joints at not more than 40-foot intervals, except that where the distance between the last expansion joint and the end of the continuous run is more than half the required interval spacing, provide an additional joint. Where expansion and contraction joints are exposed to view, their location is subject to the Architect's approval.

   3. Exposed surfaces shall be free from visible wave, warp, and buckle.

H. Install roof curbs level and square with tight, waterproof joints; attach securely to deck.

I. Completed work: Completed fiashings and sheet metal work shall be watertight, free of tool marks, dents, scratches and other damages, with joints and corners accurately machined, filed and fitted, and rigidly framed together and connected.

END OF SECTION

FLEXIBLE FLASHING
SECTION 076500

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes self-adhering concealed sheet flashing at the following locations:
   1. Around openings in exterior walls.

   2. Behind exterior cement plaster control joints, unless otherwise indicated.

B. Related work:
   1. Division 7 for metal flashings and sheet metalwork.

   2. Division 8 for steel doors and frames.

   3. Division 9 for Lath and Portland Cement Plaster.

1.2 SUBMITTALS

A. Data: Submit copies of manufacturer data.

B. Shop drawings: Submit shop drawings showing interface between flashings and other weather barrier or waterproof membranes, different surfaces, and any special conditions.

C. Samples: Submit 12-inch long samples mounted on plywood or hardboard.

PART 2- PRODUCTS

2.1 MANUFACTURERS/MATERIALS

A. 9-inch wide self-adhering (peel and stick) flexible modified bitumen flashings; one of the following:
   1. For use on exterior walls:
      a. Vycor Weather Barrier Strips by Grace Construction Products.
      b. Fast Flash by Protecto Wrap Co.
      c. Window and Door Flashing by Carlisle Coatings & Waterproofing.
      d. Sealtight Air-Shield by WR Meadows, Inc.
      e. Seam Seal Tape by SafSeal Innovations.
      f. TW Moisture Wrap by Tamko Waterproofing.

2. For use under copings:
    a. Dri-Start HR by Carlisle Coatings & Waterproofing, Div. of Carlisle Companies Inc.
    b. Vycor Ultra by WR Grace & Co.
    c. Perma-Seal PE by Henry Co.
    d. LLC MetShield by Metai-Fab Manufacturing.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine conditions affecting the work of this Section.

B. Verify that conditions detrimental to the proper and timely completion of this work are corrected before proceeding with installation.

3.2 INSTALLATION

A. Install flashings in compliance with its manufacturer's instructions, and the following.

B. Press and form material tightly against the substrate. Insure complete adhesion by using a roller or by hand; pressure is essential to eliminate wrinkles and bubbles.

C. Around windows:
    1. Apply from the end of the strip, securing bottom flashing tape flush along bottom edge of opening, with 9-inch minimum extension beyond opening on both sides. Press and form material tightly against the substrate. Eliminate wrinkles and bubbles.

    2. Apply next strip along the left vertical side of opening, flush with edge, over the top of the horizontal strip. Extend more than 6-inch beyond the opening on both sides, and beyond the top and bottom strips. Repeat same procedure for the right vertical side.

    3. Apply horizontal top strip flush with edge, over the top of the 2 vertical strips, extending more than 9-inch beyond the opening on both sides, and covering beyond the vertical strips.

D. Around Door Openings:
    1. Apply strip along the vertical sides of opening, flush with edge. Extend more than 6-inch beyond the opening.

    2. Apply horizontal top strip flush with edge, over the top of the 2 vertical strips, extending more than 6-inch beyond the opening on both sides, and covering beyond the vertical strips.

E. Under plaster control joints: Determine where control joints will occur, snap chalk lines as a guide and install continuous strip of flexible flashing from top metal trim to drip screed, lapping over drip screed.

F. Under copings: Install over wall flashing or water-resistant barrier. Lap joints 2 inches minimum. Roll or form for complete adherence to substrate.

3.3 FIELD QUALITY CONTROL

A. Before the weather barrier behind the metal lath is installed, inspect the flashings and roll again where not in firm contact with the substrate.

B. Verify that all joints are weathertight.

END OF SECTION

JOINT SEALERS
SECTION 079200

PART 1 -GENERAL

1.1 SUMMARY

A. Section includes:

1. Exterior joints in vertical surfaces and non-traffic horizontal surfaces as indicated below:
   a. Control and expansion joints in Portland cement plaster.
   b. Joints between different materials listed above.
   c. Perimeter joints between materials listed above and frames of doors and glazed assemblies.
   d. Control and expansion joints in ceiling and overhead surfaces.
   e. Other joints as indicated and required to make the building weathertight.

2. Exterior joints in horizontal traffic surfaces as indicated below:
   a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
   b. Joints between different materials listed above.
   c. Other joints as indicated and required to make the building weathertight.

3. Interior joints in vertical surfaces and horizontal non-traffic surfaces as indicated below:
   a. Perimeter joints of exterior openings where indicated.
   b. Tile control and expansion joints.
   c. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
   d. Perimeter joints of toilet fixtures.
   e. Other joints as indicated.

4. Interior joints in horizontal traffic surfaces as indicated below:
   a. Control and expansion joints in cast-in-place concrete slabs.
   b. Control and expansion joints in tile flooring.
   c. Other joints as indicated.

B. Related work:
   1. Division 3 for preformed compressible expansion joint fillers for concrete slabs.

   2. Division 7 for firestopping sealants.

   3. Division 8 for glazing sealants.

4. Division 9 for acoustical sealants.

5. Division 22 for duct sealants.

1.2 SYSTEM DESCRIPTION

A. Joint sealants are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, with recognized limitations of wear and aging as indicated for each application.

1.3 DEFINITIONS

A. Substrates:
   1. M type substrates: Concrete, concrete masonry units, brick, mortar, natural stone. The term "masonry" means brick, stone, and concrete masonry work.

   2. G type substrates: Glass and transparent plastic glazing sheets.

   3. A type substrates: Metals, porcelain, glazed tile, and smooth plastics.

   4. 0 type substrates: Wood, unglazed tile; substrates not included under other categories.

1.4 SUBMITTALS

A. Data:
   1. Data sheets and published instructions for each type of sealant, backing, bond breaker, and other accessory materials, together with statement that the proposed materials comply with these Specifications.

   2. Include manufacturers' recommendations for surface preparation and priming for all substrates to be in contact with sealant on the Project.

B. Certification: Sealant manufacturer certification that sealants, backing rods, and other materials proposed for use in the application of sealants, are chemically compatible with the materials which will come in contact with the sealants and will not cause deterioration, premature aging and staining of adjacent materials, or the sealants.

C. Test results: Results of adhesion and staining tests performed on same materials as those intended for use on the Project.

D. Samples: Cured samples of the various types and colors of materials proposed for use, approximately 12 inches long, mounted on hardboard backing.

1.5 QUALITY ASSURANCE

A. Uniformity: All sealants used in or on the exterior walls of the building shall be made by the same manufacturer.

B. Installer's qualifications: Firm with a minimum 5 years of experience with joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

C. Color selection:
   1. Final color selection of sealants to be used for exterior locations will be made by the Architect from job-applied samples on in-place materials.

   2. The Architect will select locations and extent of these samples, but length of sealant joints will not exceed 20-foot for vertical surfaces and 10-foot for horizontal surfaces.

D. Preconstruction field testing: Prior to installation of joint sealants, field-test their adhesion to joint substrates as follows:
   1. Locate test joints where indicated or, if not indicated, as directed by Architect.
      a. Each type of elastomeric sealant and joint substrate for exterior joints only.
      b. Each type of non-elastomeric sealant and joint substrate indicated.

   2. Test method: Test joint sealants by hand pull method described below:
      a. Install joint sealants in 5-foot joint lengths using same materials and methods for joint preparation and joint sealant installation required for completed Work. Allow sealants to cure fully before testing.
      b. Make knife cuts horizontally from one side of joint to the other followed by 2 vertical cuts approximately 2 inches long at side of joint and meeting horizontal cut at top of 2-inch cuts. Place a mark 1 inch from top of 2-inch piece.
      c. Use fingers to grasp a 2-inch piece of sealant just above 1-inch mark; pull firmly down at a 90-degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.

   3. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.

4. Evaluation of field test results: Sealants not evidencing adhesive failure from testing, in absence of other indications of non-compliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.6 HANDLING

A. Storage:
   1. Store sealant containers in a protected location in compliance with their manufacturer's instructions until their use. Do not store at temperature higher than 80-degree F.

   2. Do not use sealants whose shelf life has expired.

1.7 JOB CONDITIONS

A. Do not install sealants under adverse weather conditions, or when temperatures are beyond manufacturer's recommended limits.

B. Proceed with the installation only when forecasted weather conditions are favorable for proper sealant cure and development of early bond strength.

1.8 WARRANTY

A. Warrant sealants against defective materials and workmanship for 10 years after Substantial completion.

B. Warranty shall further state that installed sealants are warranted against the following:
   1. Water leakage through exterior sealed joints.

   2. Adhesive or cohesive failure of sealant.

   3. Staining of adjacent surfaces caused by migration of sealants or primer.

   4. Chalking or visible color change of the cured sealants.

C. Make repairs during the warranty period at no cost to the District.

PART 2 - PRODUCTS

2.1 SEALANTS

A. Colors: Match sealant color to color of adjacent materials as closely as possible using colors selected from the manufacturer's standard palette, as approved by the Architect.

B. Compatibility: Provide joint sealers, joint fillers and other related materials as follows:
   1. That will not cause staining, degradation and premature aging of the adjacent surfaces and the sealant itself, when in contact with these surfaces.

   2. Compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

C. Bulk sealants:
   1. Suitability for contact with food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

   2. For interior and exterior horizontal application subject to pedestrian or vehicular traffic: Multi-component pourable urethane sealant.
      a. Type and grade: M (multicomponent) and P (pourable).
      b. Class: 25.
      c. Use related to exposure: T (traffic).
      d. Uses related to joint substrates: M, A, and, as applicable to joint substrates indicated, 0.
      e. Products:
         1) Pacific Polymer, Inc.: Elasto-Thane 227.
         2) BASF: Sonolastic SL2.
         3) Sika Corp., Inc.: Sikaftex 1CSL.
         4) Tremco: THC-900.
         5) Tremco: Vulkem 245.

   3. For all other exterior applications:
      a. Type and grade: S (single component) and NS (nonsag), neutral- and basic-curing silicone sealant.
      b. Class: 100/50.
      c. Use related to exposure: NT (non-traffic).
      d. Uses related to joint substrates: M, G, A, and, as applicable to joint substrates indicated, 0.

      e. Products:
         1) Dow Corning 795, 790, 756 SM.
         2) General Electric- Silpruf, Silpruf LM, Silpruf NB.

4. For interior damp, wet and semi-wet locations, other than ftoors, such as toilet rooms where a mildew-resistant sealant is required: Provide white sealant, unless otherwise noted. Single-component mildew-resistant neutral-curing silicone sealant:
    a. Type and Grade: S (single component) and NS (nonsag).
    b. Class: 25.
    c. Use related to exposure: NT (non-traffic).
    d. Uses related to joint substrates: M, G, A, and, as applicable to joint substrates indicated, 0.
    e. Products:
        1) Pecora Corp.: 898.
        2) General Electric Corp.: 1700.
        3) Dow Corning Corp.: 786.

5. For all other interior vertical applications: Latex sealant complying with ASTM C 834, Type P, Grade NF.
    a. Products:
        1) Pecora Corp.: AC-20+.
        2) Schnee-Morehead, Inc.: SM 8200.
        3) Sonneborn, Division of ChemRex Inc.: Sonolac.
        4) Tremco: Tremfiex 834 or Acrylic Latex 384.

D. Tape sealants:
    1. Norton Specialties Plastics Div.: Norseal 730 or 770.

    2. Protective Treatments, Inc.: PTI 606.

    3. Or equal.

2.2 JOINT CLEANER, PRIMER AND SEALER

A. As recommended by the sealant manufacturer, for the surfaces to be cleaned, primed or sealed.

2.3 BOND BREAKER TAPE

A. Polyethylene or other plastic tape recommended by the sealant manufacturer to prevent 3-sided adhesion where backer rod cannot be used.

B. Use self-adhering tape wherever possible.

2.4 BACKER ROD

A. General:
   1. Provide size, density and shape of rod which will control the joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back, and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.

B. Type: ASTM C 1330, of type indicated below:
   1. Type C: Closed-cell material with a surface skin, Nomaco SOF ROD/Dual Rod, or equal.

   2. For fillet and cove joints, Nomaco HBR 1/4-inch Round.

C. Elastomeric tubing sealant backings:
   1. Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, non-absorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F.

   2. Provide products with low compression set.

2.5 MASKING TAPE

A. Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine conditions and measurements affecting the work of this Section at site. B.Correct detrimental conditions before proceeding with installation.

3.2 JOINT PREPARATION

A. Clean out joints immediately before installing sealants to comply with recommendations of joint sealant manufacturer and the following.

B. Remove foreign material from joint substrates that could interfere with adhesion of sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), oil, grease, waterproofing, water- repellents, water, surface dirt, and frost.

C. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.
   1. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

D. Remove laitance and form release agents from concrete.

E. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other non-porous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

F. Do not proceed with sealant installation over surfaces that have been painted, lacquered, waterproofed or treated with water-repellent or other coating unless specifically approved in writing by the sealant manufacturer.

G. Use masking tape or other protection to limit coverage of sealant to joints to be sealed. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

A. Comply with sealant manufacturer's instructions and ASTM C 1193, except where more stringent requirements are specified herein. At the Architect's option, ASTM C 1193 may also be used for rejection of unacceptable installations.

B. Prime or seal surfaces when recommended by the sealant manufacturer; when the manufacturer's instructions on priming are optional, prime the surface. Do not allow primer/sealer to spill or migrate onto adjacent surfaces.

C. Install backer rod for all sealants, except (1) for exterior sealants subject to traffic (verify that joint filler in paving is installed at the proper depth), (2) where the size of joint prevents the insertion of a backer rod, and (3) where recommended otherwise by the sealant manufacturer.
   1. Install backer rods with blunt or rounded tools to avoid puncturing the material.

   2. Do not twist, stretch or braid the backer rod.

D. Install bond breaker tape where space limitation does not permit use of a backer rod.

E. In no case shall sealant have 3-sided adhesion.

F. Employ only proven installation techniques that will ensure that sealants are installed in uniform, continuous ribbons without gaps or air pockets and with complete "wetting" of the rabbet surfaces equally on opposite sides.

1. Fill concave joints to the configuration shown on Figure SA of ASTM C 1193.

2. Provide flush joints to the configuration shown on Figure 8B of ASTM C 1193.

3. Provide recessed joints configuration as shown on Figure 8C of ASTM C 1193, unless otherwise indicated or required to match adjacent non-moving joint.

4. Where horizontal joints occur between horizontal and vertical surfaces, fill joints to form a slight cove to prevent trapping moisture and dirt.

5. Immediately after sealant application and prior to beginning of skinning or curing, tool sealant using tooling agents that will not discolor sealants or adjacent surfaces and are approved by sealant manufacturer.

G. Do not allow sealant or other compound to overflow, spill or migrate into voids of adjacent construction.

H. Remove excess sealant spillage promptly as this work progresses. Clean adjacent surfaces by recommended means to remove sealant, but not damage the surfaces.

3.4 CURING/PROTECTING

A. Cure sealants in compliance with their manufacturer's instructions to obtain high early bond strength, internal cohesive strength and durability. Do not disturb seals until completely cured.

B. Protect sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion.

END OF SECTION

HOLLOW METAL DOORS AND FRAMES
SECTION 081113

PART 1 - GENERAL

1.1 RELATED WORK

A. Specifications apply to steel doors, steel door frames, sidelites, transom frames and architectural assemblies as shown on Drawings and schedules as conforming to ANSI A250.8-1998 (SDI 100).

1.2 RELATED WORK

A. See following sections for related work:
   1. Rough Carpentry - Section 06100.
   2. Finish Hardware - Section 087100
   3. Painting - Section 099000

1.3 REFERENCES

A. American Society for Testing and Materials
   1. ASTM B 117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
   2. ASTM E 152 – Standard Methods of Fire Tests of Door Assemblies.
   3. ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
   4. ASTM A 568 & A 569 – Standard Specification for Steel, Sheet, Carbon, Hot-Rolled, Commercial Quality.
   5. ASTM A 653 – Standard Specification for Steel, Sheet, Zinc-Coated (Galvannealed) by the Hot-Dip Process.
   6. ASTM A 924 – Standard Specification for General Requirements for Steel, Sheet, Metallic Coated by the Hot-Dip Process.
   7. ASTM D 1735 - Standard Practice for Testing Water Resistance of Coating Using Water Fog Apparatus.

B. American National Standards Institute
   1. ANSI/UL 10B Fire Tests of Door Assemblies.
   2. ANSI/NFPA 80 Standards for Fire Doors and Fire Windows.
   3. ANSI/NFPA252 Fire Tests of Door Assemblies.
   4. ANSI A250.3 – Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
   5. ANSI A250.4 – Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing.

6. ANSI A250.6 (SDI 107) – Hardware on Standard Steel Doors (Reinforcement-Application).
7. ANSI A250.7 – Nomenclature for Steel Doors and Steel Door Frames.
8. ANSI A250.8 (SDI-100) – Recommended Specifications for Steel Doors & Frames.
9. ANSI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
10. ANSI/DHI A115 Specifications for Hardware Preparations in Standard Steel Doors and Frames.
11. ANSI/DHI A115.IG Installation Guide for Doors and Frames.

C. Steel Door Institute:
1. SDI 105 – Recommended Erection Instructions for Steel Frames.
2. SDI 106 – Recommended Standard Door Type Nomenclature.
3. SDI 108 – Recommended Selection and Usage Guide for Standard Steel Doors.
4. SDI 109 – Hardware for Standard Steel Doors & Frames.
5. SDI 110 – Standard Steel Doors & Frames for Modular Masonry Construction.
6. SDI 111 – Recommended Standard Details for Steel Doors and Frames.
7. SDI 112 – Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors & Frames.
8. SDI 122 – Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
9. SDI 124 – Maintenance of Standard Steel Doors and Frames.

D. Fire Protection
1. UL 10B Fire Tests of Door Assemblies (Neutral test pressure).
2. UL 10C Standard for Safety for Positive Pressure Fire Tests of Door Assemblies.
3. NFPA 252 Fire Tests of Door Assemblies (Neutral test pressure).
4. CBC 716 Positive Pressure Fire Tests of Door Assemblies.
5. NFPA 80 Standard for Fire Doors and Fire Windows.

1.4 QUALITY ASSURANCE

A. Conform to requirements of ANSI A250.8-1998 (SDI-100), ANSI A151.1, and other specifications herein named. Test reports shall be submitted upon request.

B. Acoustical qualities: Doors shall have a minimum sound transmission classification of 28 as tested under ASTM designation E490 and ASTM designation E413.

C. Insulation properties: Doors shall have a U factor .363 (R factor of 2.85) for honeycomb core, U factor for polystyrene core of .263 (R factor of 3.8), U factor for polyurethane core of 0.09 (R factor of 11.1).

D. Underwriters' Laboratories and Warnock Hersey, labeled fire doors and frames:
1. All labeled fire doors and frames shall be of a type which has been investigated and tested in accordance with either UL-10(b), ASTM E-152, NFPA 252, ANSI A2.2,

or UL-10(c), CBC 716.

2. Underwriters' Laboratories labeled doors and frames shall be manufactured under the UL factory inspection program and in strict compliance to UL procedures, and shall provide the degree of fire protection, heat transmission and panic loading capability indicated by the opening class.

3. Warnock Hersey labeled doors and frames shall be manufactured to meet the specific requirements of that labeling agency's current procedure for the tested hourly rating designated and shall be subject to inspection by representatives of the labeling agency.

4. A physical label or approved marking shall be affixed to the fire door or fire door frame, at an authorized facility as evidence of compliance with procedures of the labeling agency.

1.5 REGULATORY REQUIREMENTS

A. Doors and frames shall conform to applicable codes for fire ratings. All interior vertical stairwell doors shall carry a minimum 250 degrees F temperature rise rating in addition to the required fire rating.

1.6 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

B. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.

C. Indicate door elevations, internal reinforcement, closure method, and cutouts for glazing and louvers.

D. Submit manufacturer's installation instructions under provisions of Section 01300.

1.7 DELIVERY, STORAGE AND PROTECTION

A. Storage of Doors:

1. Doors shall be stored in an upright position under cover. Place the units on at least 4" (101.6 mm) wood sills on floors in a manner that will prevent rust and damage. Do not use non vented plastic or canvas shelters which create humidity chamber and promote rusting. If the corrugated wrapper on the door becomes wet, or moisture appears, remove the wrapper immediately. Provide a 1/4" space between the doors to promote air circulation.

B. Storage of Frames:
   1. Frames shall be stored under cover on 4" wood sills on floors in a manner that will prevent rust and damage. Do not use non vented plastic or canvas shelters, which create a humidity chamber and promote rusting. Assembled frames shall be stored in a vertical position, five units maximum in a stack. Provide a 1/4" space between frames to promote air circulation.

PART 2: PRODUCTS

2.1 MATERIALS

A. Acceptable manufacturers:
   1. Steelcraft.
   2. Curries.
   3. Ceco.
   4. Stiles Custom Metal, Inc.

B. Frames and frame components shall be manufactured from commercial quality carbon steel conforming to ASTM designation A568 and A569 or hot-dipped galvannealed steel having an A60 zinc-iron alloy coating conforming to ASTM designation A653. Embossed CE-Series EmCraft doors shall have as standard, hot-dipped galvannealed steel face sheets having an A40 zinc-iron alloy coating conforming to ASTM designation A653. Galvannealed steel shall be treated to insure proper paint adhesion. All steel component parts used in galvannealed doors and/or frames shall meet the galvanized specification. Stainless steel shall be fabricated from type 304 or 316 stainless steel polished to a number 4 matte finish. All steel component parts used in stainless doors and/or frames shall also be stainless steel.

C. All doors, frames and frame components shall be cleaned, phosphatized and finished as standard with one coat of rust inhibiting prime paint in accordance with ANSI A250.10.

