NO. _____

Contract Documents and Construction Specifications for Place Road and San Luis Street Storm Drain and Detention Basin

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City of Los Banos

VOLUME 1 of 2

April 2011

AECOM

1120 West "I" Street, Suite C Los Banos, California 93635

Contract Documents and Construction Specifications for Place Road and San Luis Street Storm Drain and Detention Basin

City of Los Banos

60188586
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CITY OF LOS BANOS
PLACE ROAD AND SAN LUIS STREET
STORM DRAIN AND DETENTION BASIN

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PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 00 11 13 (NTS: DELETE BELOW AND USE "NOTICE OF PUBLIC HEARING AND LETTING" FOR PUBLIC FUNDED IOWA PROJECTS.)

INVITATION TO BID

FOR CONSTRUCTION OF
PLACE ROAD AND SAN LUIS STREET
STORM DRAIN AND DETENTION BASIN

OWNER: CITY OF LOS BANOS, CALIFORNIA

TIME AND PLACE OF BID OPENING: NOTICE IS HEREBY GIVEN that the CITY invites and will receive sealed proposals (bids) up to the hour of 2:00 p.m. (Pacific Daylight Savings Time) on the 2nd day of June, 2011 for the furnishing to said CITY of all transportation, labor, materials, tools, equipment, services, permits, utilities, and other items necessary to construct said work. At said time, said proposals will be publicly opened and read aloud in the City of Los Banos Council Chambers by the office of the City Clerk,

520 "J" Street
Los Banos, California 93635

Bids shall be submitted only on forms provided in the Contract Documents. Bids shall be in the hands of the City Clerk of the City of Los Banos, 520 J Street, Los Banos, California, 93635 on or before the hour of 2:00 p.m. on June 2, 2011. No late bids will be accepted and will be returned unopened. No oral, telegraphic, electronic, facsimile, or telephone submittals or modifications will be considered unless specified.

Each bid must be submitted in a sealed envelope and addressed to the OWNER at 520 J Street, Los Banos, California 93635. Each sealed envelope containing a bid must be plainly marked on the outside as "**Place Road and San Luis Street Storm Drain and Detention Basin**", and the envelope should also bear on the outside, the name of the BIDDER, and his address. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the OWNER at 520 J Street, Los Banos, California 93635, and also state "**Place Road and San Luis Street Storm Drain and Detention Basin; Attention City Clerk**".

The major work consists of furnishing and installing approximately 1,075 l.f. of 48-inch reinforced concrete pipe and 1,730 l.f. of 48-inch cast-in-place storm drain pipeline with pump station, construction of a 20 acre-foot detention basin located in an existing park, relocation or replacement of park amenities, landscaping and furnishing and installing irrigation facilities. The time for completion is one hundred-twenty (120) consecutive calendar days after the date of contract award.

Bids shall conform to and be responsive to the Contract Documents for the work.

BIDDING DOCUMENTS: The Contract Documents consisting of Notice Inviting Sealed Proposals (Bids), Bid Form, Agreement, Bid Bond, Performance Bond, Payment Bond,

Contractor's Certificate Regarding Workers' Compensation, Certificate of Insurance (Workers' Compensation and Employers' Liability), Insurance Endorsement (Workers' Compensation and Employers' Liability), Certificate of Insurance (Liability), Insurance Endorsement (Liability), General Provisions, Special Provisions, Standard Specifications, Drawings, Plans and Addenda may be examined at the Public Works Department located at 411 Madison Avenue, Los Banos, California 93635 or on the internet at www.losbanos.org.

Copies of the Contract Documents may be obtained by downloading from the internet without charge at www.losbanos.org.

A pre-bid walk is scheduled for 2:00 pm on Thursday, May 19, 2011 at Talbott Park at the intersection of San Luis Street and Miller Lane in Los Banos. The pre-bid walk is not mandatory.

Questions regarding this project or bid package shall be directed to Gary Rogers, Project Engineer at gary.rogers@aecom.com. All questions must be submitted in writing by 3:00 pm on Wednesday, May 25, 2011.