2.2 DOORS

A. Exterior doors shall be 16 gauge hot dipped galvannealed steel, with closed tops.

B. Interior doors shall be 18 gauge commercial quality carbon steel, with closed tops.

C. Construction of Doors:
   1. Flush Doors:
      a. Steel Stiffened Core doors - B-Series Doors shall be full-flush seamless construction, fabricated from commercial quality carbon steel or hot-dipped galvannealed steel (see Section 2.1). Doors shall be reinforced, with 20 gauge hat section stiffeners at 6" o.c., and insulated with fiberglass insulation.

b. Door shall have continuous vertical mechanical interlocking joints at lock and hinge edges with visible edge seams or with edge seam filled and ground smooth. The internal portion of the seam shall be sealed with epoxy. An intermittent fastening along the seam is not permitted. Doors shall have beveled hinge and lock edges. Top and bottom steel reinforcement channels shall be galvannealed 14 gage and projection welded to both panels.

c. Hinge reinforcements shall be 7 gage for 1-3/4" doors. Lock reinforcements shall be 12 gauge and closer reinforcements 12 gauge - box minimum 6" high and 20" long. Hinge and lock reinforcements shall be projection welded to the edge of the door. Galvannealed doors shall have galvannealed hardware reinforcements. Adequate reinforcements shall be provided for other hardware as required.

d. Glass trim for doors with cutouts shall be 24 gage conforming to ASTM designation A 366 cold rolled steel or ASTM designation A 924 hot dipped galvannealed steel with a zinc coating of 0.06 ounces per square foot (A60). The trim shall be installed into the door as a four sided welded assembly. The trim shall fit into a formed area of the door face, shall not extend beyond the door face and shall interlock into the recessed area. The corners of the assembly shall be mitered, reinforced and welded. The trim shall be the same on both sides of the door. Exposed fasteners shall not be permitted. Label and non-label doors shall use the same trim.

e. Doors indicating divided glass lites shall be made using a door with a cutout and trim for one piece of glass. The small lites shall be created by an extruded aluminum grille work mechanically fastened to the glass lite trim on both sides of the door. The grille work sections shall be beveled on the exposed side and shall have a flange on the unexposed side to which glazing tape can be applied. The grille work shall be installed into both sets of glass trim prior to installing into the door. One glass trim and muntin assembly shall be installed into the door prior to glazing. After glazing the other glass trim and muntin assembly shall be installed into the door.

f. All exterior out swing doors shall have the tops closed to eliminate moisture penetration. Door tops shall no have holes or openings. Top caps are permitted.

2.3 FRAMES

A. Exterior frames shall be 16 gauge hot dipped galvannealed steel.

B. Interior frames shall be 16 gauge commercial quality carbon steel

C. Construction Frames:

1. Flush Frames
   a. F-Series flush frames shall be formed from 16 gauge commercial quality carbon steel or galvannealed steel see Section 2.1. Frames shall be set-up and back welded with full penetration through to the face, ground down and smoothed. Miter corners shall have reinforcements with four concealed integral tabs for secure and easy interlocking of jambs to head.

   b. Frames for 1-3/4" doors shall have 7 gage universal steel hinge reinforcements prepared for 4-1/2" x 4-1/2" standard or heavy weight template hinges. Strike reinforcements shall be 12 gage and prepared for an ANSI-A115.1-2 strike.

   c. Steel plaster guards shall be provided for all mortised cutouts. All hinge and strike reinforcements shall be projection welded to the door frame. Reinforcements for surface applied door closers shall be 12 gage steel.

   d. Galvannealed frames shall have galvannealed hardware reinforcements. Adequate reinforcements shall be provided for other hardware when required. F-Series frames shall be furnished with a minimum of six wall anchors and two adjustable base anchors of manufacturer's standard design.

2.4 ACCESSORIES

A. Vision Lites shall be as indicated on the drawings; moldings shall be manufacturer’s standard.

B. Louvers shall be as indicated on the drawings; blade and frame configuration shall be manufacturer’s standard or as specified elsewhere.

2.5 FABRICATION

A. Frames shall be supplied
   1. Set up and welded with faces welded and ground smooth. Miters of frames shall be back welded. Weld shall penetrate the outside face. Faces shall be dressed smooth and prime painted. Filler materials are not permitted.

2.7 FINISH

A. All doors, frames and frame components shall be cleaned, phosphatized and finished as standard with one coat of rust inhibiting prime paint in accordance with the ANSI A250.10 "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames".

B. Factory finish painted doors and frames shall be cleaned, phosphatized and finished with rust inhibiting paint capable of passing a 200-hour salt spray and 480-hour humidity test in accordance with ASTM designation B117 and ASTM designation D1735. Finish paint shall be in accordance with ANSI/SDI A250.3, "Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames".

PART 3: EXECUTION

3.1 INSTALLATION

A. Doors and frames shall be installed in accordance with ANSI/DHI A115.IG Installation Guide for Doors and Frames and/or Steelcraft installation instructions.

B. Label doors and frames shall be installed per NFPA 80 and/or as noted in item number 3.01A.

END OF SECTION

FINISH HARDWARE
SECTION 087100

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes the furnishing and installing of all finish hardware complete as shown and noted on the drawings and as specified. The Conditions of the Contract and Division 1 apply to this section as fully as if repeated herein.

B. Furnish all finish hardware required to complete the work as indicated on the drawings and as herein specified. Provide all trim, attachments and fastenings specified or required for proper and complete installation. Include all hardware under this section of the specifications that is not specified in other sections, whether or not such hardware is herein scheduled.

C. Furnish and install new cores at existing doors throughout campus.

1.2 RELATED SECTIONS

A. See following sections for related work:

1. Hollow Metal Doors and Frames - Section 081113.

1.3 GENERAL REQUIREMENTS

A. Packing, Marking and Delivering: Each unit of hardware shall be individually packaged, complete with proper fastenings and appurtenances. Each package shall be clearly marked on the outside to show the contents and specific location in the work. Except where otherwise specified, deliver all hardware to the jobsite.

B. Guarantee: Hardware shall be guaranteed for a period of two years from date of acceptance of the work, in the manner specified under Division 1. Defects in materials and workmanship occurring during the guarantee period shall be corrected to the satisfaction of the Architect.

C. Adjustment and Inspection: During the installation of hardware, a periodic inspection in company with the Architect shall be made by the Architectural Hardware Supplier. Any hardware improperly installed shall be removed and reinstalled at the Contractor's expense. At the completion of the work, a final inspection shall be made.

1.4 SUBMITTALS

A. Comply with pertinent provisions of Section 013000.

B. Hardware List: Prepare and submit a hardware list for review. The list shall identify each hardware by manufacturer, manufacturer's catalog number and exact location in the work. Hardware list shall be in suitable form to facilitate ready checking and review. Review of the hardware schedule does not relieve the hardware supplier from the responsibility of furnishing the job complete. The hardware supplier shall furnish to the Owner a copy of purchase orders showing the date of placing order.

C. Samples: When so directed by the Architect, a sample of each item of hardware proposed in the work shall be submitted for review.

D. Templates: In order to insure proper placement and fit, hardware in connection with metal doors or metal frames shall be made to template. Templates or physical hardware items, shall be furnished to manufacturers concerned and shall be supplied sufficiently in advance to avoid delay in the work.

E. Catalog Cuts: When so directed by the Architect, provide catalog cuts of every item furnished for this project. Show finishes, sizes, catalog numbers and pictures. Explain fully all abbreviations.

1.5 KEYING

A. Locksets and cylinders shall be keyed, master keyed, and grand master keyed into the school districts established keying system. District standard Schlage keyway is to be verified.

B. When two or more doors requiring a cylinder lock enter into any one room, these locks shall be keyed alike, unless otherwise noted.

C. Provide two (2) uncut keys per lockset.

D. Contractor is to utilize construction cores during the course of construction and change to permanent cores at the end of the job.

E. Final keying is to take place by the Contractor.

F. Provide Primus “P” keyways at all doors.

G. Existing door count is thirty (30) exterior and twelve (12) interior doors.

PART 2 - PRODUCTS

2.1 FINISH OF HARDWARE

A. The finish of hardware shall be as herein specified. Special care shall be taken to co-ordinate the finish of the various manufacturers to insure a uniform acceptable finish. The finish of hardware shall match the finish of the locksets unless otherwise specified.

2.2 LOCK UNIFORMITY

A. Except where otherwise specified, locksets, latchsets, cylinders and component parts, as specified hereinafter shall be by Schlage or approved equal.

1. Locksets shall be lever operated, Heavy Duty, Key in Lever Lock, D Series, Schlage Rhodes.

2. Mortise locksets shall be lever operated, extra heavy duty, L900 series, Schlage Rhodes, N escutcheon.

3. Locksets and cylinders shall have a minimum of six pins.

4. Lock strikes shall be boxed, and shall have a curved lip of sufficient length to protect the trim and jamb.

5. Exit doors shall be openable from the inside without the use of a key or any special knowledge or effort.

B. Operating Hardware is to conform to CBC 11B-404.2.7.

2.3 HINGES

A. Hinges shall be full mortise, template type, unless otherwise scheduled. Hinges shall have non-rising loose pins, ball or oilite bearings, and flat button tips, except when otherwise specified. Where necessary to keep door leaf clear of walls, casings, jambs or reveals in door openings, wide throw hinges of an approved type shall be furnished. Provide three (3) hinges minimum and all doors over 7' 6" shall have one extra hinge for each two and one half feet of height.

B. Exterior Door Hinges: Provide out-swinging door hinges with non-removable pins and security studs.

2.4 HARDWARE SCHEDULE

A. Refer to Hardware Schedule at the end of this Section.

2.5 EXIT DEVICES

A. Exit devices shall be Von Duprin series XP99 Touch Bar or equal, approved in accordance with Section 01630. Devices shall be U.L. listed for panic safety and fire exit hardware to meet U.L. labeled door requirements, and shall conform to local code requirements. Panic shall be listed with the State of California Fire Marshall and Certification of listing shall be furnished in duplicate with submittals. Exit devices shall comply with CBC standard 12-10-3 and CBC Section 1008.1.9 and the unlatching force shall not exceed 15 pounds applied in the direction of travel.

2.6 DOOR CLOSERS

A. Door closers shall be LCN Closers or equal, approved in accordance with Section 01630. Furnish flat rectangular type closers with covers. Size closers in accordance with the manufacturers recommendations and good standard practice. Surface mounted closers shall be the product of a single manufacturer. Closers shall have nonferrous covers and cast iron cases. Closers operation and speed are to comply with CBC Sections 11B-404.2.9 and 11B-4042.8.1.

B. Provide for the appropriate arm application. All closers shall be installed on the inside of rooms, not on the exterior or corridor side.

C. Door closers are to provide a sweep period so that from an open position of 90 degrees the door will take at least five seconds to move to a point 12 degrees from the latch, measured to the landing side of the door, per CBC 11B-404.2.8.1.

D. Maximum effort to operate interior and exterior doors shall not exceed 5#, such pull or push effort being applied at right angles to hinged doors. Fire doors shall have minimum opening force allowable by appropriate administrative authority, not to exceed 15 lbf.

E. Provide sex-bolted or through-bolt mounting for all door closers.

2.7 DOOR STOPS AND HOLDERS

A. Place door stops in such a position that they permit maximum door swing but do not present a hazard or obstruction. Furnish strikes of proper height to engage holders on doors. For floor mounted hardware, mount a maximum of 4" from face of wall or other surface.

2.8 THRESHOLD

A. Thresholds are to comply with CBC Section 11B-404.2.5.

B. Thresholds are not to exceed ½" in height with a beveled surface of 1:2 maximum slope per CBC Section 11B-404.2.5.

2.9 PROPRIETARY PRODUCTS

A. References to specific proprietary products are used to establish minimum standards of utility and quality. Design is based on the materials specified; other materials may be considered in accordance with the provisions of Section 01630.

2.10 MAINTENANCE RELATED ITEMS

A. Provide one (1) set of Installation and Adjusting Tools, one (1) set of Maintenance Manuals for locksets, door closers and panic devices direct to the Owner.

2.11 ACCEPTABLE MANUFACTURERS

A. Catalog numbers used in the Hardware Selection were taken from the indicated manufacturers.

	Manufacturer	Item	Acceptable Substitutes
1.	Ives	Butts	Stanley
2.	Schlage Rhodes Lever	Locks	No Substitutions
3.	LCN	Closers	No Substitutions
4.	Ives	Miscellaneous	Rockwood
5.	Pemko	Threshold	
6.	Von Duprin	Panic	No Substitutions
7.	Select Products	Continuous Hinge	PEMKO

2.12 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper finish hardware installation, shall be as selected by the Contractor subject to Architect's review and approval.

B. Furnish silencers on all doors, three for single doors, two for pais of doors. Omit where weatherstrip, sound or fire rated door assemblies.

2.13 DELIVERIES

A. Stockpile all items sufficiently in advance to ensure their availability and make all necessary deliveries in a timely manner to ensure orderly progress of the total work.

PART 3 - EXECUTION

3.1 DOOR CLEARANCE

A. Unless detailed otherwise on the drawings, provide the following door clearances
   1. Floor Clearance:
      No Threshold 3/8" max for all doors
      Carpet 1/8" typical
      Labeled Doors 3/32" max over floor or threshold
   2. Head and Jamb Clearance: 1/8" max.

3.2 HARDWARE PLACEMENT

A. Unless detailed otherwise, place hardware at the following heights above finish floor:
   1. Strike (Centerline) for Knob Locks, Handle Sets, Roller Latches, Exit Bolt Locks: 40-5/16"
   2. Push bar and Pull (Centerline): 44"
   3. Push Plate (Centerline) 44"
   4. Deadlock Strike 40"
   5. Hinges, Kick Plates: Manufacturer's Standard

3.3 INSTALLATION

A. Install hardware in precise manner, per manufacturer's instructions. Predrill pilot holes in wood for screws. Drill and tap for surface mounted hardware on metal. Set hinge leaves snug and flat in mortises, turn screws to flat seat (do not drive).

B. Mount door closers for maximum swing of door before setting stops. Silencers shall be in place before adjusting strikes. Drive hinge pins down and tighten set screws. Provide through bolts on wood doors for closers.

C. Install locks with keyways in proper position, with knobs, roses and escutcheons firmly affixed.

D. Set thresholds in waterproof sealant and secure with lead shields and countersunk screws of same finish as threshold.

E. Except for hinges, do not install hardware until completion of painting and finishing work.

F. Adjust hardware so that moving parts operate freely without bind, or excessive play. Installed hardware shall be free from paint, corrosion or damage.

G. Adjust door closers for closing speed, (5 seconds) latching, back checking, and adjust hold open devices for full control of door. Maximum pull exterior doors five (5) pounds, interior doors - five (5) pounds.

H. Upon completion of installation and adjustment, provide required dogging keys, closer valve keys, lock spanner wrenches, and other factory furnished installation aids, instructions and maintenance guides.

3.4 HARDWARE KEY

A. Unless otherwise noted all hardware shall be as specified below, all finish shall be US26D, or aluminum, all doors and frames are hollow metal:

1.	Hinges:	Continuous: Select Products SL-24HD. Heavy Duty: IVES 5BB1HWxNRP - 4 ½" x 4 ½" (exterior doors). IVES 5BB1HW - 4 ½" x 4 ½" (interior doors).
2.	Lockset:	Schlage ND Series Heavy Duty with Rhodes Lever, the lock function will be noted. With Primus cores as indicated.
3.	Panic:	Von Duprin, Series XP99 Rim device with cylinder dogging, (less cylinders, provide Schlage cylinders).
4.	Latch Protector:	Ives LG-12, Rockwood 321.
5.	Closer:	LCN 4041 Super Smoothie, adjust pull to 5# exterior doors and 5# interior doors.
6.	Kick Plates:	10" (U.N.O.) x full width of doors less 2" x .050" thick, Ives 8400. See hardware group for additional sizes.
7.	Bumper/Holder:	Ives, WS45, mounted at top of door. (Provide solid blocking in wall). Ives, FS Series at floor. (Maximum 4" from walls).
8.	Bumper:	Ives: Interior wall, WS402CCV. (Provide solid blocking in wall). Interior floor, FS436/FS438. (Maximum 4" from wall).
9.	Thresholds:	See Plans.
10.	Weatherstrip:	National Guard Products, #162SA (Jamb) and #700SA (Head)
11.	Flush Bolt:	IVES FB51PW/DP2.

12.	Removable Mullion:	Von Duprin, keyed removable.
13.	Push/Pull Plate:	IVES 8200CFC x 8302CFC - 4x16.
14.	Deadbolt:	Schlage, Series B600.
15.	Drip Cap:	National Guard Products, #17x4".
16.	Door Shoe:	PEMKO 217APK.
17.	Door Silencers:	Ives SR64.
18.	Sound Gasket:	PEMKO S88 (double row).
19.	Astragal:	Per Specification Section 08110.
20.	Smoke Seal:	National Guard Products, #2525B
21.	Magnetic Hold Open:	LCN SEM 7850

HARDWARE SCHEDULE: See Section 3.4 Hardware Key for details.

A. Hardware Group 1 - Each Door

Key	Item	Description
1	Hinges	Heavy Duty
2	Lockset	ND94PD-RHO
7	Bumper/Holder	Mount at top of Door
11	Flush Bolt	
15	Drip Cap	
17	Door Silencer	
19	Astragal	
	Signage	See Door Schedule

END OF SECTION

GYPSUM BOARD
SECTION 092000

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Gypsum board.

   2. Fasteners, joint reinforcing and finishing compound.

B. Related work:
   1. Division 6 for wood framing supporting gypsum board.

   2. Division 8 for access panels in gypsum board surfaces.

   3. Division 9 for painting.

1.2 REFERENCES

A. ASTM C 840, Specification for Installation and Finishing of Gypsum Board.

B. GA-216, Application and Finishing of Gypsum Board

C. ASTM E 497, Installing Sound Isolating Lightweight Partitions.

1.3 SUBMITTALS

A. Data: Submit manufacturer's data for all materials to be used in gypsum board construction

B. Samples: Submit three 24-inch samples with the medium orange peel spatter coat specified for Architect's approval. Approved sample will become Architect's control sample.

1.4 QUALITY ASSURANCE

A. Requirements of regulatory agencies:
   1. Comply with fire resistance ratings indicated and required by Code.

   2. Provide materials, accessories and application procedures listed by UL or tested in compliance with ASTM E 119 for the type of construction shown.

B. Mockup:

1. Where directed, construct a mockup of a gypsum board wall and ceiling inside the building. Make mockup full height (minimum 8 feet high by 8 feet wide) with a 4-foot return.

2. Tape and finish joints, trim and screw heads as specified for Level 4 herein with orange peel finish. Refer to Section 09900 for painting of the mockup with a semi-gloss paint.

3. The Architect will review the mockup under various light conditions for defects and improperly finished joints, trim and screw heads. Provide a portable light for that purpose when so requested.

4. Make corrections requested by the Architect, or remove and replace mockup when the corrective work is not acceptable to the Architect.

5. The approved mockup shall remain in the building until its removal is directed, and will be used as a standard for the gypsum board work for the Project.

1.5 HANDLING

A. Procedure: In accordance with GA 801 "Handling Gypsum Board."

B. Storage: Do not overload the fioors with localized concentration of gypsum board.

1.6 JOB CONDITIONS

A. Comply with the gypsum board manufacturer's recommendations and GA "Application and Finishing of Gypsum Board" for temperature limitations and ventilation before, during and after installation of gypsum board.

B. Protect installed materials from drafts during hot, dry weather.

C. Illuminate work areas during installation to provide the same or greater level of illumination required to properly perform the work and as will occur in the room or space after the building is in operation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. US Gypsum Co., Sheet Rock Brand Mold Tough Firecode Core.

B. Georgia Pacific, Tough Rock-Mold Guard

2.2 GYPSUM BOARD

A. General:
   1. Provide boards 5/8 in. thick boards complying with ASTM C 1396 as follows and in maximum lengths available to minimize end butt joints.

   2. Unless otherwise acceptable to the Architect, no end-to-end butt joints are allowed on walls or ceilings less than 12-foot in length or width.

B. Exposed gypsum board surfaces (Type X): Provide boards with paper face suitable to receive decorative finish, and long edges tapered to receive joint compound.

2.3 ACCESSORIES

A. Screws: The following sized in compliance with the gypsum board manufacturer's instructions and Code requirements.
   1. ASTM C 954 for fastening to supporting studs and furring.

   2. ASTM C 1002, 1-1/2" long Type W for gypsum board-to-wood framing and 1" long Type S for gypsum board-to-steel framing. Screws shall be long enough to penetrate into wood framing a minimum of 5/8 inch and through metal framing not less than 1/4 inch.

3. Do not use nails.

B. Metal trim: Galvanized steel of the types specified hereafter complying with ASTM C 1047.
   1. LC-Bead: J-shaped; exposed long flange to receive joint compound; use at exposed panel edges.

   2. L-Bead: L-shaped; exposed long leg to receive joint compound; use where indicated.

   3. U-Bead: J-shaped; exposed short flange not to receive joint compound; use at exposed panel edges.

   4. Expansion (Control) Joint: Use where indicated.

   5. Control joint: USG No. 093 or Goldbond Building Products E-Z Strip.

C. Joint tape, compound and laminating adhesive: ASTM C 475, low or very low shrinkage, type recommended by the manufacturer, by Hamilton Materials, basis of design, Murco, or one of the gypsum board manufacturers.
   1. Taping, and fastener and metal trim concealment: Red Dot Lite.

2. Topping, finish and skim coats: Green Dot Lite.

D. Spatter coats (orange peel): Sheetrock Brand Wall and Ceiling Spray, or equal.

E. Sealants: As specified in Section 079200.

PART 3 - EXECUTION

3.1 EXAMINATION/PREPARATION

A. Examine conditions affecting the work of this Section at site.

B. Verify framing members straightness and alignment.

C. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

D. Before enclosing stud walls, thoroughly clean floor tracks of debris.

3.2 GYPSUM BOARD INSTALLATION- GENERAL

A. Comply with the applicable provisions of the references standards and the following.

B. Use only full size boards above door and window openings; joints at corners of heads are not acceptable.

C. Minimize butt joints and avoid butt joints centered on walls, over protruding studs, and above doors and windows. Avoid abutting end joints in the central area of each ceiling.

D. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back blocking is provided behind end joints.

E. Position adjoining panels so that tapered edges abut tapered edges, and field-cut edges abut field-cut edges and ends.
1. Do not place tapered edges against cut edges or ends.

F. Stagger vertical joints over different studs on opposite sides of partitions.

G. Attach gypsum panels to steel studs so that the leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

H. Attach gypsum panels to framing provided at openings and cutouts.

I. Except where frames are solidly grouted, spot grout hollow metal door frames. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.

J. Provide perimeter relief where board abuts structural decks, ceilings, vertical structural elements, or glazed assembly.

K. Install horizontal boards first. Butt joints between boards loosely. Do not force boards into place. Place tapered or wrapped edges next to one another.

L. Attach boards to all studs and furring members with power-driven screws securely engaging supporting member, and with fastener heads uniformly depressed not over 1/32-inch below surface of board (except for first layer of multiple layer assembly) without breaking face paper. Maximum screw spacing is to be 12" o.c. or as indicated on Drawings, whichever is less.

M. After boards have been installed over screws and backing plates, tap boards with a rubber mallet to depress backside of board over heads to eliminate unacceptable bulges.

3.3 SINGLE LAYER APPLICATION

A. Horizontal surfaces:
   1. Install board with long dimension at right angle to supports, with end joints located over supports.

   2. Use maximum practical length boards to minimize end joints. Stagger end joints in alternate boards.

B. Vertical surfaces: Unless otherwise acceptable to the Architect, install board vertically. Use floor-to-ceiling length boards (unless height exceeds 12-foot) with vertical joints located over supports.
   1. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

   2. Offset joints at least one stud on opposite sides of partition/walls.

   3. Extend gypsum board continuously from finish floor to underside of structure above, except where indicated otherwise on the Drawings.

3.4 ALLOWABLE TOLERANCES

A. Do not exceed 3/16 inch in 8 feet, and 1/8 inch in 4 feet from plumb, level and flat (all directions) in gypsum board surfaces.

B. Do not exceed 1/16 inch offset at joints between boards.

C. Shim boards as necessary to comply with these tolerances.

3.5 FINISHING

A. Finish gypsum board surfaces with exposed joints, corners and edges reinforced or trimmed in compliance with the following:

1. Level 3: Use in storage and electrical rooms.
   a. Joints and interior angles shall have tape embedded in joint compound and apply 2 separate coats of joint compound over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges.

2. Primer Coat: Coordinate with **Specification Section 099000 - Painting** and have applied the primer/sealer coat for drywall finishes prior to the application of the textured finish coat in this section.

B. General:
1. Fill joints, fastener heads, trim accessory flanges and surface defects with joint compound in compliance with the gypsum board manufacturer's recommendations to obtain a smooth, flush surface.

2. All joints, fastener heads and trim fianges in surfaces which will remain exposed to view in the building, shall be invisible after application of joint tape and compound.

C. Install trim in single unjointed length, unless length exceeds manufacturer's standard. Attach to gypsum board in compliance with manufacturer's instructions.
1. Install Type CB trim at external corners.

2. Install Type LC trim where gypsum board edges are exposed in the finish work.

3. Install Type CB or LC trim where gypsum board abuts a different material, and the edges are not covered by a finish material.

4. Install control joints as recommended in paragraph 5.6 of the reference standard. Joint locations are subject to the Architect's approval.

D. Reinforce joints between gypsum boards, and interior corners and angles with tape set in joint compound.
1. Apply skim coat over tape in one application.

2. Where space greater than 1/16 inch occurs between abutting gypsum boards (except at control joints and for concealed layers of multiple layer assemblies), pre-fill joints with joint compound and allow to dry before applying joint tape.

E. Joint compound:
1. Lap each coat not less than 4 inches over the preceding coat (2 inches on each edge). Width of joint compound on tapered board edges shall be not less than 12 inches; width of joint compound on square board edges not less than 18 inches.

2. Allow at least 24 hours drying time between applications of joint compound.

3. Finish joint compound so that little or no sanding is required. When sanding, use sandpaper or mesh cloth with grit as fine as possible; do not scuff face paper. Remove all sanding dust before painting or applying other finishes.

F. Leave gypsum board surfaces smooth, undamaged and ready to receive scheduled finishes.

END OF SECTION

LATH AND PORTLAND CEMENT PLASTER
SECTION 092400

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Metal lath and lathing accessories.
   2. Portland cement plaster with fiber additive.
   3. Miscellaneous materials and accessories not listed, but required for complete installations.

1.2 SYSTEM DESCRIPTION

A. Provide the following systems with a fine sand finish, minimum 7/8 inches thick:
   1. 3-coat work over water resistive barrier on plywood sheathing.

1.3 SUBMITTALS

A. Data: Submit a list of proposed products, materials and components to be provided for a complete plaster assembly, along with manufacturer's product data, specifications, typical installation details and other data as necessary to demonstrate compliance with the specified requirements for each item listed.

B. Shop drawings:
   1. Submit large scale, dimensioned drawings showing materials, profiles, joints, finishes and details of attachments to other work. Furnish edge details where plaster abuts adjacent materials.
   2. Submit elevation drawings of each plane to be covered with plaster. Show location of all trim and accessories, including control joints locations.

C. Samples:
   1. Submit color samples from manufacturer's standard color palette for color selection by the Architect.
   2. Submit 4-foot square sample panel of proposed plaster finished as specified mounted to hardboard backing. Approved sample will become Architect's control sample.

1.4 QUALITY ASSURANCE

A. Mockup:
   1. Provide at the Project site, where directed by the Architect, a mockup representative of the plaster texture and color proposed for the Project for the Architect's evaluation.

2. Make mockup a minimum of 8 feet square, mount on lath/gypsum base/wood studs, with a typical window approximately centered in the panel, complete with moisture barrier, flashing and trim. Provide finished corners at each end.
3. Provide a control joint at mid-height.
4. Finish mockup to match the control sample panel available for the Contractor's review in the Architect's office.
5. Demonstrate patching that will be required for a typical scaffolding tie on one side of the panel.
6. Repeat mockup(s) until Architect's approval is obtained.
7. Protect approved mockup, which will be used as a standard for the Project, until its removal is authorized.
8. After the mockup is approved, start application of the plaster on the building where directed by the Architect. Obtain Architect's approval of a panel full height on the building before proceeding further.

1.5 HANDLING

A. Delivery: Deliver materials, except sand and water, to the site in sealed containers or bags clearly identified with manufacturer's name, brand, type and grade.

B. Storage:
1. Keep metal lath and accessories dry by storing off the ground on platforms under plastic sheeting.
2. Store plastering materials, including sand, on platforms under plastic sheeting to prevent hydration or contamination.
3. Store aggregates on clean platforms and cover with plastic sheeting to exclude dirt and other foreign materials that would adversely affect the plaster.

1.6 JOB CONDITIONS

A. Protect adjacent surfaces from damage as a result of plastering operations.

B. Protect plaster against extreme climatic conditions, including uneven and excessive evaporation from hot dry air.

C. Do not leave weather barrier exposed to the elements longer than recommended by its manufacturer.

D. Ambient temperature shall be 50^{o} and rising for all stucco product application.

PART 2 - PRODUCTS

2.1 WEATHER BARRIER

A. Complying with FS UU-B-790a, Type I, GradeD (vapor permeable), Style 2, with a water resistance of 60 minutes (min) ASTM D779; Fortifiber Corp. "Super Jumbo Tex" or eqaul

2.2 LATH

A. Self-furred welded wire Structa Mega Lath, 1.95 lbs/sq yd (an alternate to 3.4# diamond mesh) made from Class1 galvanized coated steel, to produce lath complying with ASTM A641. Install per ICC ESR-2017, as made by Structa-Wire Corp..

B. V Truss Ceiling - Rib lath, weight 22lb/sq yd, galvanized coated steel (an alternate to 3/4 lbs/sq yd Diamond mesh), complying with ASTM A641. Install per ICC ESR-2017, as manufactured by Structa-Wire Corporation.

2.3 ACCESSORIES

A. Metal trim members:
   1. Extruded aluminum trim: Alloy 6063 T5, furnished in longest possible single lengths. Factory fabricate intersections with back-up plates and legs at least 24 in. long. Provide end caps where required. All intersections shall be open. Exposed members shall have a clear anodized finish.
      a. Soffit vents: Fry Reglet Corp. PCS-75-V-300.
      b. Interior reveals: Fry Reglet Corp. DRMF-50-50
   2. Basis of design is for minimum 26-gage, zinc trim, supplied in longest obtainable single lengths to minimize joints, by ClarkWestern Metal Lath or Stockton Products as indicated.
      a. Control joints: "No. 15" by ClarkWestern Metal Lath.
      b. Casing bead expansion flange: "No. 66" by ClarkWestern Metal Lath.
      c. Corner reinforcement:
         1) Outside corners: V Truss Straight Corner.
         2) Inside corners: "No. 30" by ClarkWestern Metal Lath.
      d. Foundation screed: SJB J-Bead with weep holes and 3-1/2 in. flange by Superior.
      e. Door and window flashing: "WTP" Stockton Products.

B. Tie-wire: 18-gage galvanized, annealed steel wire for accessories-to-lath.

C. Fasteners:
   1. At Wood Studs: 12 gage, 2" long (minimum) galvanized steel wire roofing nails having 3/8 inch diameter head and 3/4 inch diameter galvanized steel washer.

2.4 PLASTERING MATERIALS

A. Portland cement: ASTM C 150, Type I or II. Use only one brand throughout this work.

B. Hydrated lime: ASTM C 206, Type S.

C. Sand: ASTM C 897, graded as follows, except for finish coat.

PERCENTAGE RETAINED ON EACH SIEVE

Sieve Size	Maximum	Minimum
No.4	0	0
No.8	10	0
No. 16	40	10
No. 30	65	30
No. 50	90	70
No. 100	100	90
No. 200	100	97

D. Water: Potable, fresh from domestic source.

E. Fiber reinforcement: Provide one of the following, or equal shorts expressly manufactured and in current use as a plaster base course reinforcement:

1. Glass fiber: "Dur-0-Fibar" 1/2-inch long alkaline-resistant chopped glass fiber strands by Dur-O-Wall, Inc. or "Cem-Fil" by Pilkington
2. Nylon: 1/2-inch long nylon/Caprolan-RC fibers by Nycon, Inc.,
3. Polypropylene: 1/2-inch long polypropylene monofilament fibers by Grace Construction Products.

2.5 PLASTER MIXES

A. Scratch coat (by volume): One part Portland cement, maximum one part dry hydrated lime, maximum 4 parts loose sand aggregate of the total volume of cement/lime.

B. Brown coat (by volume): Same as specified for scratch coat except that sand may be increased to 4-1/2 parts of the total volume of cement/lime.

C. Finish coat (by volume): 100 percent acrylic polymer by Dryvit, DPR Mojave Finish in custom color to match existing.

D. Mix ingredients thoroughly, measuring as accurately as possible. Add to the mixer from calibrated containers. Do not use materials that are caked, lumpy, dirty or contaminated by foreign materials.

E. If calibrated container supply interferes with progress of Work, shovels may be used provided they are measured to determine the accuracy of the volume of aggregate they carry, in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION/PREPARATION

A. Examine conditions and measurements affecting the work of this Section at site.

B. Before plastering begins, insure that adjacent finish work is well protected with waterproof covers securely taped in place.

C. Before enclosing stud walls, thoroughly clean space of debris.

D. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 GENERAL

A. The applicable provisions of ASTM C 1063 and ASTM C 926, govern the work of this Section, except as specified herein.

3.3 WEATHER BARRIER

A. General: Comply with ASTM C 926 and ASTM C 1063 for installation of materials, except as specified below, and where requirements of the authorities having jurisdiction are more stringent.

B. Install over sheathing and framing members with a minimum of fasteners.

C. Lap shingle fashion 2 inches at horizontal joints and 6 inches at vertical joints. No weather barrier is required on soffits. Stagger vertical joints.

D. Continue weather barrier uninterrupted behind control joints.

E. Lap over flange of accessories to prevent direct contact between lath and accessories and to ensure water tightness.

F. Interface weather barrier with flashing materials at windows, doors, electrical boxes, pipes, and other penetrations to properly discharge water to the exterior face of the wall. Absence of flashing must be corrected prior to installing weather barrier.

G. Seal unused holes from fasteners in weather barrier with silicone sealant specified in Section 079200.

3.4 LATHING

A. Comply with ASTM C 1063, except as specified below, and where Code requirements are more stringent.

B. Apply lath taut with long dimension at right angle to supports.

C. Apply first course at bottom and work up.
   1. Install per manufacturer's written installation recommendations.

D. Attach lath to wood or metal supports, thru weather barrier, at 6 inches o.c.

E. Cut lath at control joints.

F. Hold lath 1/4 inch clear of electrical boxes, columns, and similar items projecting through the plaster.

G. Where lath is attached to horizontal wood supports, either of the following attachments shall be used in addition to the methods of attachment set forth in Table 2507.2 in accordance with CBC Section 2507.3.
   1. Secure lath to alternate supports with ties consisting of a double strand of No. 18 W&M gage galvanized annealed wire at one edge of each sheet of lath. Wire ties shall be installed not less than 3 inches back from the edge of each sheet and shall be looped around stripping, or attached to an 8d common wire nail driven into each side of the joist 2 inches above the bottom of the joist or to each end of a 16d common wire nail driven horizontally through the joist 2 inches above the bottom of the joist and the ends of the wire secured together with three twists of the wire.
   2. Secure lath to each support with ½ inch wide, 1-1/2 inch long No. 9 W&M gage, ring shank, hook staple placed around a 10d common nail laid flat under the surface of the lath not more than 3 inches from the edge of each sheet. Such staples may be placed over ribs of 3/8 inch rib lath or over back wire of welded wire fabric or other approved lath, omitting the 10d nails.

H. Where lath is attached to horizontal metal supports, metal lath shall be attached to metal support with not less than 0.049 inch (No. 18 BW gage) tie wire spaced not more than 6 inches apart or with (DSA) equivalent attachments.
   1. Screws (when applicable) shall be an approved type long enough to penetrate into wood framing not less than 5/8 inch and through metal supports adaptable for screw attachment not less than 1/4 inch.

3.5 PLASTER ACCESSORIES

A. Wire-tie at no more than 24 inches o.c. to metal lath or studs.

B. Use single length wherever length of run does not exceed longest standard stock length available.

C. Miter or cope at corners with hairline joints, and seal with sealant specified in Section 079200. Seal butt splices in the same manner.

D. Set accessories level, plumb and true to line with a tolerance of not more than 1/8 inch in 5 feet. Shim as required and align joints with concealed splice or tie plates

E. Install corner reinforcement at external corners.

F. At plaster terminations, provide casing bead at the following locations:
   1. Where plaster termination abuts other finishes, isolate casing bead from contact with adjacent finishes with 1/4 inch thick tape sealant specified in Section 07920.
   2. Where plaster termination is not covered by another finish or applied trim, provide cased opening by installing casing bead around perimeter of opening as detailed.

G. Control joints:
   1. Install vertical control joint first, continuous from top to bottom of wall; install horizontal control joints second and split where it meets the vertical control joint.
   2. Install joints plumb, level, evenly spaced where so indicated, and in one piece at the spacing indicated.
   3. Follow manufacturer's directions for their installation.

H. Accessories that butt each other need to be lapped, sealed, soldered or welded, and/or stripped with flexible flashing.

3.6 PLASTERING

A. General: Comply with ASTM C 926, except as specified below, and where Code requirements are more stringent.

B. Sequencing: Provide sufficient manpower and equipment to ensure a continuous operation free of cold joints, scaffold lines, texture variations, and other objectionable conditions.

C. Application: Plaster surfaces in one operation once the application of any coat has begun. Stop plaster at control joints, edges or corners only. Plaster in one operation, full height and width between control joints.
   1. Scratch coat: Apply with sufficient material and pressure to form good full keys, and to cover well.

a. Minimum thickness of scratch coat shall be 3/8 inch when measured from backing to crest of scored plaster.
b. Scratch before plaster hardens to provide sufficient mechanical key for brown coat. Moist cure continuously for a minimum of 48 hours, including weekends and holidays.

2. Brown coat:
   a. Apply the brown coat approximately 3/8 inch thick in 2 coats. Bring to a true, even surface by rodding and floating and leave slightly rough to receive the finish coat.
   b. Begin floating only after hydration of the cement has commenced and sufficient moisture has evaporated, so that surface sheen has disappeared, but before plaster has become too rigid to be moved under the float.
   c. Moist cure continuously for a minimum of 48 hours, including weekends and holidays.
3. Finish coat: Apply not less than 7 days after brown coat has been applied. Dampen brown coat thoroughly and apply finish coat to a minimum thickness of 1/8 inch to match approved mockup.
4. Allowable tolerance: Maximum deviation from true planes of finish plaster shall not exceed 1/8 inch in 5 feet when measured with a straightedge placed at any point on plaster surfaces.

D. Do not use materials that are caked, lumpy, dirty, or contaminated by foreign materials.

E. Plaster flush with metal frames and other built-in metal items or accessories that act as plaster grounds.

F. Where permanent grounds are too far apart to serve as guides for rodding, provide supplemental plaster screeds as required.
1. Establish true surfaces with rods before setting the screeds.
2. Keep grounds clean and free of plaster.
3. Finish plaster in a true plane, plumb, or level as applicable, flush with grounds.

3.7 FIELD QUALITY CONTROL

A. The specified moist curing periods are minimum requirements. Be responsible for determining the most effective procedure for curing and time lapse between application of coats, based on climatic and job conditions.

B. Completed plaster shall match approved mockups, be within the tolerances specified, be uniform in thickness, texture and color when applicable, free of cracks, blisters, pits, checks and other defects.

C. Repair, or remove and replace, as determined by the Architect, lath/plaster that does not meet these requirements, with materials satisfactory to the Architect.

3.8 REPAIRING/CLEANING

A. Cut, patch, repair, and point-up defective plaster.
   1. Repair cracks and indented surfaces by moistening plaster and filling with new material, troweled and tamped to match adjoining surfaces.
   2. Point-up finished plaster surfaces around items that are built into or penetrate plaster.

B. Promptly remove plaster spatter and droppings from adjacent surfaces. Repair surfaces that have been stained, marred, or otherwise damaged during plastering.

END OF SECTION

PAINTING
SECTION 099000

PART 1 - GENERAL

1.1 SUMMARY:

A. The work includes the furnishing of all materials and equipment and the completion of all painting and painter's finish on all exposed interior and exterior surfaces, as required to complete the finishing of the building as shown and noted on the drawings and as specified. The Conditions of the Contract and Division 1 apply to this section as fully as if repeated herein.

B. Related Sections:

1. Section 076000 - Sheet Metal.
2. Section 077200 - Access Hatches/Access Doors
3. Section 081100 - Hollow Metal Doors and Frames.
4. Section 092500 - Gypsum Board.

1.2 SUBSTITUTIONS:

A. Materials will be considered for substitution subject to requirements.

1.3 SUBMITTALS:

A. Submit proposed paint schedule and product data for each different product.

B. The Architect will select the finish colors and determine the basic hues of all surfaces to be painted or finished.

C. Prepare samples of colors and textures based upon the Architect's selections and submit them for review.

1.4 GENERAL REQUIREMENTS:

A. Examine the drawings and the specifications of other trades and consult with the other trades to determine the full extent of work and items which are specified to include shop priming and shop finish painting.

B. Conditions affecting the work of this section shall be verified at the job site.

C. No materials other than those specified, or approved, shall be delivered to the job or used on the work. Materials shall be delivered in manufacturer's sealed containers with labels defining the contents therein.

D. Paint materials and equipment, when not in actual use, shall be stored in places specifically assigned for that purpose. Such storage space shall be well ventilated and adequately fire protected. Paint mixing and handling shall be performed in these assigned areas and containers used for mixing and handling shall be metal and suitably designed for safety. Paint materials, including rags, tarpaulins, mixers, empty containers and filled or partially filled containers shall be removed from the building areas at the close of each working day.

5. Paints and Coatings: All paints and architectural coatings totaling 90% or more of the total volumes of such products applied in the project's interior shall meet the requirements described herein. Products in this category include but are not limited to sealers, stains, clear wood finishes, floor sealers and coatings, waterproofing sealers, primers, flat paints and coatings, non-flat paints and coatings, and rust preventative coatings. All such products shall meet the VOC content requirements in the applicable category of South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings (amended July 2007, or current version). Further, all such products shall comply with the requirements of the Safe Drinking Water and Toxic Enforcement Act of 1986 and the most current list of chemicals (Proposition 65, CA OEHHA). Products that are labeled or would require labeling under this law are not eligible for this credit.

   Further all paints and coatings normally applied to walls, ceilings, floors or trim shall be tested and evaluated for emissions of VOCs of concern with respect to chronic inhalation exposures following the specifications of the CDPH Standard Practice. The product shall be applied to the appropriate plate or gypsum board panel and tested individually (i.e., not as part of a multi-coat assembly). Sealers and paints shall be modeled to the school classroom using the manufacturer's specified coverage and the classroom flooring area. Wall applied paints and coatings shall be modeled using the manufacturer's specified coverage and the classroom wall paint and wall coverings area. Ceiling applied paints and coatings shall be modeled similarly using the ceiling area. Wood stains, finishes, and trim applied paint shall be modeled similarly using the area of the classroom door plus the area of the wall base (i.e., 11.6 m2).

1.5 WORK INCLUDED:

A. The requirements of this section, is that all work, items and surfaces which are normally painted and finished in a building of this type and quality, shall be so included in this contract, whether or not said work, item or surface is specifically called out and included in the schedules and notes on the drawings, or is, or is not, specifically mentioned in these specifications.

1.6 PRODUCT HANDLING:

A. Deliver paint to site in manufacturer's labeled and sealed containers. Labels shall give manufacturer's name, brand, type, batch number, color of paint and instruction for reducing. Thin only in accordance with printed directions of manufacturer.

1.7 ENVIRONMENTAL CONDITIONS:

A. Do not apply exterior paint in damp, rainy weather or until the surface has dried thoroughly from the effects of such weather. Do not apply varnish or paint when temperature is below 50 degrees F. Avoid painting surfaces when exposed to hot sunlight.

1.8 PROTECTION AND CLEAN UP:

A. Before painting, remove hardware, accessories, plates, lighting fixtures and similar items or provide ample protection of such items. On completion of each space, replace above items. Use only skilled mechanics for removing and connecting above items. Protect adjacent surfaces as required or directed.

B. Wherever painting and finishing work is being performed, floors, surfaces and items shall be carefully protected from damage by the painting work. Clean drop cloths shall be provided and used wherever necessary. Supplies, materials, paints, containers, shall be orderly and carefully arranged and protected. Accidental spatter, spillage, shall be immediately cleaned and the damaged surfaces restored to perfect condition. Paint spots and spatter on glass, other surfaces shall be completely removed and the surface cleaned.

C. At the completion of work in each space or room, materials, supplies, debris and rubbish shall be removed and the areas left in a clean, orderly condition.

1.9 GUARANTEE:

A. Guarantee the painting work, in writing, against peeling, fading, cracking, blistering, or crazing for a period of two (2) years from the time the Notice of Completion is filed.

1.10 EXTRA STOCK:

A. Contractors to provide the owner with at least one-gallon of each type and color of paint product.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Paint materials shall be as manufactured by Dunn Edwards Paint (D-E) or as indicated in the Paint Schedule or equal approved in accordance with Section 01650.