Each bid shall be submitted on a form furnished as part of the Contract Documents and must be accompanied by cash, a cashier's check, a certified check, or a Bidder's bond executed by an admitted surety insurer, or substitute pursuant to Section 995.710 of the Code of Civil Procedure, in an amount not less than 10% of the amount of the bid, made payable to the order of or for the benefit of the CITY. The security of unsuccessful Bidders will be returned by the CITY no later than sixty (60) days following the date of award. Each bid shall be sealed and delivered to the CITY at the location designated in this notice for the opening of proposals at or before the time in this notice provided. The check or bond shall be given as security that the Bidder will enter into a contract with the CITY and furnish the required payment and performance bonds, or substitutes in lieu thereof, and certificates of insurance and endorsements if awarded the work, and will be declared forfeited if the Bidder refuses to timely enter into said contract or furnish the required bonds or certificates of insurance and endorsements if the Bidder's bid is accepted.

This project is subject to prevailing wage rates.

Pursuant to Public Contract Code Section 22300, equivalent securities may be substituted for monies withheld to ensure performance of the contract. The CITY reserves the right to solely determine the adequacy of the securities being proposed by the CONTRACTOR and the value of those securities. The CITY shall also be entitled to charge an administrative fee, as determined by CITY in its sole discretion, for substituting equivalent securities for retention amounts. The CITY'S decisions with respect to the administration of the provisions of Section 22300 shall be final and shall include, but not be limited to, determinations of what securities are equivalent, the value of the securities, the negotiability of the securities, the costs of administration and the determination of whether or not the administration should be accomplished by an independent agency or by the CITY. The CITY shall be entitled, at any time, to request the deposit of additional securities of a value designated by CITY, in CITY'S sole discretion, to satisfy this requirement. If the CITY does not receive satisfactory securities within twelve (12) consecutive days of the date of the written request, CITY shall be entitled to withhold amounts due CONTRACTOR until securities of satisfactory value to CITY have been received.

The CONTRACTOR'S license classification(s) required for this project are as follows:

Class A

These classifications are provided for information purposes only. The Engineer does not warrant that all classifications required for the project are listed.

It is the CITY'S intent that "plans," as used in Public Contract Code Section 3300, is defined as the construction contract documents, which include both the drawings and the specifications.

The CITY reserves the right to select the schedule(s) under which the bids are to be compared and contract(s) awarded, to reject any and all bids, and to waive any and all irregularities in any bid.

The Bidder is required to sign the attached Noncollusion Affidavit and submit it with his bid.

BID REJECTION/ACCEPTANCE: OWNER reserves the right to reject any and all Bids, waive informalities in bidding or to accept the Bid or Bids, which best serve the interests of OWNER.

BID WITHDRAWAL: No Bid shall be withdrawn for a period of **[30]** days after the opening of Bids without consent of OWNER.

Published by authority of the City of Los Banos, California.

By:

END OF SECTION

SECTION 00 41 13

BID

PROPOSAL TO: CITY OF LOS BANOS

FOR THE CONSTRUCTION OF: PLACE ROAD AND SAN LUIS STREET
STORM DRAIN AND DETENTION BASIN

PROJECT NUMBER**:** 60188586

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

City of Los Banos
Attn: City Clerk
520 "J" Street
Los Banos, California 93635

(Hereinafter called Owner)

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the **Official Notice to Bidders** and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for the Bid withdrawal time period specified in the Official Notice to Bidders or Notice of Public Hearing and Letting after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

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

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in SC-4.02 as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in SC-4.06 as containing reliable "technical data."

E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs.

F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

A. Unit Prices shall be computed in accordance with Paragraph 11.03.B of the General Conditions.

UNIT PRICE SCHEDULE

Item No.	Description	Qty	Unit Price	Total Amount
1	Mobilization and Demobilization	LUMP SUM		
2	Sheeting, Shoring and Bracing	LUMP SUM		
3	Storm Water Pollution Prevention Plan and Dust Control	LUMP SUM		

4	Demolition	LUMP SUM		
5	Earthwork	LUMP SUM		
6	48-Inch Cast-in-Place Pipe	1,730 LF		
7	48-Inch Reinforced Concrete Pipe	1,120 LF		
8	30-Inch Reinforced Concrete Pipe	LUMP SUM		
9	10-Inch PVC Pipe	1,145 LF		
10	Discharge Piping	LUMP SUM		
11	48-Inch Diameter CIPCP Manholes	3 EA		
12	48-Inch Diameter Manholes	1 EA		
13	72-Inch Diameter Manholes	6 EA		
14	Catch Basins	6 EA		
15	Reinforced Concrete Inlet-Outlet Structure	LUMP SUM		
16	Reinforced Concrete Storm Drain Pump Structure	LUMP SUM		
17	Submersible Pumps	LUMP SUM		
18	48-Inch Slide Gate with Operator	1 EA		
19	Electrical Work	LUMP SUM		
20	Aggregate Base	980 TON		
21	Asphalt Concrete	410 TON		
22	8-Foot Wide Concrete Walkway	20,335 SF		
23	Fire Hydrant Removal and Reinstallation	LUMP SUM		
24	Landscape Planting	LUMP SUM		
25	Landscape Irrigation	LUMP SUM		
26	Construction of Playground Area	LUMP SUM		
27	Construction of Horseshoe Pits	LUMP SUM		

Schedule of Work Items Total: _____

BID PRICE (Summation of Bid Items) _____ Dollars
(dollars written)

B. Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security in the form of a bid bond in the amount of 10 percent of the bid;

B. List of Proposed Subcontractors;

C. List of Proposed Suppliers;

D. Disclosure of Ownership form (attached) .

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid is submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____
Type (General Business, Professional, Service, Limited Liability):_____

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____
(CORPORATE SEAL)

Attest _____

Date of Qualification to do business in California is ____/____/____.

A Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of first joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____(SEAL)

By: _____
(Signature of first joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business Address _____

_____

Phone No. _____ Fax No. _____

E-mail _____ _____

SUBMITTED on _____, 20____.

State Contractor License No. _____.

Sworn and subscribed to before me this

_____ day of _____ , 20___ .

_____

Notary or other officer authorized to administer oaths

My commission expires: _____ , 20___ .

(Bidders shall not add any conditions or qualifying statements to this Bid as otherwise the Bid may be declared irregular as being not responsive to the advertisement. BIDDERS SHALL USE THIS BID FORM IN SUBMITTING THEIR BIDS.)

END OF SECTION

SECTION 00 43 13

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:
CITY OF LOS BANOS
520 "J" Street
Los Banos, California 93635

BID
Bid Due Date:
Description *(Project Name and Include Location)*:
Place Road and San Luis Street Storm Drain and Detention Basin

BOND
Bond Number:
Date *(Not earlier than Bid due date)*:
Penal sum _____ $ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

SECTION 00 52 13

AGREEMENT

THIS AGREEMENT is by and between The City of Los Banos ("Owner") and _____ ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

The major work consists of furnishing and installing approximately 2,800 l.f. of 48-inch cast-in-place storm drain pipeline with pumping station, construction of a 20 acre-foot detention basin located in an existing park, relocation or replacement of park amenities, landscaping and furnishing and installing irrigation facilities.

ARTICLE 2 – THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Place Road and San Luis Street Storm Drain and Detention Basin for the City of Los Banos, California

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by AECOM (Engineer), which is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

3.01 The Project has been designed by AECOM (Engineer) who will issue clarifications and interpretations in accordance with Paragraph 9.08 of the General Conditions.

3.02 Owner will provide a site representative who is to act as Owner's representative, assume duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents except as described in Paragraph 3.01.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Days to Achieve Milestones and Final Payment*

A. The Work within street right-of-ways and the Junior High School driveway and parking lot will be completed prior to school beginning (August 9, 2011), and all work will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 120 days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $1,000 for each day that expires after the time specified in Paragraph 4.02 above for Milestone Work until the Work is complete. If Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner $1,000 for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

B. Failure to reach the Milestone of completing all Work within street right-of-ways and the Junior High School driveway and parking lot prior to school beginning on August 9, 2011 will result in the Contractor paying the Owner liquidated damages for each day that expires after the Milestone date until the Milestone Work is completed.

4.04 Permitting Contractor or Surety to continue and finish the Work or any part of the Work after the times specified for completion, or after the date to which the times for completion may have been extended, shall in no way operate as a waiver on the part of Owner of its rights under the Contract.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

The Bid prices for Unit Price Work set forth as of the Effective Date of the Agreement are based on estimated quantities. As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions.

A. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the last day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

1. Progress payments will be made in an amount equal to 90% of the Work completed but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 – CONTRACTOR'S REPRESENTATIONS

7.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified in Paragraph SC-4.02 of the Supplementary Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous

Environmental Conditions, if any, at the Site that have been identified in Paragraph SC-4.06 of the Supplementary Conditions as containing reliable "technical data."

E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in Paragraph 8.01.E above, Contractor does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

J. In connection with the performance of Work under this Contract, Contractor agrees not to discriminate against any employee or applicant for employment because of age, race, religion, color, handicap, sex, physical condition or developmental disability. This provision shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training including apprenticeship. Contractor further agrees to take affirmative action to ensure equal employment opportunities for persons with disabilities. Contractor agrees to post in conspicuous places, available for employees and applicants for employment, notices setting forth the provisions of the nondiscrimination clause. Form of notice is included in the Project Forms.

ARTICLE 8 – CONTRACT DOCUMENTS

8.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 00 52 13-1 to 00 52 13-8, inclusive).

2. Performance bond (pages 00 61 13-1 to 00 61 13-3, inclusive).

3. Payment bond (pages 00 61 16-1 to 00 61 16-3, inclusive).

4. General Conditions (pages 00 72 00-1 to 00 72 00-62, inclusive).

5. Supplementary Conditions (pages 00 73 02-1 to 00 73 02-02 01 31, inclusive).

6. Specifications as listed in the table of contents of the Contract Documents.

7. Drawings consisting of the Drawings listed on the index sheet in Volume 2 of the Contract Documents.

8. Addenda (numbers _____ to _____, inclusive).

9. Exhibits to this Agreement (enumerated as follows):

    a. Contractor's Bid (pages 00 41 13-1 to 00 41 13-7, inclusive).

10. Wage Rates.

11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

    a. Notice to Proceed.

    b. Work Change Directives.

    c. Change Orders.

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 9 – MISCELLANEOUS

9.01 *Terms*

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

9.02 *Assignment of Contract*

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the

contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.03 *Successors and Assigns*

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

9.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

9.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

9.06 *Other Provisions*

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____ (which is the Effective Date of the Agreement).

OWNER:	CONTRACTOR
By:	By:
Title:	Title:
	(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
[**CORPORATE SEAL**]	
Attest:	Attest:
Title:	Title:
Address for giving notices:	Address for giving notices:
	License No.:
(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)	

END OF SECTION

SECTION 00 61 13

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):
CITY OF LOS BANOS
520 "J" Street
Los Banos, California93635

CONTRACT
Effective Date of Agreement:
Amount:
Description (*Name and Location*): Place Road and San Luis Street Storm Drain and Detention Basin

BOND
Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ (Seal)
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature (Attach Power of Attorney)

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.

2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
   - 2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
   - 2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
   - 2.3 Owner has agreed to pay the Balance of the Contract Price to:
     1. Surety in accordance with the terms of the Contract; or
     2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.

3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:

   - 3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
   - 3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
   - 3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
   - 3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
     1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
     2. Deny liability in whole or in part and notify Owner citing reasons therefor.

4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and
5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

6. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

7. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

8. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located, and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

9. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

10. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

11. Definitions.

11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
11.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
11.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
11.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address and Telephone*) Surety Agency or Broker: Owner's Representative (*Engineer or other party*):

SECTION 00 61 16

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):
CITY OF LOS BANOS
520 "J" Street, Los Banos, California 93635

CONTRACT
Effective Date of Agreement:
Amount:
Description *(Name and Location)*: Place Road and San Luis Street Storm Drain and Detention Basin

BOND
Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ (Seal)
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature (Attach Power of Attorney)

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2 Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. RESERVED

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders, and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. Definitions

15.1 Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address, and Telephone*) Surety Agency or Broker: Owner's Representative (*Engineer or other*):

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

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and

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*—The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

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12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*—See Paragraph 11.01 for definition.

17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*—The individual or entity named as such in the Agreement.

20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*—Sections of Division 1 of the Specifications.

22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.

23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

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27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*—Polychlorinated biphenyls.

31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.

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

38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

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40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.

46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.

47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.

48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

49. *Unit Price Work*—Work to be paid for on the basis of unit prices.