B. Primer and sealer coats may be thinned no more than 10%, with paint manufacturer's thinner. Other coats shall be used as they come from the can, except as otherwise approved.

C. Secure the Color Schedule before undercoating. Unless otherwise specified, all undercoats shall be tinted slightly to approximate the color of the finish coat. Approval of color shall be obtained before proceeding with the work.

D. Where a specific name is not given for a product or ingredient, such item shall be of the best quality of the approved manufacturer, which is normally used for the intended purpose.

2.2 PAINT SCHEDULE:

A EXTERIOR:

1.	Group One:	Ferrous Metal	
			D-E
	1st Coat	Primer	BRPR00
		(If shop primed, only touch-up is required)	
	2nd Coat	Exterior Acrylic Semi-Gloss	SSHL50
	3rd Coat	Exterior Acrylic Semi-Gloss	SSHL50
2.	Group Two	Galvanized Metal	
			D-E
	Etch	Etching Solution	ME 01
	1st Coat	Alum Primer	GAPR00
	2nd Coat	Exterior Acrylic Semi Gloss	SSHL50
	3rd Coat	Exterior Acrylic Semi Gloss	SSHL50
C.	Group Three	Concrete and Masonry	
			D-E
	1st Coat	Masonry Primer	ESPR00
	2nd Coat	Exterior Acrylic Low Sheen	EVSH40-2
	3rd Coat	Exterior Acrylic Low Sheen	EVSH40-2

4.	Group Four	Composite Trim (Pre-Primed)	
			D-E
	1st Coat	Primer (for touch-up only)	EZPR00
	2nd Coat	Exterior Acrylic Semi Gloss	SSHL50
	3rd Coat	Exterior Acrylic Semi Gloss	SSHL50

B. INTERIOR:

1.	Group One	Gyp Board	
			D-E
	1st Coat	Gyp Board Primer - Zero VOC	BIPR00
	2nd Coat	Acrylic Semi-Gloss - Zero VOC	EVER50
	3rd Coat	Acrylic Semi-Gloss - Zero VOC	EVER50
2.	Group Two	Interior Metal - Ferrous	
			D-E
	1st Coat	Primer - Rust Black Premium Low VOC	BRPR00
	2nd Coat	Acrylic Semi-Gloss - Zero VOC	EVER50
	3rd Coat	Acrylic Semi-Gloss - Zero VOC	EVER50
3.	Group Three	Interior Metal - Galvanized	
			D-E
	1st Coat	Primer - Ultra Grip - Low VOC	UGPR00
	2nd Coat	Acrylic Semi-Gloss - Zero VOC	EVER50
	3rd Coat	Acrylic Semi-Gloss - Zero VOC	EVER50
4.	Group Four	Interior Wood	
			D-E
	1st Coat	Sealer/Undercoat - Low VOC	BIPR00
	2nd Coat	Acrylic Semi-Gloss - Zero VOC	EVER50
	3rd Coat	Acrylic Semi-Gloss - Zero VOC	EVER50

All interior paint must conform to GreenSeal, GS-11 Criteria.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Examine surfaces to be painted before beginning painting work. Work of other trades that has been left or installed in a condition not suitable to receive paint shall be repaired or corrected by the applicable trade prior to painting. Painting of defective or unsuitable surface implies acceptance of the surface.

B. Surfaces shall be clean and dry prior to painting and finishing. Dirt and dust shall be removed by stiff bristle brush and wiping with cloths. Oil and grease shall be removed by solvent cleaning, using a solvent such as mineral spirits and wiping with clean cloths. Surfaces shall be given a final rinse of clean solvent. Surfaces which have been contaminated with chemicals shall be thoroughly rinsed with water. The first coat of paint shall be applied as soon as possible after cleaning and drying surfaces.

C. Shop Primed Ferrous Metal Surfaces: Wash free of grease, dirt, oil, and dust, using solvents as required. Galvanized surfaces shall be cleaned with solvents and given a vinyl wash coat. Shop primed surfaces shall be repaired and touched up wherever shop priming is damaged and at all welds.

3.2 APPLICATION:

A. Application: Apply paints by brush or roller except as otherwise specified. Use paint of proper consistency for each coat, well brushed-out or flowed-on to obtain a uniform finish free from holidays, brush marks, sags, crawls, or other defects. If paint is applied by sprayer, all surfaces shall be back-rolled.

B. Materials shall be applied in accordance with the approved manufacturer's directions and specifications. Thinning required, shall be done in the manner and the type of reducer recommended by manufacturer.

C. The proper number of coats of paints and other finishes specified, properly applied, will result in the desired effect. Should this effect not be attained, additional applications of the specified materials and methods shall be made.

D. Each coat of painted work shall vary in shade from the proceeding coat in a manner that will make each coat readily distinguishable without affecting the finish color.

E. In enclosed spaces, the application and drying of paint shall be performed only when the temperature is 65 degrees F., or above and maintained constantly to prevent condensation.

F. Enamel coats shall be sanded smooth prior to re-coating., All defects and unevenness in previously applied coatings shall be repaired before applying the next coat.

G. Where questions occur as to the indicated surfaces inform the Architect and receive clarification therefrom.

H. Back Priming: All wood trim is to be primed on the back side prior to installation. Coordinate with finish carpentry.

I. Gypsum Board Prime Coat: Primer coat for drywall finishes are to be applied prior to the application of the texture finish coats. Coordinate with Section 092000.

3.3 CLEANING, TOUCH-UP AND REFINISHING:

A. Touch-up and Refinishing: Runs, sags, misses, holidays, stains and other defects in the painted surfaces, including inadequate coverage and mil thickness shall be satisfactorily touched up, or refinished, or repainted as necessary to produce a first-class workmanlike job.

B. Cleaning:

1. Carefully remove all spattering, spots and blemishes caused by work under this section from surfaces throughout the project.

2. Upon completion of painting work remove all rubbish, paint cans, and accumulated materials resulting from work.

END OF SECTION

PROTECTIVE COATINGS
SECTION 099556

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. All exposed metal and steel pipes and mechanical equipment except for the following:
      a. Stainless steel
      b. Rubber
      c. Plastic pipe, including polyvinyl chloride and similar items
      d. Nameplates and grease fittings
      e. Pre-finished or anodized aluminum

B. Related Sections:
   1. Section 33 11 13, Piping Systems (Piping, Fittings, Valves and Meters)

C. The Contractor is to base this bid on using the products specified. If the products specified are not available or not available in formulations that meet applicable regulations on volatile organic compounds (VOC) levels at time of application, the Contractor is to submit for review products of equivalent quality and function that comply with regulations in effect at that time.

D. All steel pipes shall be lined and coated per AWWA C210 and C213 latest edition as specified.

1.02 REFERENCES

A. American Water Works Specifications (Latest Addition):
   1. AWWA C210 Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
   2. AWWA C213 Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines

B. National Sanitation Foundation (Latest Addition):
   1. NSF 61 Drinking Water System Components Health Effects

C. SSPC Steel Structures Painting Council Specifications

D. ASTM D2200 Pictorial Surface Preparation Standards for Painting Steel Surfaces

1.03 DEFINITIONS

A. Dry Film Thickness (DFT) - The fully cured applied paint thickness for each coat.

B. Exterior Surface - Surface that is not inside a building or structure and is exposed to the weather.

C. Stripe Coat - Coating applied to the edge, corner, welds or bolts, which is applied prior to application of additional system coats.

D. Submerged - Surfaces that are under water or the vertical extension of those walls that are partly under water during normal operating conditions.

E. Definition of Painting Terms: ASTM D16

1.04 SUBMITTALS

A. Submit in accordance with Section 01 33 00, Submittals.

B. Prior to ordering material, submit a complete schedule of materials to be used. Include the manufacturer's brand name, product name, and designation number for each coat of each system to be used. Include statement as to VOC compliance with air quality standards within the County of Yuba, CA.

C. Prior to commencing work, submit a detailed list of all surfaces and equipment items upon which the Contractor intends to apply protective coatings.

D. If materials other than those listed are submitted, submit additional information to fully define the proposed substitution. The Engineer may further require the Contractor to furnish additional test results from an independent paint laboratory comparing the proposed substitution with one of the named products, at no additional cost.

E. Provide Material Safety Data Sheets (MSDSs) for all products.

F. Manufacturer’s Certification – That products furnished meet applicable Air Quality Management District regulations as to allowable volatile organic compound (VOC) content for the place of application and use intended.

G. Color chart for each coating for color selection by the Owner. Submit color chart two (2) weeks in advance of required pre-painting conference and walkthrough.

1.05 PRE-PAINT CONFERENCE AND WALKTHROUGH

Schedule with the Engineer a pre-paint conference and walkthrough two (2) weeks prior to start of field painting or coating to ensure the paint and coating products and colors are properly selected and allow coordination with other trades.

1.06 QUALITY ASSURANCE

A. Environmental Regulatory Requirements:

1. All work, material, procedures, and practices under this Section shall conform to requirements of the local Air Resources Board or Air Quality Management District having jurisdiction. Prime or finish coat painting done in locations other than the project site shall be in accordance with air quality regulations in effect at the place the coating is applied. Contractor is responsible to confirm that products proposed are in compliance with the applicable volatile organic compounds (VOC) levels allowable at the date these Specifications were issued for bid.
2. The Air Resources Board or Air Quality Management District having jurisdiction may prohibit the sale or application of paints and enamels containing more than the stipulated percentages of volatile organic solvents manufactured after a stated date. Provide material meeting applicable regulations effective at the date of manufacture or, if not available, provide top of the line materials developed as replacements for specified materials and meeting applicable regulations as to VOC solvents content.
3. If the Contractor applies coatings that have been modified or thinned other than as recommended by manufacturer, they will be responsible for any fines, costs, remedies or legal actions that may result.

1.07 WARNINGS

A. Be advised that as a part of this work abrasive blasting is required. This may require the use of special equipment. Become familiar with the existing site conditions and take all steps necessary to protect adjacent facilities and personnel, at no additional cost to the Owner.

B. The Contractor shall furnish all labor, equipment and means required and shall carry out protective measures wherever and as often as necessary to prevent their operations from producing overspray or dust in amounts damaging to property or causing nuisance. The Contractor shall be responsible for any damage resulting from overspray or dust originating from their operations. The abatement measures shall be continued until all surface preparation and painting is completed. All compensation to be received for overspray and dust abatement shall be included in the prices named for appropriate items of the bidding schedule.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver all coating materials in unopened containers with the manufacturer's label which must include name, batch number, and date and VOC content.

B. Store in an assigned area onsite with concurrence from the coating manufacturers. Maintain storage area clean and fire safe. Dispose of used rags, thinner and buckets daily. Solvents shall be stored in closed approved storage containers.

1.09 COATING CONTRACTOR REQUIREMENTS

The field coating activities under this Section shall require a C-33 painting and decorating license. The Contractor shall have a foreman with a minimum of 5 years of practical experience in the application of the specified coating products to surfaces at similar facilities on site at all times during any site preparation and coating activities under this Section.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Paints used in each system shall be the product of one manufacturer.

B. Only compatible materials shall be used in the work. Particular attention shall be directed to compatibility of primers and finish coats.

C. Coating systems shall not contain lead.

D. Abrasives shall not be classified a hazardous material under California Title 22.

E. Materials – Paints and protective coatings listed in the Paint Systems and the Schedule in Part 3 of this Section refers to the following manufacturers and is specified as levels of quality. It is understood that the words "or equal" are included herein.

F. No request for substitution of an “equal” will be considered which decreases the film thickness designated, the number of coats to be applied, solids content by volume, the general type of coating, paint, or primer, or the quantity, quality and type of ingredients in the coatings specified. The Contractor shall provide a list of reference where coating of the same generic type has been applied on similar projects. The reference list shall give the project name, city, state, phone number of city, coating system reference and number, and year coating was applied. Coatings not listed in the specifications shall be submitted with certified ingredients analysis so that a complete comparison between specified and proposed coating may be made.

Sherwin Williams	CRC Industries
Kop Coat	Roto Metals
Tnemec Co.	Protecto Wrap
Chemical Products Co.	Tapecoat
Amercoat	Or an Approved Equal

2.02 COLORS AND SAMPLES

A. Colors are to be factory mixed, using light-fast colorants proportioned by accurate measurement into proper type base. All coatings must be formulated to perform in the climate and environment to which they will be exposed.

B. Finish colors shall be as selected by the Owner from the manufacturer's standard color samples.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION AND APPLICATION

A. Field Coating – Prepare surfaces in strict accordance with the manufacturer's instructions prior to application. Provide the manufacturer's instructions with submittal. Apply first coat immediately after surface preparation. Keep all paints at a consistency and applied in accordance with the printed directions of the manufacturer. The painting shall be done by hand, spray, or roller as approved by the manufacturer's recommendations. The Engineer and Contractor will review all surfaces to be painted on the job prior to application of any coatings. Once the Contractor begins undercoating or priming, this will be his guarantee that the surface is acceptable to paint. All painted surfaces are to be free from drips, ridges, holidays, and brush marks. The following stipulations also apply:

1. Thinning permitted only when recommended by the manufacturer and only with thinner recommended for use with the particular product.
2. The use of additives to improve working characteristics or to lengthen or shorten set time is prohibited.
3. Items difficult or impossible to paint after installation are to be painted before installation and touched up after installation.
4. Apply each coat to a uniform, even coating; lay material on in one direction and finish at right angles. Allow material to thoroughly dry between coats. Scuff, sand, runs, sags, overspray, surface roughness, and other defects shall be removed between each coat. Dust and wipe surface clean before applying next coat.

5. Apply no less than the number of coats or dry film thickness specified. Apply additional coats if required for uniform coverage, full hiding, and to achieve file continuity. Finished work is to be uniform in color, full coverage, smooth and free of sags and brush marks.
6. Apply each coat on all work only after all major construction is inactive and the work areas have been cleaned up and are dust free.
7. Apply all coatings within the manufacturer's recommended recoat window. If a topcoat passes the recoat window, submit a letter from the coating manufacturer stating what is required before the topcoat can be applied. Do not apply topcoat until the corrective action has been favorably reviewed by the Engineer.
8. Coat abrasive blast-cleaned surfaces with primer before visible rust forms. Apply painting system within 8 hours of blast-cleaning the surface.

3.02 FIELD QUALITY CONTROL

A. Pinhole and Continuity Testing:
1. After the application of the prime and finish coats of Paint Systems A, B and F, perform continuity and pinhole checking by means of a low voltage electrical resistance meter and check thickness with a magnetic thickness gauge to determine that pinhole free condition and specified film thickness of the paint system has been achieved over all of the painted surfaces. Repair all deficiencies in film integrity and thickness in accordance with the manufacturer's instructions. The Contractor shall provide pinhole and continuity testing equipment, conduct the test, and provide the test results to the Engineer. Notify the Engineer when the test will be held by at least 14 calendar days. The Engineer may elect or witness the test.
2. The Engineer or its independent testing consultant may perform its own continuity and pinhole checking and thickness checks in addition to the Contractor's required tests. The appropriate equipment and necessary support, if requested, is to be provided by the Contractor. Repair any additional deficiencies in film integrity and thickness per the manufacturer's instructions and to the satisfaction of the Engineer.
3. Attention is directed to the fact that past use of the low voltage electrical resistance meter has demonstrated that the painter must apply at least two and usually three or more stripe coats along all edges, angles and crevices formed by joining member in addition to the coats specified in order to achieve a pinhole free surface.

B. Adhesion Testing – Where there is a question of paint or coating adhesion to surfaces, demonstrate to the Engineer's satisfaction that the coating adhesion to the area in question is equal to or greater than that which the paint manufacturer literature states may be achieved by his product. An "Elcometer Adhesion Tester" shall be provided by and used by the Contractor to accomplish this test.

C. Continuity, Pinhole, and Adhesion Testing Support – Provide scaffolding, ladders, lighting, and labor as required to facilitate the Engineer's check. Repair any areas damaged during and by the testing operation.

D. Environmental Conditions:
   1. Measure and record the temperature, dew point, and humidity daily (at the start of the day, prior to painting, and if conditions deteriorate). Maintain the records in a place where the Engineer can check them. Submit the records to the Engineer at the end of the project.
   2. Coatings shall be applied only to surfaces that are dry, and only under such atmospheric conditions as will cause evaporation rather than condensation. Coating shall not be applied during rainy, misty weather, or to surfaces upon which there is frost or moisture condensation. During damp weather, when the temperature of the surface to be coated is within 10°F of the dew point, the surfaces shall be heated to prevent moisture condensation thereon.
      Bare metal surfaces, except those which may be warped by heat, may be dehydrated by flame heating devices immediately prior to coating application. During coating, and for a period of at least 8 hours after the coating has been applied, the temperature of the surfaces to be coated, the coated surfaces, and the atmosphere in contact shall be maintained at or above 50°F and not less than 10°F above the dew point. Coating, when applied, shall be approximately the same temperature as that of the surface on which it is applied. Fans or heaters shall be used inside enclosed areas where conditions causing condensation are severe.
   3. Coating shall not be applied on surfaces hotter than 120°F.

E. Existing Coating Systems:
   1. Unless otherwise specified, existing coating systems damaged by new construction shall be repaired and coated in accordance with the appropriate system specified for new work.
   2. Contractor shall demonstrate that the existing coating is compatible with field coating by applying small test patches of specific coatings over existing coatings. If the existing coating is not compatible with the field coat (it lifts or ripples), the existing coating shall be re-primed with a primer compatible with both the existing coating and the field applied coating or replaced with the proper prime coat. The primer shall be as recommended by the manufacturer of the field applied coatings.

3.03 QUALITY OF LINING AND COATING APPLICATION

The cured lining or coating shall be smooth and glossy with no graininess or roughness. The lining or coating shall have no blisters, cracks, bubbles, underfilm voids, mechanical damage, discontinuities, or holidays.

3.04 CLEANING AND COMPLETION

A. At the completion of this portion of the work, remove all debris, remove all paint and stains from work for which paint finish is not intended, touchup all marred surfaces, and leave all buildings and structures in a clean condition, ready for use.

B. Refinish all damaged or imperfect painting to the satisfaction of the Engineer prior to final acceptance of the facility.

C. Finish work, except waterproofing mastics, is to present an even, pleasing, and uniform color and appearance. Surfaces exhibiting coatings with shadows, streaks, overlap marks, sags, drips, roughness, or non-uniform sheen will be considered as improperly applied and will not be considered acceptable.

D. Leave all machinery nameplate data tags clean and readable and all grease fittings clean and usable. Clean paint from windows and electrical equipment provided with factory coatings.

3.05 SPARE PAINT

Furnish one gallon (minimum) container of each type and color of finish product used. Label containers. Each product shall have a minimum of 11 months of shelf life at project completion.

3.06 COATING SYSTEMS

The coating systems used for different types of surfaces are listed below and followed by specification for each:

Surface Type	System
Ferrous Metal - Continually or Intermittently Submerged	A
Ferrous Metal - Exposed to Atmosphere	B
Ferrous Metal - Fusion Epoxy Bonded	C
Underground Piping and Appurtenances	D
Underground Ductile Iron Appurtenances	E

System A- Ferrous Metal – Continually or Intermittently Submerged:

1. General:

All submerged metalwork, equipment, and exposed pipe work except as noted hereinafter shall be painted with this coating system. No coating is required on stainless steel or aluminum metal surfaces. Coatings for vertical pump cans may be shop applied.

2. Surface Preparation:

a. All metal surfaces (non-galvanized) shall be field sandblasted according to SSPC-SP-10, "Near-White Metal Blast Cleaning", to provide a surface profile of 1.5 to 2 mils.
b. For non-ferrous and galvanized metal, pretreat with Paint System B-2b.

3. Coatings:
   a. Tnemec: Prime coat shall consist of Tnemec 69-1211 H.B. Epoxyline II to a minimum dry film thickness of 3 mils. Finish coats shall consist of two or more coats of Series 69 - Color Epoxy, to a minimum dry film thickness of 10 mils. Total dry film thickness for this system shall be a minimum of 13 mils.
   b. Koppers: Prime coat shall consist of Koppers 654 Epoxy Primer to a minimum dry film thickness of 3 mils. Finish coats shall consist of one or more coats of Koppers Hi-Gard. Epoxy to a dry film thickness of 10 mils. Total dry film thickness for this system shall be a minimum of 13 mils.

<u>System B - Ferrous Metal, Miscellaneous Items – Exposed to Atmosphere</u>

1. General:

All new exposed ferrous metal surfaces shall be pretreated and coated with this system electrical panels, fusion epoxied pipe, and other equipment which may be factory coated per System C or a similar approved system.

The pumps and motors shall be shipped with a compatible shop applied prime coat and the final coat shall be field applied as specified herein. Exposed ferrous metal surfaces to be coated include all piping, fittings, and valves.

The Well's above grade discharge piping and fittings to be sandblasted and recoated per System B.

Exposed conduits, junction boxes, communication and small power panels, and supports to be coated per System B unless otherwise specified.

2. Surface Preparation:
   a. All metal ferrous surfaces, except those with a factory pretreatment and primer, shall be sandblasted according to SSPC-SP-10, "Near-White Blast Cleaning"
   b. For nonferrous and galvanized metal shall be prepared in accordance with SSPC-SP-7 (Brush-off Blast Cleaning). Nonferrous and galvanized metal not in contact with water shall be cleaned prior to the application of the prime coat in accordance with SSPC-SP-1 (Solvent Cleaning)
3. Coatings:
   a. Tnemec: Prime coat shall consist of Tnemec 135 (epoxy) to a minimum dry film thickness of 5 mils. Finish coats shall consist of one or more coats of Tnemec Series 75 (aliphatic acrylic polyurethane) to a minimum dry film thickness of 5 mils. Total dry film thickness for this system shall be a minimum of 10 mils
   b. Carboline: Prime coat shall consist of Carboline Series 893 Primer (polyamide epoxy) to a minimum dry film thickness of 3 to 5 mils. Finish coats shall consist of two or more coats of Carboline Series 133 HB

(aliphatic acrylic polyurethane). Total dry film thickness for this system shall be a minimum of 10 mils

System C – Ferrous Metal – Above Grade Steel Piping

1. General:

All new above grade steel piping shall be lined and coated in the shop with a fusion-bonded epoxy. This includes all above grade piping and fittings except for gate valves and meters that will be coated per System B. Shop Application of Fusion-Bonded Epoxy Lining and Coating:

Grind surface irregularities, welds, and weld spatter smooth before applying the epoxy. The allowable grind area shall not exceed 0.25 square foot per location, and the maximum total grind area shall not exceed one square foot per item or piece of equipment. Do not use any item, pipe, or piece of equipment in which these requirements cannot be met.