50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

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addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

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E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

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2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on

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Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

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3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation , (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

   a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or

   b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

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1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or

2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

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ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

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4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

   a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

   b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

   a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

   b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and

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contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all such information and data;

b. locating all Underground Facilities shown or indicated in the Contract Documents;

c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the

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consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

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C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

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H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also

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meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.

E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

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a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

6. include completed operations coverage:

a. Such insurance shall remain in effect for two years after final payment.

b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

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5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors,

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members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:

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1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's

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interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

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B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

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2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and

3) it has a proven record of performance and availability of responsive service.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,

b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

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c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified, and

b) available engineering, sales, maintenance, repair, and replacement services; and

4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be

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required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner,

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Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

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6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought

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by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and

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shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is

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required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

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2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

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6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

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B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

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E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

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B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.

C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

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8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or

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continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

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9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise

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or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

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10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data

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shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part;

2. approve the Claim; or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

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1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of

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said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not

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limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances:*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to

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the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

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C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

   a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

   b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

   c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

   d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

   e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

   f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or

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neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

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13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

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C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

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1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

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13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an

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Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or

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involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

   c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

   d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

   e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

   a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

   b. the Contract Price has been reduced by Change Orders;

   c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

   d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

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D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

   a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

   b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

   c. there are other items entitling Owner to a set-off against the amount recommended; or

   d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before

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final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

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4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

   b. consent of the surety, if any, to final payment;

   c. a list of all Claims against Owner that Contractor believes are unsettled; and

   d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying

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documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due:*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, 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 to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, 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 Contractor to Engineer with the Application for 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.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

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ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's repeated disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when

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so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days

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to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or

3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

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1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SPECIAL PROVISIONS

SECTION 00 73 02

SUPPLEMENTARY CONDITIONS

ARTICLE 1. DEFINITIONS

SC-1.01

Defined Terms:

Delete Subparagraph 1.01.A.8 in its entirety and insert the following in its place:

8. *Bidding Requirements* - The Official Notice, Notice of Public Hearing, Advertisement or Invitation to Bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid form with any supplements.

SC-1.01

Defined Terms:

Insert the following language before the word “Agreement” in the first sentence of the definition 1.01A.12 entitled "Contract Documents" in the General Conditions:

Invitation to Bid, Instructions to Bidders,

SC-1.01

Defined Terms:

Add the following to the end of Paragraph 1.01A.19:

Wherever in the Contract Documents the name Boyle, CTE, Earth Tech, Metcalf & Eddy, or TCB appears, it shall also mean to include AECOM-Water.

SC-1.01

Defined Terms:

Add the following new paragraph immediately after paragraph 1.01.A.31:

33A. Products: Means materials and equipment that Contractor furnishes and provides, other than labor and services.

ARTICLE 2. PRELIMINARY MATTERS

SC-2.01

Delivery of Bonds and Evidence of Insurance:

Delete Paragraph 2.01.A in its entirety.

SC-2.02

Copies of Documents:

Amend the first sentence of Paragraph 2.02.A. by deleting the number "10" and inserting the number "3 ".

Delete Paragraph 2.02.A in its entirety and insert the following in its place:

A. Owner shall furnish Contractor up to 3 printed or hard copies of Drawings, and 3 printed or hard copies of the Contract Documents. Additional printed copies will be furnished upon request at the cost of reproduction.

SC-2.01

Copies of Documents:

Delete paragraph 2.01B of the General Conditions in its entirety and insert the following in its place:

C. Before any work at the site is started, Contractor shall deliver to Owner, with a copy to Engineer, certificates of insurance (and other evidence of insurance requested by Owner) which Contractor is required to purchase and maintain in accordance with the requirements of Article 5.

    1. Contractor shall include and identify on the certificate of insurance, indemnification as required by Article 6.20.

    2. Engineer shall furnish to the Contractor, the form for Certificate of Insurance to be completed.

SC-2.03

Commencement of Contract Times; Notice to Proceed:

Delete paragraph 2.03A of the General Conditions in its entirety and insert the following in its place to read as follows:

A. The Contract Time will commence to run on the tenth day following the effective date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed.