Remove surface imperfections, such as slivers, scales, burrs, weld spatter, and gouges. Grind outside sharp comers, such as the outside edges of flanges, to a minimum radius of 114 inch.

Uniformly preheat the pipe, item, or piece of equipment prior to blast cleaning to remove moisture from the surface. The preheat shall be sufficient to ensure that the surface temperature is at least 5°F above the dew point temperature during blast cleaning and inspection.

Sandblast surfaces per SSPC SP-5. Protect beveled pipe ends from the abrasive blast cleaning.

Apply a phosphoric acid wash to the pipe, item, or piece of equipment after sandblasting. The average temperature, measured in three different locations, shall be 80°F to 130°F during the acid wash procedure. The acid wash shall be a five percent by weight phosphoric acid solution. The duration in which the acid is in contact with the surface shall be determined by using the average temperature as tabulated below:

Pipe Treatment (°F)	Contact Time (Seconds)
80	52
85	45
90	36
95	33
100	28
105	24
110	21
130	10

After the acid wash has been completed, remove the acid with demineralized water having a maximum conductivity of 5 micromhos/cm at a minimum nozzle pressure of 2,500 psi.
Apply lining and coating by the electrostatic spray or fluidized bed process. Minimum thickness of lining or coating shall be 15 mils. Heat and cure per the epoxy manufacturer's recommendations. The heat source shall not leave a residue or contaminant on the metal surface. Do not allow oxidation of surfaces to occur prior to coating. Do not permit surfaces to flash rust before coating.
Apply lining and coating per AWWA C213 except as modified herein.
Grind 0.020 inch (minimum) off the weld caps on the pipe weld seams before beginning the surface preparation and heating of the pipe.

2. Coatings:

Lining and coating shall be a 100 percent solids, thermosetting, fusion-bonded, dry power epoxy resin NSF 61 certified for potable water systems: Scotchkote 134 or 206N, Lily Powder Coatings "Pipeclad 1500 Red," H.B. Fuller IF-3003, or equal. Epoxy lining and coating shall meet or exceed the following requirements:

Hardness	Barcol 17 (ASTMD 2583, Rockwell 50 (“M” scale)
Abrasion Resistance (maximum value)	1,000 cycles: gram removal 5,000 0.115 gram removal ASTM D 1044, Tabor CS 17 whee,l, 1,000 gram weight
Adhesion (Minimum)	3,000 (Elcometer)
Ensile Strength	7,300 psi (ASTM D 2370)
Penetration	0 mil (ASTM G17)
Adhesion overlap shear, 1/8-inch steel panel, 0.010 glue line	4,300 psi, ASTM 1002
Impact (minimum value)	100 inch-pounds (Ga4rdner 5/8-inch diameter tup)

3. Field-Applied Epoxy Coating for Patching – Use a two-component, 80 percent solids liquid resin, such as Scotchkote 306 or an approved equivalent.
4. Coating of Flexible Pipe Couplings – Line and coat couplings the same as the pipe. Color shall match the color of the pipe fusion epoxy coating.

System D- Underground Steel Pipe and Appurtenances

1. General:

Unless otherwise specified or factory painted with an approved system, buried pipeline items, such as valves, couplings and bolts shall be coated with this system.

2. Surface Preparation:

Apply only to clean, dry surfaces. Remove rust, paint and other foreign matter by sand blasting (SSPC-SP-6), wire brushing, or scraping.

3. Coating:
    a. Lined and coated per AWWA C213
    b. Koppers: Two coats of Bitumastic Super Service Black, 13 mils each coat.
    c. Polyurethane Wrap

System E - Underground Ductile Iron Pipe and Appurtenances

1. General:

Unless otherwise specified, all underground ductile iron pipe, fittings and appurtenances shall have a tubular polyethylene encasement and installed per manufacturer's recommendation per ANSI/AWWA C105/A21.5 and in accordance with Section 33 11 13 Subsection 2.05.

2. The polyethylene encasement shall be from Polywrap or an approved equivalent.

3.07 SURFACES NOT TO BE PAINTED

A. Unless otherwise specified, the following surfaces shall be left unpainted:
1. Stainless Steel
2. Aluminum
3. Hot Dip Galvanized Items
4. Rotork Actuators
5. Concrete
6. Glass
7. Equipment Nameplates
8. Electrical enclosures
9. Conduits
10. Transformers
11. Instruments,
12. Equipment (unless specifically stated)

END OF SECTION

INTERIOR CONCRETE FLOOR SEALER
SECTION 099723

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Clear concrete sealer on exposed surfaces of the concrete floors.

1.2 PERFORMANCE REQUIREMENTS

A. Provide sealer with the following properties based on testing manufacturer standard products, according to test methods indicated, applied to substrates simulating Project conditions using same materials and application methods to be used for Project.
   1. Absorption: Minimum 90 percent reduction of absorption after 24 hours in comparison of treated and untreated specimens for hardened concrete: ASTM C 642.

   2. Water-vapor transmission: Maximum 10 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens, ASTM E 96.

   3. Durability: Maximum 5 percent loss of water repellency after 2500 hours of weathering in comparison to specimens before weathering, ASTM G 53.

   4. Permeability: Minimum 80 percent breathable in comparison of treated and untreated specimens, ASTM D 1653.

B. Appearance: When compared visually to an untreated sample under same lighting conditions, the sealer shall not change the color and sheen of the coated substrate, and shall be invisible after application and over the life of the building.

1.3 SUBMITTALS

A. Data: Submit manufacturer's data of the proposed sealer, including recommended coverage rates, include material test reports indicating and interpreting test results for compliance of water-repellent sealer with criteria specified.

B. Manufacturer's certification: Submit the following.
   1. Letter from the sealer manufacturer to verify its acceptance of the applicator, acceptance of substrates as satisfactory to receive the specified sealer, and affidavit that sealer is compatible with concrete curing agent used.

1.4 QUALITY ASSURANCE

A. Installer's qualifications: Firm with a minimum of 3 consecutive years of experience in application of the sealer proposed for use, or similar sealers, on projects of similar size and scope, and licensed or approved in writing by the sealer manufacturer.

B. Samples: When requested by the sealer manufacturer, or necessary to adjust sealer formulation, provide sealer manufacturer with sufficient samples of substrate to be coated to determine exact formulation and coverage rates.

C. Manufacturer's inspections:
   1. Obtain materials only from manufacturer who will send a qualified technical representative to the Project site before start of this work to verify substrate acceptability. Schedule subsequent visits as required thereafter to review installation procedures and completed work, and to issue warranty specified.

   2. Unsatisfactory conditions disclosed by the manufacturer visits to the site shall be promptly and satisfactorily repaired and the areas re-inspected by the manufacturer before work starts or resumes in affected areas.

E. Pre-installation testing:
   1. Test sample panel in accordance with ASTM E 514, modified for field use.

   2. Report results of tests and apply additional sealer, when appearance is unchanged, or re-formulate and re-apply sealer, when test results are not satisfactory.

F. Environmental - Product shall comply with SCAQMD Rule 1113 for low emitting with V.O.C. less than 100 grams per liter.

1.5 HANDLING

A. Materials shall be delivered to Project site in manufacturer's unopened containers bearing manufacturer's labels with batch number and date of manufacture.

1.6 JOB CONDITIONS

A. Comply with manufacturer's recommendations regarding environmental requirements, and temperature and conditions of surfaces to receive sealer.

1.7 WARRANTY

A. Warrant sealer against water penetration through treated surfaces, peeling, cracking, discoloration and other defects of the sealer, caused by faulty materials and workmanship, for 5 years after Substantial Completion.

B. The warranty shall include repair of any defects and failures in the sealer during the warranty period, at no additional cost to the District.

PART 2 - PRODUCTS

2.1 SEALER/MANUFACTURER

A. Basis of design is Ashford Formula by Curecrete Distribution, Inc. Equivalent products by the following manufacturers will be accepted with the Architect's approval in each case:
   1. Monopole.
   2. Prosoco.
   3. Harris Specialty Chemicals, Inc. (Hydrozo).
   4. L&M Construction Chemicals, Inc.
   5. Pecora Corp.
   6. Sivento.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Provide services of a factory-authorized technical service representative, from the sealer manufacturer, to inspect and approve the substrates before application and to instruct the applicator on the product and application method to be used.

B. Verify that slabs to be sealed are clean, dry and free of dust, dirt, oil, grease and other foreign material that would affect the application and performance of the sealer.

C. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

3.2 CLEANING

A. Clean sealer from adjacent surfaces immediately after spillage.

B. Comply with manufacturer's recommendations for cleaning.

END OF SECTION

LOUVERS AND VENTS
SECTION 102000

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 the following:
   1. Fixed, formed-metal louvers.

B. Related Sections include the following:
   1. Division 7, Section - 076000 “Sheet Metal”.
   2. Division 7, Section - 079200 “Sealants and Caulking” for sealants installed in perimeter joints between louver frames and adjoining construction.
   3. Division 23, Section - 230800 “Heating, Ventilating and Air Conditioning”.

1.3 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section, unless otherwise defined in this Section or in referenced standards.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide exterior metal louvers capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of louver components including blades, frames, and supports; noise or metal fatigue caused by louver blade rattle or flutter; or permanent damage to fasteners and anchors.
   1. Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. (960 Pa), acting inward or outward.

B. Air-Performance, Water-Penetration, and Air-Leakage Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacture’s stock units 48 inches (1220 mm) wide by 48 inches (1220 mm) high. Test units according to AMCA 500.
   1. Perform testing on unpainted, cleaned, degreased units.
   2. Perform water-penetration testing on louvers without screens.

1.5 SUBMITTALS

A. Product Data: For each type of product specified.

B. Shop Drawings: For louver units and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of louver blades. Show unit dimensions related to wall openings and construction; free area for each size indicated; profiles of frames at jambs, heads, and sills; and anchorage details and locations.

C. Product Certificates: Signed by manufacturers of louvers certifying that the products furnished comply with requirements and are licensed to bear the AMCA seal based on tests made according to AMCA 500 and complying with AMCA's Certified Ratings Program.

D. Product Test Reports: Indicate compliance of products with requirements based on comprehensive testing of current products.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where alike in one or more respects regarding type, design, or factory-applied color finish.

B. Welding Standards: As follows:
   1. Comply with AWS D1.3 "Structural Welding Code -- Sheet Steel."
   2. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

C. SMACNA Standard: Comply with SMACNA's Architectural Sheet Metal Manual" recommendations for fabrication, construction details, and installation procedures.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Ruskin Manufacturing; Tomkins Industries, Inc.

2.2 EXTRUDED ALUMINUM COMBINATION LOUVERS

A. Fabrication:
   1. Model: ELBD812.
   2. Frame:
      a. Material: Extruded aluminum, Alloy 6063-T5.
      b. Wall Thickness: 0.081 inch (2.1 mm) nominal.
      c. Depth: 4 inches.
      d. Construction: Standard.
      e. Caulking surfaces.
      f. Insect screen.
   3. Louver Blades:
      a. Style: Stationary, J-style.
      b. Material: Extruded aluminum, Alloy 6063-T5.
      c. Wall Thickness: 0.081 inch nominal.
   4. Backdraft Damper Blades:
      a. Style: Gravity.
      b. Material: Roll formed aluminum.
      c. Wall Thickness: 0.031 inch, nominal.
   5. Seals: Synthetic seals mounted on louver blade edges to provide quiet operation.
   6. Assembly: Factory assemble louver components.

2.3 FACTORY FINISH

A. Kynar 500 Fluoropolymer Coating:
   1. Conform to AAMA 605.2.
   2. Apply coating following cleaning and pretreatment.
   3. Cleaning: AA-C12C42R1X.
   4. Dry lovers before final finish application.
   5. Total Dry Film Thickness: Approximately 1.2 mils (0.03 mm) when baked at 450 degrees F (232 degrees C) for 10 minutes.

B. Color for Fluoropolymer Coating: Color as selected by Architect from manufacturer's standard colors.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate and place louver units level, plumb, and at indicated alignment with adjacent work.

3.2 ADJUSTING, CLEANING, AND PROTECTING

A. Periodically clean exposed surfaces of louvers and vents that are not protected by temporary covering to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Protect louvers and vents from damage during construction. Use temporary protective coverings where needed and approved by louver manufacturer. Remove protective covering at the time of Substantial Completion.

D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

END OF SECTION

FIRE EXTINGUISHERS AND CABINETS
SECTION 105220

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes the furnishing and installation of all fire extinguishers and cabinets as shown on the drawings or as specified herein.

B. Related Work:
   1. Section 061000 - Rough Carpentry.
   2. Section 092500 - Gypsum Board Systems.

C. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 SUBMITTALS

A. Refer to Section 013000.

B. Manufacturer's data: Submit complete data on extinguishers and cabinets.

C. Shop Drawings: Submit shop drawings showing dimensions for all necessary openings, backing, and manufacturer's details for anchorage.

1.3 CODES AND STANDARDS

A. Comply with all pertinent codes and regulations. All firefighting devices shall be approved by Underwriter's Laboratories, Inc., bear UL label, and be approved by Fire Marshal.

PART 2 - PRODUCTS

2.1 CABINETS

A. Semi-Recess Mount: J.L. Industries, #2032W10, #1032W10, and #FX1032W10.

B. The cabinet shall be able to open with a maximum amount of 5 pounds of force.

2.2 EXTINGUISHERS

A. Cabinet Extinguishers: J.L. Industries;
   1. Cosmic 5E, #3A: 40-BC (Class A, B, C fires; multi-purpose chemical).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install fire extinguishers and cabinets where indicated on Drawings and in accordance with all pertinent regulations and manufacturer's recommendations, setting handle extinguisher at no more than 48" above finish floor, and anchoring all components firmly in place.

3.2 SERVICE

A. Determine approximate completion, date of Work and then inspect, charge, and tag fire extinguishers not more than 10 days before nor less than one day before actual completion date of Work.

END OF SECTION

HORIZONTAL BOOSTER PUMPS
SECTION 112116

PART 1 – GENERAL

1.01 SUMMARY

This section specifies materials, testing and installation of two horizontal close coupled end suction booster pumps to be used to supply potable water and maintain pressure within the School's water system. The first booster pump is a low flow pump that will be typically used to supply water to the school's water system. The second booster is a higher flow pump that will be used to supply water during school events.

1.02 REFERENCES

The pump and its accessories shall be furnished, installed, and disinfected per the American Water Works Association standards latest edition.

1.03 SUBMITTALS

A. Submit shop drawings and Product Data: Submit the following as a single complete initial submittal:
   1. Product data to demonstrate that the equipment conforms to the Specifications.
   2. Motor data
   3. Pump layouts and dimensions
   4. Pump performance curves

B. Performance Testing: Submit certified non-witnessed factory performance test

C. Manuals: Furnish manufacturer's installation, lubrication, operations and maintenance manuals, bulletins, and spare parts lists.

D. Manufacturer's certification of compliance with AWWA E103.

E. Affidavits: Submit an affidavit from the manufacturer stating that the equipment has been properly installed, adjusted, and tested and is ready for full-time operation. This will require that the manufacturer provide a certified trained technician to be on the construction site for one 8-hour day during start-up, which will include trouble shooting with defect corrections, and training the Owner's operational staff on the proper operation and maintenance of the pump, motor, and appurtenances.

1.04 QUALITY ASSURANCE

A. Equipment furnished under this Section shall be supplied by a manufacturer(s) who has been regularly engaged in the design and manufacture of this equipment for at least five years.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Pumps: Xylem (Gould), Pentair (Berkeley), Peerless, or equal.

2.02 EQUIPMENT

A. Provide horizontal centrifugal end suction booster pumps including the bowl assembly, column, pipeline shaft and guides, discharge head and electric motor. Pump and appurtenances shall comply with ANSI/NSF 61 requirements.

B. Motor:
   1. Provide solid shaft horizontal motor for outdoor service, suitable for operation at three phase 208/230/460 volts. Nameplate motor horsepower shall not be exceeded at any flow on the pump curve.
   2. The pump motors shall be suitable for operation with a variable frequency drive (VFD).

C. The motor bearing shall withstand any momentary thrust.

D. The pumps are to be provided with permanently affixed nameplates which include impeller diameter, rated capacity in gpm, rated head in feet, rpm, and motor horsepower.

2.03 SERVICE CONDITIONS

A. The following criteria shall be used for pump selection:
   1. Pump head shall continuously decrease with increasing flow.
   2. Rotation of the pump's line shaft and impellers shall be counterclockwise when viewed from the motor.

2.04 PERFORMANCE AND DESIGN REQUIREMENTS

A. The following criteria shall be used for pump selection:
   1. Pump head shall continuously decrease with increasing flow.
   2. Rotation of the pump's line shaft and impellers shall be counterclockwise when viewed from the motor.

B. Booster Pump A (Low-Capacity)
   1. Pump hydraulic performance characteristics shall be 10 gpm at 140-ft total dynamic head.
   2. Liquid pumped: Potable Water
   3. Maximum pump speed: 3550 rpm
   4. Motor horsepower: 1 HP

5. Pump model: Goulds Model LB or an approved equal.
6. The pump will be equipped to operate with an Aquavar CPC variable speed controller designed to vary the speed of the pump to maintain pressure in the school's water system.

C. Pump B (High-Capacity Booster)
1. Pump hydraulic performance characteristics shall be 65 gpm at 115-ft total dynamic head.
2. Liquid pumped: Potable Water
3. Maximum pump speed: 3550 rpm
4. Motor horsepower: 5 HP
5. Pump model: Berkeley Model B1WP Size 1x1-1/2x7 or an approved equal.
6. The pump will be operated as a fixed speed pump with a motor starter that will ramp up and down with the booster pumps is signaled to start and stop.

PART 3 – PRODUCTS

3.01 INSTALLATION

A. Verify that the installed pump is fully self-supporting before bolting pipe flanges, so that no strain is imparted on the flanges, pipes, or pipe supports from the pump assembly. Adjust the position of the pump assembly so that the pump flanges are plumb and aligned with the adjacent pipe flanges. Do not use temporary shims or jacking nuts for leveling, aligning, or supporting equipment.

B. Provide continuous protection of the installed equipment from the elements, dust, debris, paint spatter, or other conditions which will adversely affect the unit's operation until such time as the equipment is scheduled for start-up testing. C. The pump and motor installation shall be done by a qualified contractor with a State of California C61, D21 contractor license.

3.01 INSTALLATION

A. The pumps shall be installed in accordance with the instructions of the manufacturer and as shown on the drawings.

B. Installation shall include furnishing the required oil and grease for initial operation. The grades of oil and grease shall be in accordance with the manufacturer's recommendations.

C. With project inspector on-site, bump motor to ensure that motor has been connected for proper counterclockwise rotation.

D. Perform field tests on the installed pump to demonstrate that it performs according to the specified service conditions. If the measured flows are more than 5% below the specified service conditions adjust the impellers or provide new impellers or otherwise repair or replace the pump.

E. Conduct vibration level tests with the pump operating at its rated capacity. Adjust or replace the pump if it exceeds the maximum vibration levels.

F. Test the pump system to determine its overall efficiency. This test shall consist of measuring flow, suction and discharge pressure, and electrical input kilowatts to the motor at the operating service point on the pump curve and determine the ratio of power input to the water to the electrical input power to the motor ("wire-to-water efficiency"). Results of this test to be submitted to the Owner.

3.02 INSPECTION AND FACTORY TESTS

Each centrifugal pump furnished under these specifications shall be tested at the factory to verify individual performance (VIP). Certified copies of all test reports shall be submitted to the Engineer for approval prior to shipment. Each unit shall be hydrostatically tested in accordance with the Hydraulic Institute Standards.

END OF SECTION

SEISMIC REQUIREMENTS
SECTION 220548

PART 1 – GENERAL

1.01 SUMMARY

A. This Section is applicable to the following secondary structural system elements, non-structural components, and/or equipment:
   1. Mechanical, electrical, and plumbing equipment and appurtenances
   2. Horizontal Pressure Filters
   3. Conduit, piping, and similar systems

1.02 REFERENCES

A. American Society of Civil Engineers Standard ASCE 7-05, Minimum Design Loads for Buildings and Other Structures, Chapters 11, 13, 15.

B. California Building Code, Latest Edition.

1.03 DEFINITIONS

A. Engineer – The Engineer responsible for the preparation of Contract Documents.

B. Specialty Engineer – Structural or Civil Engineer provided by the contractor licensed in the State of California responsible for specific elements of the primary structural system, the secondary structural system, non-structural elements and/or equipment supported by structures.

1.04 GENERAL DESIGN REQUIREMENTS

A. The Contractor is responsible for producing designs that resist the total seismic forces in accordance with the seismic design criteria. The Contractor is responsible for coordinating between the Engineer and the Specialty Engineer.

B. The seismic design for non-structural components and equipment shall be in accordance with the IBC Chapter 16, and the required coefficients and factors for determining the total design seismic forces are provided for in the geotechnical report that is in Appendices.

C. Coordinate the layout so that adequate space is provided between items for relative motion. Provide additional supports and restraints between items of different systems when necessary to prevent seismic impacts or interaction.

D. Design anchorages of all elements of structures, non-structural components, equipment supported by structures, and non-building structures to resist static and dynamic operational loads, plus total seismic loads specified in the IBC, ASCE 7-16 Section 13.3.1. For anchorage uplift, multiply dead load by 0.9 and subtract 0.2SDS if used to reduce vertical seismic effects.

E. Design anchorages utilizing a Component Coefficient, Rp =1.5, unless supporting documentation for embedment length, showing compliance with section 13.4.2 of ASCE 7, is provided for expansion anchor bolts, chemical anchors, or cast-in-place anchors.

1.05 DESIGN REQUIREMENTS FOR PIPING AND CONDUITS

A. The Contractor is responsible for producing designs for support of piping, conduit, duct, or other systems to resist total seismic forces based on the seismic design criteria coefficients specified above unless shown on the Contract Documents. Except where the technical specifications give specific exemption from resistance of seismic forces, all supports shall be designed to meet seismic criteria.

B. Where possible, pipes, conduit, and their connections shall be constructed of ductile materials (e.g., copper, ductile iron, steel or aluminum and brazed, welded or screwed connections). Pipes, conduits, and their connections, constructed of non-ductile materials (e.g., cast iron, no-hub pipe and plastic), shall have the brace spacing reduced to one-half of the spacing allowed for ductile material.

C. Seismic restraints may be omitted for the following conditions where flexible connections are provided between components and the associated piping and conduit:
   1. All other exposed piping less than 2.5 inches inside diameter or electrical conduit less than 2.5 inches trade size.

D. As an alternative to designing the supports and anchorage where an approved national standard provides a basis for the earthquake-resistant design, submit standard, data, and details for piping, conduit, duct, or other systems:
   1. For mechanical piping, process piping, and electrical conduits, follow Guidelines for Seismic Restraints of Mechanical Systems by SMACNA modified as follows:
      a. Seismically brace piping regardless of size or location. Provide transverse braces at all changes in direction and at the end of all pipe runs. Space transverse braces not more than 20 feet apart. Provide longitudinal braces at 40-foot centers.

1.06 SUBMITTALS

A. Submit in accordance with Section 01 33 10.

B. Submit certification for equipment not listed in this specification but included in the contract documents that the equipment itself is designed to resist all internal seismic forces based on the seismic design criteria for the project.

C. Where required in the equipment specifications in or listed below, submit signed and sealed structural calculations and detailed drawings from a Specialty Engineer where the project is being built for the attachments and anchorage to the primary structure.
   1. Required anchorage items include:
      a. Hypochlorite Tank
      b. Packaged Sodium Hypochlorite Feed System
      c. Electrical Switchgear, Panels, and Equipment in Electrical Room

D. Structural calculations and detailed drawings shall be prepared by a Specialty Engineer.

E. Structural calculations and detailed drawings shall clearly show the total design seismic forces which will be transferred from the elements of the structural system, non-structural components, and/or equipment and their attachments to the prime structure.

1.07 QUALITY ASSURANCE

A. The Contractor is responsible for submitting signed and sealed structural calculations and detailed drawings from a Specialty Engineer.

B. Comply with the California adopted and amended versions of the International Building Code (IBC) Section 1613, the referenced sections of ASCE 7.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

FACILITY CONTROL
SECTION 260917

PART 1 – GENERAL

1.01 DESCRIPTION

This specification describes the planned control of the water treatment plant (WTP) using a programmable logic controller (PLC) and all required equipment that will be required by Datumpin along with the Electrician and Contractor.

1.02 CONTROL RESPONSIBILITIES

The following are the responsibilities associated with the control of the facility:

A. Datumpin's Responsibility (not a part of this Contract)

1. Responsible for providing the PLC and its programable control for installation by the Electrician. The PLC and its programming by Datumpin are not a part of the Contractor's scope of work.

An example of the PLC is shown in Figure 1 below:

B. Electrician's Responsibility

1. Responsible for running all conduits and conductors from remote I/O to the PLC along with landing all control conductors on PLC's' landing strip.

2. Mount, provide power, grounding, and interconnection cables from the PLC to Field Devices in the treatment building.
3. Connection to all remote I/O at the facility. This includes pump starters, well water level transducer, storage tank level transducer, pressure transducers, flow meter I/O connections, MOV I/O connections, MOV valve I/O and other electrical equipment that are required to operate the facility.
4. Start up and testing of the operation of the overall water treatment plant.

C. Contractor's Responsibility
1. To install and test all equipment that will be controlled by the PLC such as the submersible pump, booster pumps, chlorine feed equipment, pressure relief valve, and two water quality analyzers (chlorine and nitrate).
2. Assist Datumpin in the startup of the facility that is related to the Contractor's work and equipment they have provided under this Contract.

PART 2 – PRODUCTS

2.01 PLC (BY DATUMPIN)

Datumpin will be providing a PLC with a 7-inch operator interface terminal (OIT). The PLC will control the facility along with the monitoring and recording of the facility's operation.

PART 3 – EXECUTION

3.01 FACILITY CONTROL STRATEGY

The Control Strategy (Strategy) has been developed to describe how the PLC will be programmed to operate the new (WTP.

3.02 OVERVIEW

The WTP is being designed to supply the Shiloh School's water system (water system) maximum day, and peak hour potable water demands. The PLC will provide the following for the Plant:

• Automatic control functions
• Local and remote condition monitoring
• Alarm reporting
• Storing all set points

An operator interface terminal (OIT) will be used to provide a graphical means of interfacing with the PLC. The OIT will be a 7-inch touch screen is mounted to the PLC's cabinet door.

3.03 BASIC COMPONENTS

A. The basic components of the WTP include:
1. Groundwater Well with 10-gpm submersible pump and motor

2. Nitrate Treatment System designed to remove nitrates from the groundwater
3. Sodium hypochlorite feed system for disinfection
4. 10,000-gallon potable water storage tank
5. Treated water booster pumps
    a. Pump A – 10 gpm horizontal centrifugal booster pump
    b. Pump B – 75 gpm horizontal centrifugal booster pump
6. Pressure relief bypass line with pressure relief valve
7. Pressurize storage tank on discharge of booster pumps

3.04 SUBMERSIBLE WELL PUMP

A. Control
The submersible well pump operates at a "fixed speed" and is operated on and off based on the water level in the Storage Tank. The Well Pump is wired for a hand/off/automatic operation.

B. Well Pump Starting
When the pump is signed to start from the WTP's PLC, the following must happen prior to starting:
• Pumping water level above the "Low-Low" Well Water Level
• Pump starts
• Chlorine feed pump starts

C. Well Pump Stopping
When the pump is signed to stop from the WTP's PLC, the following must happen prior to starting:
• Pump stops
• Chlorine feed pump stops

D. Manual Control (Hand Position):
The Well Pump can be started manually by selecting the "Hand" position of the HOA selector switch and the chlorine feed pump will operate.

E. Off Control (Off Position):
In the off position of the selector switch, a Well Pump will not operate.

F. Automatic Control (Automatic Position):
In the automatic position, the Well Pump will be controlled from the PLC with settings made by the Plant Operator on the PLC's OIT. The Well Pump will be signaled to start and stop based on the water level in the storage tank.

G. Automatic Control Setpoints:
The following Well Pump's set points that are adjustable through the WTP's OIT.
• Well Pump "On" Storage Tank Level (0 – 10 ft)
• Well Pump "Off" Storage Tank Level (0 – 10 ft)

H. Alarms
These alarms are associated with the Well Pump and is intended to only notify the Plant Operator of the alarm condition and has no effect on the operation of the WTP.
1. Well Pump
• Low Well Water Level
• Meter Transducer Failure (Well Discharge)
2. High Storage Tank Water Level
3. Low Nitrate Treatment Chlorine Residual

I. Interlocking Alarms
These interlocks will disable their associated Well Pump and create an alarm. Interlocks will continue to prevent the Well Pump from being enabled until the interlocking condition has cleared, and the associated alarm has been reset by the Plant Operator. The following are the interlocks common to the Well Pump:
1. Well Pump
• Low-Low Well water level
• Well Pump fail to run (No run status after delay)
• Well Pump chemical feed pump failure to start
2. Reservoir water Level transducer fail
3. Reservoir High-High Water Level
4. Low-Low nitrate system effluent chlorine residual

3.05 NITRATE TREATMENT SYSTEM

The nitrate treatment system (nitrate system) is intended to remove nitrates from the groundwater well. The nitrates system is designed to treat a portion of the water and blend it with water that bypasses the nitrate system and designed to maintain a nitrate level of not greater than 8 ppm which is 80% of the California's Division of Drinking Water's maximum contaminant level (MCL) of 10 ppm. The blended line will have an inline valve that will be adjusted manually to set the blending ratio to maintain the nitrate effluent water quality. A nitrate analyzer will monitor the blended effluent water from the nitrate treatment system for compliance monitoring.

A. Alarms
The following alarms are associated with the nitrate system. These alarms are intended to only notify the operator of the alarm condition.
1. Low nitrate system flow
2. High nitrate level from analyzer

B. Interlocking Alarms

Interlocks will disable the Well Pump, creating an alarm. Interlocks will continue to prevent the Well Pumps from being enabled until the interlocking condition has cleared, and the associated alarm has been reset by the Plant operator.

1. Low-Low nitrate system flow
2. High-High nitrate level from the analyzer
3. Well discharge meter transducer fail
4. Treatment System bypass meter transducer fail

3.06 CHLORINE TREATMENT SYSTEM

The chlorine treatment system consists of one chlorine pump that pumps out of a chlorine container to maintain a chlorine residual for disinfection in the school's water system. A chlorine residual analyzer will continually monitor the chlorine between nitrate system's effluent and the storage tank's inlet.

A. Alarms

Alarms associated with the Chlorine System and are intended to only notify the operator of the alarm condition. Alarms will blink initially on any screen until a Plant Operator acknowledges the alarm. The alarm will remain active until a Plant Operator resets the alarm. Non-interlocking Chlorine System alarms are created in response to the following conditions.

1. Chlorine Residual Low
2. Chlorine Residual Analyzer – Equipment failure

B. Interlocking Alarms

Chemical Feed System interlocks will disable the chemical feed pump and Well Pump then create an alarm. Interlocks will continue to prevent the Well Pump and chemical feed pump from operating until the interlocking condition has cleared, and the associated alarm has been reset by the Operator. The following are the Chemical Feed System interlocks:

1. Chlorine Residual Low-Low Level

3.07 TREATMENT WATER BOOSTER PUMPS

The two treated water booster pumps (Booster Pump) are supplied water from the storage tank and pump water into the school's water distribution system. The booster pumps consist of the following booster pumps:

A. Booster Pump A (VFD) – 10 gpm

B. Booster Pump B (Fixed Speed) – 75 gpm

The two booster pumps are wired for a hand/off/automatic operation.

A. Manual Control:
For manual control, each booster pump can be started by selecting the hand position of the HOA selector switch. For Booster Pump A, the speed of the pump can be adjusted using a dial on the Aquavar.
Both booster pumps will not stop until the Operator turns the selector switch from the hand position to the off position or if the pumps are off due to an interlocking alarm condition.

B. Off Control (Off Position):
In the off position of the selector switch, either booster pump will not operate.

C. Automatic Control (Automatic Position):
In the automatic position, the booster pumps will be controlled from the PLC with settings made on the OIT. Booster Pump A will be operated using its VFD and vary its speed to maintain "System Pressure" based on the pressure transducer that is located on the discharge of the booster pumps. Booster Pump B will operate on and off based on the school's discharge pressure.

D. Set Points:
The following are the "Set Points" that are adjustable through the OIT.
1. Booster Pump A "On" Pressure (0-100 psi)
2. Booster Pump A "Desired Pressure" (0-100 psi)
3. Booster Pump A "Off" Pressure (0-100 psi)
4. Booster Pump B "On" Pressure (0-100 psi)
5. Booster Pump B "Off" Pressure (0-100 psi)

E. Alarms
Pump alarms associated with booster pumps. These alarms are intended to only notify the operator of the alarm condition.
1. Low Storage Tank Water Level
2. Low System Pressure
3. High System Pressure

F. Interlocking Alarms
Pump interlocks will disable their associated pump and create an alarm. Interlocks will continue to prevent a pump from being enabled until the interlocking condition has cleared, and the associated alarm has been reset by the Operator. The following are the interlocks common to each pump:
1. VFD Fail (hardwired)
2. Motor Overtemp Lockout (hardwired)
3. Pump VFD speed feedback transducer fail
4. Pump fail to run (No run status after delay)
5. Low-Low Storage Tank Water Level
6. High-High System Discharge Pressure

7. System Pressure Transducer failure

3.08 STORAGE TANK PRESSURE RELIEF VALVE

The Pressure Relief Valve (Control Valve) is an MOV valve that is used to prevent the water system from excess pressure by opening a bypass line that will allow water from the booster discharge to go into the inlet of the storage tank. The control valve is normally closed and will only open if the booster discharge pressure reaches an operator setpoint. The Control Valve is controlled by the WTP's PLC. The following describes the manual and automatic controls for the Control Valve:
The Control Valve will open and modulate to relieve any pressure that is above this setpoint.
• Pressure Relief (PSI, 65 psi)

A. Alarms
None

B. Interlocking Alarms
The valve interlocks will close and disable the valve along with creating an alarm. Interlocks will continue to prevent the Control Valve from operating until the interlocking condition has cleared and the associated alarm has been reset by the Plant Operator. The following are the valve interlocks:
• Control Valve fail (alarm status from valve)
• Control Valve position transducer fail
• System Pressure Transducer Failure

3.09 MISCELLANEOUS ALARMS

The following miscellaneous alarms will be added to the WTP's control to notify the Operator of the alarm condition:
1. Utility Power Outage
2. Smoke Detected
3. PLC UPS Battery Low
4. PLC UPS Battery Online

END OF SECTION

CHAIN LINK FENCES AND GATES
SECTION 32 3113

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Galvanized steel chain link fences with vinyl slats.
   2. Galvanized steel chain link gates.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.
   1. Product Data: in the form of manufacturer's technical data, specifications, and installation instructions for posts, fabric and accessories.

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain chain link fences and gates as complete units, including necessary erection accessories, fittings, and fastenings for a single source or manufacturer.

PART 2 - PRODUCT

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
   1. Galvanized Steel Fencing and Fabric:
      Allied Tube and Conduit Corp.
      American Chain Link Fence Company
      American Tube Company
      Anchor Fence, Inc.
      Capitol Wire and Fence Co., Inc.
      Century Tube Corp.
      Cyclone Fence Div./USX Corp.

Master Halco

2.2 FABRIC

A. Steel Fabric: Comply with Chain Link Fence Manufacturers Institute (CLFMI) Product Manual. Furnish one-piece fabric widths for fencing **up to 6 feet high.** Wire size includes zinc coating. Gate fabric shall match fence fabric.
   1. Size: 2-inch mesh, 9-gage (0.148-inch diameter) wire with vinyl slats.
   2. Galvanized Steel Finish: ASTM A 392, Class 2, with not less than 1.2 oz. Zinc per sq. ft. of uncoated wire surface on wire of fabric coated after weaving as determined from the average of two or more samples and not less than 1.2 oz. zinc per sq. ft. of uncoated wire surface for any individual sample. Top and bottom edges shall have knuckled edges.

2.3 FRAMING

A. Strength Requirements: for posts and rails conforming to ASTM F 669.

B. Pipe: shall be straight, true to section, material, and sizes specified, and shall conform to the following weights per foot:

NPS in inches	Outside Diameter (OD) in inches	Type 1 steel
1	1.315	1.6
1-1/4	1.660	2.27
1-1/2	1.900	2.72
2	2.375	3.65
2-1/2	2.875	5.79
3	3.500	7.58
3-1/2	4.000	9.11
4	4.500	10.79
6	6.625	18.97
8	8.625	28.55

C. Steel Framework, General: Posts, rails, braces, and gate frames.
   1. Type I Pipe: Hot dipped galvanized steel pipe conforming to ASTM F 1083, plain ends, standard weight (schedule 40) with not less than 1.8 oz zinc per sq. ft. of surface area coated.

D. Top Rail: Manufacturer's longest lengths, with expansion-type couplings, approximately 6 inches long, for each joint. Provide means for attaching top rail securely to each corner, pull, and end post.

2.4 FITTINGS AND ACCESSORIES

A. Material: Comply with ASTM F 626. Galvanized iron or steel, to suit manufacturer's standards.
   1. Zinc Coating: Unless specified otherwise, galvanize steel fence fittings and accessories in accordance with ASTM A 153, with zinc weights per Table I.

B. Tension Wire: 7 gauge metallic-coated steel marcelled tension wire conforming to ASTM A 824 with finish to match fabric.
   1. Class 2, with a minimum coating weight of 1.20 oz. per sq. ft. of uncoated wire surface.

C. Tie Wire: 11-gage galvanized steel with a minimum of 0.80 oz. per. sq. ft. of zinc coating of surface area in accordance with ASTM A 641.

D. Post Brace Assembly: Manufacturer's standard adjustable brace at end posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace and truss to line posts with 3/8-inch-diameter rod and adjustable tightener. Provide manufacturers standard galvanized steel or cast iron cap for each end.

E. Post and Line Caps: Provide weathertight closure cap for each post. Provide line post caps with loop to receive tension wire or top rail.

F. Tension or Stretcher Bars: Hot-dip galvanized steel with minimum length 2 inches less than full height of fabric, minimum cross-section of 3/16 inches by 3/4 inch and minimum 1.2 oz. zinc coating per sq. ft. of surface area. Provide one bar for each end post, and two for each corner and pull post, except where fabric is integrally woven into post.

G. Tension and Brace Bands: Minimum 3/4-inch-wide hot-dip galvanized steel with minimum 1.2 oz. zinc coating per sq. ft. of surface of area.
   1. Tension Bands: Minimum 14 gage (0.074 inch) thick.
   2. Tension and Brace Bands: Minimum 12 gage (0.105 inch) thick.

H. Concrete: Provide concrete consisting of Portland cement, ASTM C 150, aggregates ASTM C 33, and clean water. Mix materials to obtain concrete with minimum 28-days compressive strength of 3000 psi. Use at least 4 sacks of cement per cu. yd., 1-inch maximum size aggregate, maximum 3-inch slump, and 2 to 4 percent entrained air.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install fence in compliance with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

B. Excavation: Drill or hand excavate (using post-hole digger) holes for posts in firm, undisturbed or compacted soil.
   1. Excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than 4 times largest cross-section of post.
   2. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less tahn 36 inches below finish grade surface.

C. Setting Posts: Center and align post in holes 3 inches above bottom of excavation. Space maximum 8 feet o.c., unless otherwise indicated.
   1. Protect portion of posts above ground from concrete spatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
   2. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water.

D. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to post or post caps and fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.

E. Brace Assemblies: Install braces so post are plumb when diagonal rod is under proper tension.

F. Bottom Rail: Install as close to existing grade as possible.

G. Fabric: Leave approximately 2 inches between finish grade and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

H. Tension or Stretcher Bars: Thread through or clamp to fabric 4 inches o.c., and secure to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c.

I. Tie Wires: Use U-shaped wire of proper length to secure fabric firmly to posts and rails with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.

J. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to rails and braces 24 inches o.c.

K. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

L. Gates: Size as indicated on Drawings. Gate posts shall be 4" minimum O.D. schedule 40. Gate hinges, Master Halco industrial pressed steel, 180 swing. Gate frames, size as detailed but minimum 1 5/8" O.D. schedule 40. Provide 3/8" truss rod with tightener at each leaf. Provide pressed steel fork latch. At double gate provide 2 3/8" enter drop rod assembly. See Drawings for configuration.

END OF SECTION

COMMISSIONING
SECTION 330810

PART 1 – GENERAL

1.01 DESCRIPTION

This section contains requirements for the commissioning of the facility. All commissioning work, as described in this section, shall be performed by the Contractor.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 COMMISSIONING PERIOD

After completion of the operational test, the Contractor shall remove all temporary piping, controls and other alterations to the permanent systems that may have been needed during the facility testing and shall perform the tasks necessary to make the improvements constructed under this contract fully operational.

The commissioning period system shall be continuous period of 28 days. Should the commissioning period be interrupted at any time due to the Contractor's work, the commissioning period shall be restarted from the beginning of the full 28-day period. No additional compensation will be provided.

During the commissioning period, the Owner shall be responsible for all normal operational costs and the Contractor shall bear the costs of all necessary repairs or replacements, including labor and materials, required to keep the facility operational. The Contractor shall be always available during commissioning periods to provide immediate assistance in case of trouble or failure of any portion of the facility. The commissioning period shall be considered ended when all corrections required by the Engineer to assure a reliable and completely operational facility are complete. The completion of the commissioning period is required prior to final acceptance.

3.02 FACILITY CLEANUP

Prior to final acceptance of the facility, the Contractor shall clean the facility. This shall include at a minimum the following:

A. Removal of concrete, asphalt, or mud from any metal, painted surfaces or concrete block.

B. Removal of any project debris, equipment, or stockpiles of material that the Owner does not want.

C. Wipe down the interior of the operations building to remove surface dust or mud.

D. Removal of debris and dusting all electrical and other enclosures

E. Removal of mud and debris from all underground vaults

F. Clean all debris from the tank roof.

G. Clean the gutter of the operations building.

H. Remove debris, leaves and trash within the water treatment plants fenced in area.

END OF SECTION

PIPING SYSTEMS
(Piping, Fittings, Valves and Meters)
SECTION 331113

PART 1 – GENERAL

1.01 DESCRIPTION

This Section specifies all piping, fittings, valves, meters, and accessories as shown on the drawings.
All material of construction in contact with drinking water must be compliant with NSF/ANSI/CAN 61-2022: Drinking Water System Components.

1.02 REFERENCES

All pipe, fittings, valves, and coating shall be furnished, installed, tested, and disinfected per Section 33 13 00 Disinfection.

1.03 SUBMITTALS

A. Submit data to show that the following items conform to the Specification and NSF61 compliance requirements:
   1. Pipe, fittings, and accessories (Product Review)
   2. Pipe couplings, flexible pipe pieces (Product Review)
   3. Valves, and accessories (Product Review)

B. Fittings and Coupling Compatibility: To assure uniformity and compatibility of piping components, fittings and couplings shall be furnished by the same manufacturers.

C. Manuals: Furnish manufacture's installation and operation manuals, bulletins, and spare parts lists for the following items:
   1. Valves
   2. Actuated valves
   3. Motorized actuators
   4. Instrumentation

1.04 QUALITY ASSURANCE

A. Field Quality Control:
The Contractor shall be responsible for the costs of additional inspection, retesting, or repair incurred by the owner resulting from non-compliance of defective materials provided by the Contractor.

1.05 PIPING SYSTEMS

The various piping systems are identified on the Drawings and Specifications.

1.06 APPURTENANCES

Furnish and install all necessary guides, inserts, anchors and assembly bolts, washers and nuts, hangers, supports, gaskets, couplings, and flanges; all other appurtenant items shown on the Drawings, specified, or required for the proper installation and operation of the piping; devices included in or on the piping equipment; and piping accessories.

PART 2 – PRODUCTS

2.01 GENERAL

A. Pipe and valve sizes are nominal inside diameter unless otherwise noted.

B. All pipes, fittings and valves shall be lead free and NSF 61 certified.

C. All pipe, fittings and appurtenances shall be painted and/or coated, per section 09 96 56.

2.02 PIPING MATERIALS

All piping shall be as follows unless stated otherwise on the plans:

A. Potable Water Pipe:
   1. Exposed Pipe (Outside Treatment Building) shall be standard steel epoxy lined and coated per Section 09 96 56
   2. Exposed Pipe (Inside Treatment Building) shall be schedule 80 PVC
   3. All underground pipes shall be:
      a. Smaller than 4” - schedule 80 PVC
      b. 4” and larger – ductile iron pipe

2.03 PIPE COUPLINGS AND ADAPTERS

A. General: For typical pipe joints refer to the pipe material specifications. Other joint devices shall be furnished where called for on the drawings and as specified below.
   1. Flexible Couplings:
   • Connecting pipe with identical outside diameters:
   • Dresser style 38 or equal.
   2. Banded Flexible Couplings (restrained):
   • Dresser style 38 or equal with two all thread bolts bolted through the coupling to flanges or welded ears both sides to prevent the pulling out of the pipe from the coupling.
   3. Transition Couplings:
   • Connecting pipe with slightly different outside diameters: Dresser style 162 or equal.
   4. Flange Coupling Adaptors:
   • Dresser Style 127 or equal.

2.04 VALVES

A. General Requirements for Valves:
   1. Valves of the same size and service shall be provided by a single valve manufacturer.
   2. Packing shall be non-asbestos material.
   3. Unless otherwise noted or indicated, all valves 2 inches and larger shall have flanged ends; all valves smaller than 2 inches shall have threaded IP ends. All valves installed in each pipe shall be designed to withstand the pressure rating of the pipe.
   4. Buried valves shall use Type 316 stainless steel for the bolts and nuts.
   5. All above grade valves 2 inches and larger shall be furnished with operator hand wheels.
   6. All threaded stem valves shall open by turning the valve stem counterclockwise.
   7. All buried valves 12 inches or smaller shall be resilient wedge flanged or mechanical joint gate valves with valve box manufactured by Clow Valve Company or equal.
   8. All check valves shall be flanged with a spring-balanced assembly manufactured by Clow or equal. Check valves shall meet the material and design requirements of AWWA specification C508.

B. Gate Valves:
   1. Gate valves 4 inches and larger shall be resilient wedge AWWA C509 manufactured by Clow Valve Company or an approved equal.
   2. Gate valves less than 4 inches shall be standard Milwaukee bronze valves or an approved equivalent.

C. Combination Air Valves: Combination air valves shall be manufactured by ARI or an approved equal.

2.05 FITTINGS

A. General Requirement for Fittings:
   1. All below grade fittings smaller than 4 inches shall be PVC schedule 80 glue fittings.
   2. All below grade fittings 4 inches and larger shall be cast iron mechanical joint type (restrained) with thrust blocks sized by the Contractor.
   3. All above grade bends and tees shall be standard long radius welded fittings.
   4. All tapping sleeves shall be full wrap and stainless steel.

2.06 METERS AND GAUGES

A. Flow Meter:
   1. Meters shall be the following:
      a. Nitrate Treatment influent flow meter shall be a 1-inch McCrometer Ultra Mag UM06
      b. Treatment bypass flow meter: 1-inch McCrometer Ultra Mag UM06
      c. Or an approved equivalent
   2. Each meter will be equipped with the following:
      a. Flow Signals: 4-20 mA output signal proportional to the flow for forward flow
      b. Digital Flow Indication Range from 0 to 100-gpm.
      c. Flow Totalization:
         i. Totalizer reading in units of 100 cubic feet (CCF) for one direction.
      d. HART Protocol compatibility
      e. Stainless steel grounding ring, gaskets, and #10 AWG copper ground conductor with green insulation to connect the grounding ring to the ground lug on the meter and to the #4/0 AWG grounding electrode conductor in the flow meter vault. Provide a suitable mechanical copper ground fitting to connect the #10 ground wire to the #4/0 ground wire. Grounding ring and gaskets shall be supplied by the flow meter manufacturer.

B. Requirements for Pipeline Pressure Transmitters
   1. New Pressure Transducers shall be installed at the following locations:
      a. Well Discharge
      b.. Treatment System Influent (after prefiltration and before ion exchange contactors}
      c. Treatment System Effluent (after ion exchange contactors and before storage tank
      d. Booster Pump Discharge
   2. A 3-way, ball type shutoff valve and snubber shall be included for all pressure transmitters.
   3. Configure 3-way valve to allow blowing out the supply line to the transmitter.
   4. Pressure transmitter shall be loop powered (2-wire), 4-20mA, silicone filled, 316L stainless steel isolating diaphragm, LCD display, 0-150 psi, Rosemount 2051 or approved equal.
   5. Configure the LCD display to display the psi reading.
   6. Snubber shall be an Omega PS-2E or equal.
   7. A 1/4-inch brass ball valve shall be included for all manifolds containing a pressure gauge, pressure transmitter and or sample tube to permit isolation of the manifold from the pipeline for calibration.

C. General Requirements Pressure Gauges:

1. A pressure gauge shall be installed on the booster pump discharge to measure the Shiloh water system's pressure.
2. The pressure gauge shall be an Omega PGM Series (liquid filled) with a pressure range from 0 to 100 psi or equal. A snubber shall be an Omega PS-2E or equal on the pressure gauge.
3. A three-way ball type valve shall be included for all pressure gauges and a 1/4-inch sample tube shall be piped to the three-way valve.

2.07 FLANGE ASSEMBLIES

A. Flanges:

1. General:
   Flanges shall either be flat flanges or convoluted ring flanges as specified in the following paragraphs.
2. Flat Flanges:
   Cast iron flanges shall be faced in accordance with ANSI B 16.1. Where companion flanges are used, the flanges on pipe shall be refaced to be flush with the companion flange face. Class 150 and Class 300 forged steel flanges shall be raised face conforming to ANSI BI6.5. Lightweight slip-on flanges shall be plain face conforming to A WWA C207, Class B and ANSI BI6.5. Unless otherwise specified, steel flanges shall be ANSI BI6.5, Class 150 or AWWA C207, Class D. Class EAWWA flanges shall be provided where test pressure exceeds 175 psi. Plain faced flanges shall not be bolted to raised face flanges.

B. Gaskets:
Gaskets for plain faced flanges shall be the full-face type. The thickness shall be 1/16 inch for pipe 10 inches and less in diameter and 1/8 inch for pipe 12 inches and larger in diameter. Unless otherwise specified, gaskets for raised face flanges shall match the raised face and shall be 1/16 inch thick for pipe 3-1/2 inches and less in diameter and 1/8 inch thick for pipe 4 inches and larger.

C. Bolts:
Flange assembly bolts shall be ANSI B 18.2.1 standard square or hexagon head bolts with ANSI B 18.2.2 standard hexagon nuts. Threads shall be ANSI B1.1, standard coarse thread series; bolts shall be Class 2A, nuts shall be Class 2B. Bolt length shall conform to ANSI B 16.5.
Unless otherwise specified, bolts shall be carbon steel machined bolts with hot pressed hexagon nuts. Bolts for submerged service shall be made of Type 316 stainless steel in conformance with ASTM F593, marking F593F. Nuts for submerged service shall be made of copper-silicon alloy bronze conforming to ASTM B98, alloy C65100, designation H04 or alloy C65500, designation H04. Bolts and nuts for buried service shall be made of noncorrosive high-strength, 1ow-alloy steel having the characteristics specified in ANSI/AWWA C111/A21, regardless of any other protective coating. Where

washers are required, they shall be of the same material as the associated bolts.

2.08 WATER QUALITY INSTRUMENTATION

A. Nitrate Analyzer:
Nitrate analyzer shall be HACH model type Nitratax Clear SC. 4 off ¼ inch sample lines routed from raw water, nitrate treatment column train A, nitrate treatment column train B and blended effluent shall be manifolded to the analyzer through ASCO isolation valves or equivalent. Each sample line will require a rotameter scaled 0 to 7gph and a flow switch to detect low or no flow below 3.0gph.

B. Conductivity:
The conductivity monitor shall be Thermo Scientific model type AP4, or equivalent fitted with conductivity probe with a measurement range of 0 to 5,000uS.

C. Free Residual Chlorine Analyzer:
The chlorine monitor shall be HACH model type CL17sc or equivalent mounted locally to the chlorine injection quill.

2.09 DISINFECTION

A. Chlorine injector quill shall be Griffco CS-CP-C050-CF or equivalent.

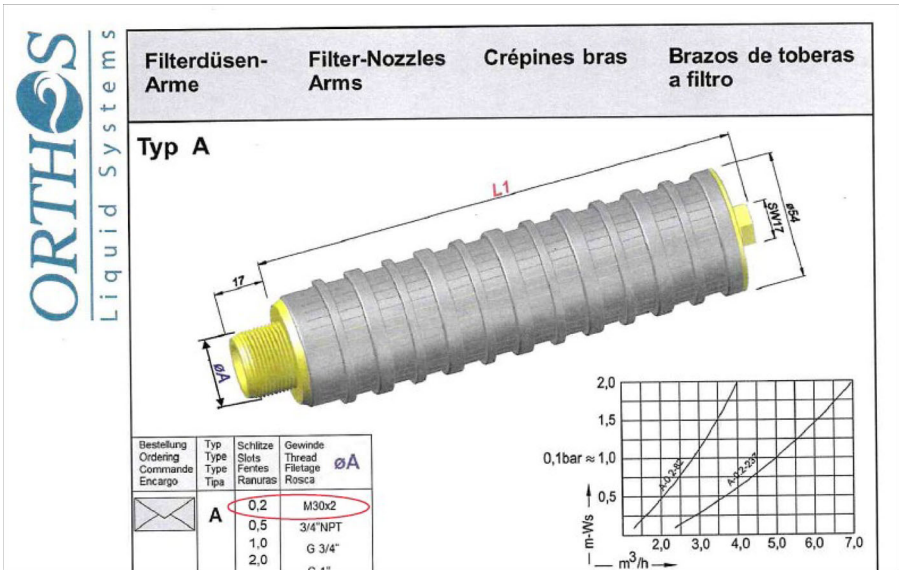
B. Chlorination pump shall be Grundfos 97722420 or equivalent with a selectable dosing rate between 0 to 30gpd.

C. Chlorination piping to injector shall be double contained and protected by Griffco or equivalent back pressure relief valve piped back to the chlorination supply tank.

D. Chlorination storage shall be enclosed, with an integral spill bund and mounted above the level of the dosing pump intake.

2.10 IX CONTACTOR WATER DISTRIBUTION AND RESIN RETENTION

Each stainless-steel ion exchange contactor will require 2 off Orthos Type A Filter Nozzle Arm.



2.11 PRESSURE TANK

A new pressure tank shall be a diaphragm type and will be installed on the discharge of the booster pumps to reduce pressure surges and minimize pump cycling.

A. The pressure tank shall be as follows:
   1. Minimum Tank Volume: 100 gallons
   2. Maximum Pressure: 150 psi
   3. Maximum tank diameter: 30 inches

B. Manufacturer:
   1. Amtrol WX-350
   2. Or an approved equivalent

END OF SECTION

SUBMERSIBLE PUMP AND MOTOR
SECTION 33 1225

PART 1 - GENERAL

1.01 DESCRIPTION

Furnish and install a submersible pump, motor, column, power cable, discharge head and related materials and equipment. The pump bowl assembly and motor shall be manufactured by the same company.

1.02 REFERENCES

The submersible pump and its accessories shall be furnished, installed, and disinfected per the American Water Works Association standards latest edition.

1.03 SUBMITTALS

A. Provide all submittals per Section 013300.

B. Submit the following shop drawings and product data:
1. Product data to demonstrate that the equipment conforms to the Specifications.
2. Motor data
3. Horsepower
4. Efficiency
5. Other pertinent data related to the pump features and materials of construction.

C. Performance Test

1.04 CERTIFICATIONS

A. Operation and Maintenance Manuals:
1. Provide operation and maintenance data for all furnished equipment herein specified in accordance with Section 017823.
2. Furnish manufacturer's installation, lubrication, operations and maintenance manuals, bulletins, and spare parts lists.

B. Tests and Certificates
1. Factory test reports and certified curves including thrust loadings, losses, horsepower, efficiency, total dynamic head, flow, and other pertinent data at the design capacity.

1.05 QUALITY ASSURANCE

A. Equipment furnished under this Section shall be supplied by a single manufacturer who has been regularly engaged in the design and manufacture of this equipment for at least five years.

PART 2 - PRODUCTS

2.01 GENERAL

A. The submersible pump and motor shall meet the following criteria:
   1. The submersible pump and motor shall be rated for continuous duty and shall be capable of pumping the specified flow range without surging, cavitation, or vibration.
   2. The pump shall not overload the motor for any point on the maximum speed pump performance characteristic curve throughout the entire pump operating range.
   3. The service factor for the motor shall not be applied when sizing the motor.
   4. To help insure vibration-free operation, all rotative components of the pumping unit shall be statically and dynamically balanced. Excessive vibration shall be sufficient cause for rejection of the equipment. The mass of the unit and its distribution shall be such that resonance at all operating speeds is avoided. In any case, the amplitude of vibration as measured at any point on the pumping unit shall not exceed the limits set forth in the latest edition of the Hydraulic Institute Standards.
   5. All parts of the pump shall be designed to withstand the stresses that will be imposed upon them during their handling, shipping, installation, and operation.
   6. The completed unit, when installed and operating, shall be free of cavitation, vibration, noise, and oil or water leaks over the range of operation.
   7. The pump and motor shall be able to operate for short durations at zero flow conditions and operate continuously at runout with no harm to the pump or to the motor.

2.02 SUBMERSIBLE PUMP AND MOTOR MANUFACTURERS

A. Goulds

B. Grundfos

C. or an approved equal

2.03 SERVICE CONDITIONS

A. Liquid Pumped – Groundwater

B. Liquid Temperature – 45°F to 65°F

C. Fixed speed (flow) application

2.04 DESIGN AND OPERATING CONDITIONS

A. The submersible pump shall be designed to produce 10 gpm with a range of between 45 to 65 ft TDH.

B. The pump shall be a Goulds 5GS05R or an approved equal.

C. Maximum Speed, Shaft – 3,600 rpm

D. Submersible Motor – 240-volt, 60 Hertz, 3 phase

E. Discharge Diameter – 1-¼" inch

F. Column Size – 1 inch

G. Pump Setting – 50 feet

2.05 PERFORMANCE AND DESIGN REQUIREMENTS

A. The following criteria shall be used for pump selection:
   1. Bowl diameter shall allow for installation in the 8-inch well casing as constructed.
   2. Pump head shall continuously decrease with increasing flow.

2.06 EQUIPMENT

A. Provide a submersible pump and motor including the bowl assembly, column and discharge head. Comply with construction features of AWWA E102 except where indicated differently in this Specification. Pump, motor, column pipe, and motor cable shall comply with ANSI/NSF 61 requirements.

B. Pump Construction:
   1. Discharge Assembly:
      a. Provide a fabricated steel discharge assembly suitable for surface discharge. Discharge assembly shall have connections for the pump column and discharge piping and shall support the loadings which they impose as well as section and pipe load, hydrostatic and hydrodynamic heads. The discharge head shall be machined as one unit.
      b. The discharge shall be threaded with a 1-inch FIP end for connection to the discharge piping

c. Provide for lifting the discharge head by means of heavy-duty lifting eyes that can sustain the weight of the complete unit.

2. Column Pipe:
   a. Column pipe joints shall be 1-inch threaded and in 10-foot maximum lengths with no coating. The top and bottom column joints shall be 5-foot in length. The column pipe shall be of a standard steel size.
3. Bowl assembly
   a. The bowl assembly shall consist of the bowl, impeller and impeller shafting, and bearings. Bearings shall be located above and below the impeller. Impellers shall be statically balanced.
   b. The pump bowl shall be of the material listed under the subsection on "Pump Materials of Construction." The bowl shall be sufficiently rigid to prevent adverse changes in bearing alignment and to maintain the running clearance of seal rings. Waterways and the diffusion vanes shall be smooth and free from nodules, bumps, and dips. Provide the bowls with a renewable wear ring adjacent to the impeller, made of bronze as indicated under "Pump Materials of Construction."
4. Pump setting (bottom of discharge head to top of pump assembly): 50-feet
5. Impellers
   a. Pump impellers shall be of the enclosed type made of the material listed in the subsection on "Pump Materials of Construction" and shall be cast in one piece. Machine to fit the contour of the bowl, hand file in the waterways, and equip with replaceable wearing rings or with wearing-ring hubs for mounting wear rings in future repair cycles. Attach impellers to the shaft in such a manner that they cannot become loose under any operating condition or under reverse rotation. Provide for adjustment of the axial position of the impeller at the motor connection to the head shaft so that proper clearance between bowls and impellers may be maintained.

2.07 PUMP MATERIALS OF CONSTRUCTION

A. Materials of construction shall conform to the requirements listed below. Materials of construction for components not listed below shall conform to AWWA E101, Part A, Table 1, except that the materials shall be considered required, not typical.

Component	Material
Pump Bowls	Cast Iron - ASTM A48 CL30
Column Pipe	Carbon Steel, ASTM A283, Grade B or C, or ASTM A53, Grade A or B

Bolts and nots for discharge head	Bolts shall be Type 316 stainless steel conforming to ASTM A193, Grade B8M, with tensile strength of 139,000 psi and yield of 106,000 psi. Nuts shall be type 316 stainless steel conforming to ASTM A194, Grade 8M.

B. Casting, fabrications, machined parts, and drives shall conform to the industry standards for strength and durability and shall be rated for continuous duty over the entire operating range. Service factors, where applicable, shall be assumed to be 1.10.

C. All cast iron used in pump construction shall be close-grained grey cast iron conforming to the requirements of ASTM Designation A48 CL30.

D. Fabrications shall conform to the requirements of ASTM Designation A36 for fabricated steel.

E. Shop prime ferrous metal surfaces in conformance with Section 09 96 56 Protective Coatings.

F. The discharge head shall have a 300 series stainless steel plate permanently attached to the pump frame into which the following information shall be impressed, engraved, or embossed: Manufacturer's name, pump size, serial number, impeller diameter, capacity, head rating and speed.

2.08 PUMP CONSTRUCTION

A. The pump covered by these specifications shall be a multistage turbine submersible pump to be used in a domestic water well application.

2.09 COLUMN PIPE

A. Pump column shall be 1 inch, Schedule 40, threaded and coupled, black steel pipe, with taper threads (NPT) to prevent the column pipe from unscrewing during pump operation. The pipe shall be furnished in interchangeable sections not over twenty-one feet in length, and shall be connected with threaded, sleeve type couplings.

2.10 CHECK VALVE

A. A check valve shall be provided in the column pipe just above the bowl assembly. The valve shall have threaded ends to match column pipe and be capable of supporting the weight of the pump and column pipe and the maximum thrust of the pump with a safety factor of at least 2. Valve shall be by Lakewood or approved equal.

2.11 SURFACE AND BASE PLATE

A. A fabricated steel surface plate shall be provided for mounting the column pipe. It shall rigidly support the total weight of the motor, bowl assembly, column pipe, cable, and the column of water. The cable outlet shall be designed to prevent entry of foreign matter into the well and shall be equipped with a cable seal. The surface plate shall be equipped with a discharge outlet of the same diameter as the column pipe. The steel base plate shall be provided as shown on the project plans.

B. Elbow shall be 1-inch Class 150. Surface plate shall be drilled for ASA flange bolt holes and gaskets provided to insure a water-tight fit with well flange and inner-casing flange.

2.12 SUBMERSIBLE MOTOR:

A. Provide a submersible motor, suitable for operation at 3 phase, 240 volts.

B. Nameplate motor horsepower shall not be exceeded at any flow on the pump curve excluding the service factor. The motor shall be suitable for operation with a variable frequency drive (VFD).

C. The motor shall be filled with FDA-approved, high-strength, dielectric mineral oil and have automatic pressure balancing between reservoir and top bearing.

D. The motor shall be so designed that water and sand cannot be mixed with the oil and circulated nor oil released from the motor into the well water.

E. Motor thrust bearing shall be sized for continuous up-thrust and down-thrust conditions utilizing a double-sided Kingsbury thrust bearing or approved equivalent.

2.13 POWER CABLE

A. The electrical cable shall be designed specifically for submersible motor service and shall be round and furnished by the motor manufacturer.

B. The cable shall be sized to conform to National Electric Code for 125 % of motor full load amps at a conductor temperature rating of 75 degrees C submerged, and a voltage drop at the motor not to exceed 3%.

C. The cable shall be sized to limit the voltage drop to 5 percent oat the motor's terminals. Size shall be selected and furnished by the pump manufacturer.

D. The cable shall consist of 3 stranded copper conductors with cross-linked polyethylene insulation. The cable shall also include an integral ground lead of appropriate size. The power cable shall have an overall Nitrile/PNC blend jacket and shall be manufactured by Brand-Rex or equal.

E. The conductor insulation shall be water and oil resistant, suitable for continuous immersion at the depth shown in paragraph 2.06.B.4

F. The cable shall be supported on the column pipe by means of series 300 stainless steel cable clamps and bands.

G. The cable shall terminate in a waterproof junction box above the surface plate.

H. The motor end of the cable shall be factory spliced to a flat cable assembly that is protected by stainless steel inner and outer guards as the cable passes by the bowl assembly.

I. The cable shall connect to the motor with a plug-in watertight molded rubber connector with brass gland follower and gasket.

2.14 PUMP NAMEPLATE

A. A corrosion resistant nameplate shall be attached to the surfaced plate in a clearly visible, easily accessible location. The nameplate shall be stamped with the following information:

1. Manufacturer's name
2. Manufacturer's pump model number
3. Manufacturer's serial number
4. Design capacity, gpm
5. Design TDH, feet
6. Design maximum speed, rpm

2.15 COATING

A. Pump bowl assembly outside diameter (OD) and surface plate inside diameter (ID) shall be epoxy coated. The pump column shall receive the manufacturer's standard coatings. Surface plate OD, discharge elbow, and power cable junction box shall be factory coated and then field coated per Section 09 96 56 Protective Coatings.

2.16 PUMP GUARANTEE

A. The pump supplier shall guarantee the equipment furnished in this specification to be free of defects in manufacturing for a period of one year from acceptance by the Owner. The guarantee shall cover all parts and labor including removal and re-installation of the equipment in the well.

PART 3 - EXECUTION

3.01 PREPARATION FOR SHIPMENT

A. The submersible pump and motor specified shall be factory assembled. Any parts and assemblies that are unassembled shall be packaged and tagged in a manner that will protect the equipment from damage and facilitate the final assembly in the field. Machined and unpainted parts shall be protected from damage by the elements with the application of strippable, protective coatings. Provide all lubricants required for initial lubrication.

3.02 INSTALLATION

A. The submersible pump and motor components shall be installed in accordance with the manufacturer's instructions and accepted industry standards for proper handling and installation of submersible deep well pumps.

B. Frequent testing of the pumping system is required to ensure the integrity of the installed components and are as follows:

1. The pump and motor assembly shall be lifted into the vertical position before uncrating.
2. Before attaching the power cable to the motor, the motor shall be tested by attaching one lead from a resistance instrument to any one motor lead and the other lead to the motor frame. All three leads shall be tested separately. The minimum reading at normal room temperature shall be at least 500 megohms.
3. Before lowering the pump, a meger shall be connected to the end of one of the power cables and to the pump or motor casing and the insulation resistance shall be measured. Wet down the cable spice by immersing in a bucket of water before megging. The cable and motor shall not be installed if they meg less than 100 megohms. Defective cables shall be replaced.
4. The power cable shall be banded to the column pipe as the unit is lowered into the well. The first band shall be placed within three feet of the pump while the last band shall be within three feet of the surface plate. Three-quarter (3/4) inch stainless steel banding shall be used with a rubber cable protector installed between the band and power cable.
5. The Contractor shall insure that all column joints are securely tightened as each joint is installed to prevent loosening of the joints on pump startups.

6. Megger readings shall be taken after each join of column is installed in the Well once the motor has reached the water table and has become submerged. One line from the megger shall be attached to the power cable and the second line attached to the pump column. Each power lead shall be tested. If readings lower than 100 megohms are experienced, the cable will be deemed defective and replaced.

C. Furnish the services of competent factory-trained personnel to supervise the pump installation and initial eight (8) hours of pump operation.

D. The pump and motor installation shall be done by a qualified contractor with a State of California C57, C61, or D21 contractor license.

3.03 FACTORY TEST

A. General
1. After completion of manufacture and assembly, and before shipment, the pump manufacturer shall test the pump in accordance with AWWA/ANSI E102-06 and as described below. Factory tests will be a non-witnessed test.
2. Testing Equipment
   a. All testing equipment used shall have an accuracy and precision at least equivalent to the limits of accuracy of the manufacturer's device.
   b. Dated copies of the most recent calibration curves for all instruments used shall be furnished to the Owner.
3. Input horsepower shall be measured using the job motor. The use of dynamometers is prohibited.
4. Submittal of Test Data: The following shall be submitted for approval on the pump/motor assembly:
   a. Certified and guaranteed pump test data, including:
      (1) Speed, rpm
      (2) Flow, gpm
      (3) Total dynamic head, feet
      (4) Input electrical horsepower to motor
      (5) Overall efficiency
5. Acceptance: Acceptance of the pump assembly will be subject to the following:
   a. Proof that it will operate at or above the specified efficiency.
   b. Capacity at design head shall not be less than rated.
   c. Capacity at design head shall be not more than 110 percent of rated. Straight line interpolation shall be used to determine head capacity at the design point.
   d. Notwithstanding item band c above, the guaranteed minimum bowl efficiency shall be determined from the actual test flow at the test head within ±2 percent of the rated design head. The overall efficiency calculations shall be carried to within ±1 percent.

e. The nameplate horsepower of the motor shall not be exceeded at any point on the pump curve.

3.04 FIELD TESTING

A. With owner's representative on-site, bump motor to ensure that motor has been connected for proper counterclockwise rotation.

B. Perform field tests on the installed pump to demonstrate that it performs according to the specified service conditions. If the measured flows are more than 5% below the specified service conditions adjust the impellers or provide new impellers or otherwise repair or replace the pump.

C. Conduct vibration level tests with the pump operating at its rated capacity. Adjust or replace the pump if it exceeds the maximum vibration levels.

D. Test the pump system to determine its overall efficiency. This test shall consist of measuring flow, discharge pressure, pumping level, and electrical input kilowatts to the motor at the operating service point on the pump curve and determine the ratio of power input to the water to the electrical input power to the motor ("wire-to-water efficiency"). Results of this test to be submitted to the Owner.

E. Installation of the pump and motor shall be complete, and the unit shall be serviced, operated, adjusted, and ready for used before the field tests are scheduled.

F. All equipment that fails any test shall be rejected, and complete retesting shall be required at the Contractor's expense after the Contractor makes corrections or modifications to the equipment which has previously failed any test. All field tests shall be witnessed by the Owner's representative.

G. Written records of the testes shall be made by the Contractor and shall be submitted to the Owner's representative within ten (10) days. The test record shall indicate the test criteria and arrangement, the time of the test, the results, and pertinent data such as voltage, frequency, load current, ambient temperature, pump discharge and total dynamic head. The pump shall be operated during testing for a minimum of one hour. Pertinent data shall be recorded for each test and at least every thirty (30) minutes.

3.05 FIELD COATING

Field coat exposed ferrous metal surfaces in conformance with Section 09 96 56 Protective Coatings.

END OF SECTION

DISINFECTION
SECTION 331300

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall disinfect and flush all water distribution facilities, both new and all existing campus water lines, in accordance with ANSI AWWA C651 Standard for Disinfecting Water Mains and these specifications.

B. The Owner will provide the bacteriological testing.

C. The Contractor shall furnish the sodium hypochlorite chemical for disinfection.

D. All chlorination, flushing and sampling events shall be scheduled at least 48 hours in advance with the Owner.

1.02 SUBMITTALS

Submit in accordance with Section 01 33 00 Submittals:

A. Shop drawings and manufacturer's literature for all materials

B. Affidavit of Compliance for sodium hypochlorite with AWWA B300 and B301 from the manufacturer

C. The disposal of the chlorinated water will require to be dechlorinated and land applied on site.

PART 2 – PRODUCTS

2.01 GENERAL

A. Provide chlorine disinfection in accordance with Section 4.1 of ANSI AWWA C651 and the provisions of ANSI AWWA B300 Standard for Sodium Hypochlorite.

B. Provide backflow protection in accordance with ANSI AWWA B301 Standard for Liquid Chlorine Backflow Protection.

PART 3 – EXECUTION

3.01 GENERAL

The Contractor shall follow the basic disinfection procedure in accordance with Section 4.2 of ANSI AWWA C651.

3.02 CONSTRUCTION PROCEDURES

The Contractor shall follow the preventive and corrective measures during construction in accordance with Section 4.3 of ANSI AWWA C651.

3.03 METHODS OF CHLORINATION

A. The Contractor shall use a chlorination method in accordance with Section 4.4 of ANSI AWWA C651.

B. The Contractor will be required to import water from the City of Modesto that will be required to supply potable water needed for filling and flushing the new onsite facilities.

3.04 FINAL FLUSHING

A. The Contractor shall follow the final flushing procedures in accordance with Section 4.5 of ANSI AWWA C651.

B. Chlorinated water more than 100 ppm shall not remain in contact with pipe and appurtenances for more than 1 week after the applicable retention period.

C. Chlorinated water shall be neutralized prior to discharging on the school's property.

D. The Contractor shall be solely responsible for disposal of chlorinated water in accordance with all applicable Federal, State, and local NPDES discharge requirements.

3.05 FINAL CONNECTION TO EXISTING MAINS

A. The Contractor shall follow the final connection procedures in accordance with Section 4.6 of ANSI AWWA C651.

B. Temporary blow-offs shall be removed by the Contractor and final connection pipe shall be provided and installed by the Contractor as indicated on the drawings.

C. The Contractor shall assist the District with any additional flushing the District may perform associated with this project.

3.06 CUTTING IN EXISTING MAINS

The Contractor shall install pipe and fitting assemblies shown on the drawings in accordance with Section 4.7 of ANSI AWWA C651, these assemblies shall be installed prior to chlorination of any waterlines, to ensure that the final connection can be installed, as indicated on the drawings.

3.07 BACTERIOLOGICAL TESTS

A. The Owner shall perform the bacteriological tests in accordance with Section 5.1 of ANSI AWWA C651

B. Bacteriological tests shall demonstrate complete absence of coliform organisms and heterotrophic plate counts (HPC) of less than 500 CFU/mL. If tests show presence of coliform organisms or HPCs higher than 500 CFU/mL, the Contractor will be required to perform additional flushing and disinfection of the pipeline and filter vessels until such time acceptable tests are obtained, all at no additional cost to the Owner. C. The Contractor will not be charged for the additional water provided or bacteriological testing performed by the Owner.

END OF SECTION

WELDED STEEL GROUND WATER STORAGE TANK
SECTION 331613

PART 1 - GENERAL

1.1 SCOPE

A. This specification covers the furnishing of all labor, material, equipment, tools, services, and installation of Welded Steel Water Storage Tank, by TIGER TANKS INC., as shown on the plans and specified herein.

1.2 REFERENCE SPECIFICATIONS

A. Perform the work in conformance with the following standards.
   1. American Water Works Associations (AWWA) Standard D100-11 Welded Carbon Steel Tanks for Water Storage.

1.3 SUBMITTALS

A. Shop Drawings: Submit shop drawings of the welded steel reservoir and all accessories for review and approval by the engineer prior to beginning any related shop fabrication or erection. Include sufficient data to show that the reservoir and accessories conform to the requirements to these Specifications. Submittals shall include.
   1. Fabrication and erection drawings and details for the reservoir and all accessories.
   2. Certified mill tests on steel plate and structural members demonstrating that the physical and chemical requirements of this Specification have been met.

PART 2 - PRODUCT

2.1 GENERAL DESCRIPTION

A. The Contractor shall furnish, install and test the tank on a concrete foundation, as required by AWWA D100-11. The contractor shall be completely responsible for the design construction and for the integrity and satisfactory performance of the tank during the guarantee period. The tank shall conform to AWWA D100-11, including Section 14, to the latest edition CBC and to the requirements of the plans and these Specifications. The supplier shall submit for approval complete and detailed plans for the tank and appurtenances.
   1. Manufacturer is to be Tiger Tanks Inc, Bakersfield CA. - (661)363-8335. No substitutions will be acceptable.

B. The welded steel tank shall have nominal capacity of 5,000 gallons. It shall have a nominal diameter of 10.33 feet and a nominal height of 9'-0" feet. Provide the reservoir complete with all pipe connections, access openings, nozzles, taps, drains, ladders, vent, and other accessories as shown on the plans or required herein.

2.2 DESIGN DATA

A. The following data and information are supplied as a basis for design and erection of the tank and appurtenances:

1. Tank Capacity & Dimensions

a.	Nominal Capacity	5,000 gallons
b.	Usable Capacity	4,600 gallons
c.	Inside Diameter	10'-4"
d.	Tank Height	9'-0"

2. Liquid to be stored — Potable water.

2.3 TANK DESIGN

A. All plate and structural steel shall conform to AWWA D100, Section 14.

B. Tubular structural shapes shall be hermetically sealed to prevent internal corrosion. Protection solely by means of an interior coating system is not allowed.

C. The roof of the steel tank shall be sloped a minimum of 3 in. per foot.

D. Joints Welds

1. All shell joints shall be butt-welded.
2. Floor joints may be butt-welded or lap welded. In both cases an additional layer of padding shall be placed under the joint and extended a minimum of 6" either side of the joint.
3. The roof shall be of a low-cone design with a slop of 3-inch on 12-inch minimum, or a self-supporting steel dome roof. The roof design shown on the plans shall be the basis of the roof design for the project.

B. Seal Welding:

1. All surface voids shall be seal welded. Surface voids include but are not limited to areas behind tank rafters, skip-welded lap joints, between back to back angle iron backing, and junction of rafters to column supports.

2.4 ACCESSORIES

A. Shell Manways: Provide two (2) 30 inch, minimum, shell manholes located as shown on the drawings. The center of the manhole shall be located 30 inches above the bottom of the tank.

B. Pipe Connections:
   1. Provide inlet nozzle, outlet nozzle, and overflow and drain outlets as shown on the plans.

C. Overflow Pipe:
   1. Provide steel internal and external overflow pipe, internal weird box, if required, and supports as shown on the plans.

D. Roof Openings:
   1. The tank roof shall have a curbed, upward opening 24-inches square, minimum; hatch.

E. Gasket and sealants shall meet or exceed AWWA, FDA, and EPA standards for portable water.

F. Anchor bolts and stirrups to be furnished by the Tank Contractor.

2.5 FOUNDATION

A. See drawing for tank foundation.

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. The tank and appurtenances shall be assembled, erected, and cleaned in accordance with Section 10 of AWWA Standard D100. All weld irregularities such as sharp edges, sharp corners, and weld spatter shall be ground to a smooth surface. A door sheet may be included in the construction schedule. The door sheet must be the full height of a wall ring. Cutting of a partial section of any wall ring sheet is unacceptable.

3.2 TESTING AND INSPECTION

A. General: Inspection, testing and repair of welds shall be performed in accordance with Section 11 and AWWA D100. Vertical and horizontal shell joints shall be radiographed in accordance with AWWA D100. In addition, junctions of vertical and horizontal joints shall be radiographed to show clearly not less than two inches of horizontal shell weld length on each side of the intersection. At completion of the work, the Contractor's representative who witnessed the inspection test and shall submit a report certifying that the tank is inspected in accordance with the above standard. The report shall include the content as specified in Section 11.2 of the Standard.

B. Bottom: All welds in the bottom of the tank shall be vacuum tested prior to the application of protective coatings. The surface of each weld shall be coated with soap suds and a vacuum tester passed over the weld. The tester shall be constructed with a suitable window to permit the operation to observe the effect of the soap suds as the tester is passed along the weld. Any leaks found shall be marked and the holes sealed by welding. Sealing by peening will not be permitted. The tester shall be equipped with a pressure gauge, and a partial vacuum of not less than 2 psi shall be maintained during the test.

C. Shell: Test by filling with water to elevation of overflow. Completed storage tank shall show no leaks at end of 24 hour test period. No charge will be made for water required to fill tank.

3.3 DISINFECTION

A. General: After testing and painting has been satisfactorily completed, tank shall be disinfected.

B. Standards: Disinfecting of interior surfaces shall be performed in accordance with AWWA. After disinfection, the Owner shall take a water specimen for bacteriological test, as prescribed at Code 40 of the Federal Regulations, Section 141.21 through 141.30, 141.1 and 141.42.

C. After disinfection, the tank shall be filled to the overflow level and allowed to stand for 5 days, minimum. After 5 days, the Owner shall take water specimens for V.O.C. test per EPA 502.2. The tank may be placed into service once acceptable test results are received.

END OF SECTION

WATER TREATMENT EQUIPMENT
SECTION 444413

PART 1 – GENERAL

1.01 DESCRIPTION

This section specifies the water treatment plant's nitrate and sodium hypochlorite (chlorine) treatment systems.

1.02 SUBMITTALS

Submit in accordance with Section 01 33 00 Submittals the following for the chemical treatment equipment and all associated equipment:

A. Chlorine system
   1. layouts with accessories
   2. Wiring and connection diagrams indicating all electrical connections for the chemical metering pump and control panel.
   3. Piping connections, locations, sizes, and details for all fittings
   4. Proposed on-site installation, testing, and start-up procedures.
   5. Catalog information and materials list
   6. Operation and maintenance information
   7. Equipment anchoring details.

B. Nitrate Treatment System
   1. Proposed on-site installation, testing, and start-up procedures.
   2. Catalog information and materials list
   3. Operation and maintenance information, by Datumpin that is not a part of this contract
   4. Equipment anchoring details, Stamped by a Professional Civil Engineer Registered in the state of California

1.03 ENVIRONMENTAL CONDITIONS

The equipment will be located inside a ventilated operations building that is a potentially corrosive environment due to the off gases of sodium hypochlorite.

1.04 WARRANTY

The equipment manufacturer and supplier shall warrant the units against defects in materials and workmanship for a period of two years from the date of project acceptance.

1.05 RELATED SECTIONS

A. 26 09 17 TEC and Facility Control

PART 2 – PRODUCTS

2.01 ACCEPTABLE PRODUCTS

Figure 1 is a material list of the equipment to be provided as part of this project. All treatment equipment that comes in contact with the potable water must be NSF 61 approved/certified.

FIGURE 1 - MATERIAL LIST

TAG	Description	Function	Manufactuer	Model - Part Number
FM	Flow meter 0 to 40gpm (4-20mA / 24V DC)	Raw water total flow monitoring	Rosemount	8750WDMT - 2A1FTHA010CA1M4G2D
SP	Sample Port 1/4 inch isolation valves	Water Sample Valve	ASAHI	1076002
SP	MT X Hose Labcock Valve End Connector for Type-21 Valves	Water Sample Valve	LABCOCK	
FIL	1 in, NPT, 10 gpm, 100 psi Max Pressure, 13 3/4 in Overall Ht, Blue	Cartridge Water Filter 0 to 10gpm	Culligan	HD-950A
MV	1 in. EPDM Soc/Thr PVC Type-21 Ball Valve	Manual Isolation Valve	ASAHI	
MV	1 in. EPDM Soc/Thr PVC Type-21 Ball Valve	Manual Isolation Valve	ASAHI	
FIL	1-1/4 in. Threaded Clear Y Strainer	Resin Trap (Y Strainer)	GF	192-306-599
FIL	1-1/4 in. Threaded Clear Y Strainer Filter	Resin Trap (Y Strainer)	GF	161-305-586
AV	1 in. Socket PVC Electromni Ball Valve	Automated Isolation Valve	ASAHI	
IX	Stainless Steel column assembly 10" * 54" (2cuft volume)	ST ST fabrication plus Orthos internals		
IX	Resin	Ion exchange resin (non-regenerable)	Purolite	PGW6002EBF - sulfate/ bicarbonate/chloride form
NRV	1 in. EPDM Soc/Thr PVC Ball Check Valve	Non-return Check Valve	ASAHI	
FCV	Flow Control Valve 0 to 10gpm	Blend treated and bypass water	Flow-Tek	1"-F-15
FCV	Flow Control Valve Electrical Actuator	Blend treated and bypass water		
DPT	Differential Pressure Sensor 0 to 45psi	Differential Pressure Transducer 0 to 15psi	Endress & H	PMD55
NRV	1 in. EPDM Soc/Thr PVC Ball Check Valve	Non-return Check Valve	ASAHI	
FM	Flow meter 0 to 40gpm (4-20mA / 24V DC)	Treatment bypass to blend mixer flow	Rosemount	8750WDMT - 2A1FTHA010CA1M4G2D
MIX	1 inch inline static flow mixer	Bypass / Treated Water Mixer	Westfall	Model 2800
ROT	Flow Rotameter 7 GPH 0.25" FNPT	Rotameter 0 to 7 GPH	King	7530-3-3-2-2C-02
NAIT	Nitrate analytical instrument	Nitrate monitor	HACH	Nitratax Clear SC - LX404.99.00552 and LX404.99.50002
FS	Nitrate sample flow switch 1 GPH	Nitrate monitor sample flow	ProPulse	3000-1-JET 1
uS	Conductivity Probe 0 to 5000uS range	Blended water conductivity monitor	Thermo-Scie	5c-2-1-B-1-30
uSAIT	Conductivity analytical instrument	Blended water conductivity monitor	Thermo-Scie	AP4XXXJ
CAIT	Chlorine analytical instrument	Residual chlorine monitor	HACH	CL17sc - 8572400 and LX404.99.00502
CAIT	Chlorine monitor reagents - pressure regulator installation kit	Residual chlorine monitor	HACH	8573000
CAIT	Chlorine analyser isolation valve 316ss Viton NO	Residual chlorine monitor isolation valve	ASCO	8262R152-V-120AC
MV	Manual valve (Chlorination) 0.5" PVC/Viton	Chlorination service isolation valve	ASAHI	1605005
NRV	Non-Return Valve (Chlorination) 0.5" PVC/Viton	Chlorination delivery non-return valve	GF	192.304.031
PRV	Pressure Relief Valve PVC-PTFE/VITON	Chlorination pressure protection	Griffco	PRM-050P-TV
CCC	Chemical calibration column 200ml capacity	Chlorination chemical calibration	Griffco	CC-200-S
INJ	Chemical injection quill	Chlorination injection pipeline set	Griffco	CS-CP-C050-CF
BPV	Chlorination Back Pressure Valve PTFE/Viton diaphargm	Chlorination pressure control	Griffco	BPM-050P-TV
PMP	Diaphargm metering pump 0 to 30 GPD	Chlorination Metering Pump	Grundfos	97722420

2.02 CHLORINE FEED SYSTEM

A. Chlorine Metering Pump:
A chlorine metering pump will be solenoid diaphragm metering pump. The pump will be designed to dose between 0.9 ppm to 1.5 ppm chlorine at a flow range of between 1 to 10 gpm. The Pump will operate at a fixed speed with the operator adjusting the pumps stroke to change the dosage rate.

B. Control Panel
Custom engineered control panel supplied by the manufacturer of the chemical pumps with 120V controls for the following:

1. Hand/Off Operation – in hand the pump shall run as configured on the pump, in off the pump shall not run, in auto the pump shall run whenever the well operates as signaled by the TEC.
2. Terminals interconnect the pump to the control panel with waterproof, quick connect style connectors.
3. NEMA 4X non-metallic enclosure
4. Dry contacts for the TEC to monitor auto status of the pump.
5. Provisions to receive start signals from the TEC for the pump, start signals shall only affect pump operation when the HOA is in auto, and when the start signal is present the pump shall flow at a rate set by the operator adjusting the pump's stroke and when the signal is not present the pump shall not run.
6. Fused switch inside the enclosure to disconnect power locally.

C. Chlorine Residual Analyzer

1. A reagent free residual analyzer will be installed in the Treatment Building. The analyzer will continually monitor the free chlorine residual at the sample locations shown in the drawings. The residual analyzer will be wired to the Water Plant's TEC.
   The analyzer shall include the following:
   a. ½-inch corporation stop
   b. ½-inch PVC water sample line from sample point located between the nitrate treatment system and the potable water tank to the analyzer
   c. ½-inch PVC drain line from analyzer to site drainage
2. The analyzer shall provide a 4-20 mA output signal to the TEC for remote monitoring of the chlorine residual.

D. Chlorine Storage Container:

1. Standard 1-gallon NSF chlorine containers will be provided by the chemical supplier and connected directly to the chemical metering pump.
2. An adapter shall be used to connect the 1-gallon storage container to the chemical metering pump. The adapter shall also include a vent to allow air to enter the container when chlorine is being drawn out by the chemical metering pump.

E. Eye Wash
   1. Provide a single use eyewash station that includes two 32 oz bottles of buffered saline solution
   2. Acceptable Manufacturers
      a. Honeywell
      b. Seton
      c. Medi-first
      d. Or an approved equivalent

PART 3 – EXECUTION

3.01 CHLORINE SYSTEM

The contractor shall connect the chlorine container to the chlorine feed system with ¼-inch tubing. For the chemical feed pump discharge, a ¼ -inch tubing will connect the chemical metering pump to the waterline. The chlorine injection point will be located just prior to the treatment system and inside of the operations building. The injection point will include a check valve and corporation valve.
The chemical feed equipment shall be aligned, connected, and installed in accordance with manufacturer's written recommendations and located as shown on the drawings.

3.02 NITRATE TREATMENT SYSTEM

The nitrate treatment system shall be installed as shown in the drawings. At startup, the Contractor shall provide enough resin for one replacement of all the columns (4 columns).

3.02 TESTING

After completion of installation, the treatment equipment shall be tested to demonstrate compliance with operating requirements as specified.

3.03 TRAINING

A. A minimum of four hours of training shall be provided by the chemical metering pump manufacturer.

B. Treatment system training will be provided by Datumpin that is not a part of this contract.

END OF SECTION