SC-2.05

Before Starting Construction:

Amend the first sentence of Paragraph 2.05.A.3. by inserting the words "except for Unit Price Work" at the beginning of the sentence.

SC-2.06

Preconstruction Conference:

Add the following new paragraphs immediately after Paragraph 2.06.B.:

C. The conference will be held at a location selected by Owner and shall be attended by:

1. Contractor's Office Representative.

2. Contractor's Resident Superintendent.

3. Contractor's Safety Representative.

4. Contractor's "hands on" individual designated by Contractor to process and submit Shop Drawings and other submittals.

5. Subcontractors' or Suppliers' representatives whom Contractor may invite or Engineer may request.

6. Owner's Representatives.

7. Engineer's Representatives.

8. Local Utilities Representatives.

D. A suggested format would include, but is not limited to:

1. Project safety.

2. Presentation of the preliminary Progress Schedule and preliminary Schedule of Submittals prepared in accordance the General Requirements.

3. Liquidated damages.

4. Procedures for handling submittals such as Shop Drawings, product data, and other submittals.

5. Direction of correspondence, and coordinating responsibility between Contractors, if any.

6. Project meetings.

7. Equal opportunity and funding agency requirements.

8. Laboratory testing of material requirements.

9. Procedures for inventory of material and equipment stored on-Site or off-Site if off-Site storage is authorized.

10. Review Schedule of Values, application for progress payment, and progress payment procedures.

11. Work Change Directive and Change Order procedures.

12. Posting of Project signage.

13. Contractor's proposed Erosion Control Plan.

ARTICLE 3. CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

SC-3.01

Intent:

Add a new paragraph immediately after paragraph 3.01A of the General Conditions which is to read as follows:

1. Each and every provision of law and clause required by law to be inserted in the Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though they were included herein. If through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

2. Sections of Division 1 - General Requirements govern the execution of the work of all sections of the specifications.

SC-3.01

Intent:

Add the following new paragraph immediately after paragraph 3.01.C:

D. Sections of Division 1 - General Requirements govern the execution of the work of all sections of the specifications.

SC-3.03

Reporting and Resolving Discrepancies

Add the following language as Paragraph 3.03.A.4.:

4. A request for written interpretation or clarification of the Contract Documents shall be submitted on the Contract Clarification/Interpretation Request form provided in the Project Forms section.

ARTICLE 4. AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

SC-4.01

Availability of Lands:

Add a new paragraph immediately after paragraph 4.01C of the General Conditions which is to read as follows:

D. If all lands and rights-of-way are not obtained as herein contemplated before construction begins, Contractor shall begin the Work upon such land and rights-of-way as Owner has previously acquired and no claim for damages whatsoever will be allowed by reason of the delay in obtaining the remaining lands and rights-of-way. Should Owner be prevented or enjoined from proceeding with the Work, or from authorizing its prosecution, either before or after the commencement, by reason of any litigation, or by reason of its inability to procure any lands or rights-of-way for the Work, Contractor shall not be entitled to make or assert claim for damage by reason of said delay, or to withdraw from the Agreement except by consent of Owner. Time for completion of the Work will be extended as provided in Article 12, to such time as Owner determines will compensate for the time lost by such delay.

SC-4.02

Subsurface and Physical Conditions:

Delete paragraph 4.02A of the General Conditions in its entirety and insert the following in its place:

A. Reports and Drawings: In the preparation of Drawings and Specifications, Engineer or Engineer's Consultants have relied upon:

   1. The following report of explorations and tests of subsurface conditions at the site of the work:

      Report dated May 4, 2011 prepared by Moore Twining Associates, Inc., entitled: Geotechnical Engineering Investigation for Approximate ½ Mile Long Underground Storm Drain Pipeline and Detention Basin Pacheco Boulevard at Place Road to Talbott Park Los Banos, California.

SC-4.04

Underground Facilities:

Delete the following words from line 5 of paragraph 4.04B.2 of the General Conditions:

"or not shown or indicated with reasonable accuracy"

SC-4.05

Reference Points:

Delete Paragraph 4.05A in its entirety and insert the following in its place:

A. The Contractor shall provide all construction staking for the project.

B. Engineer may check the lines, elevations, reference marks, batter boards, etc., set by Contractor, and Contractor shall correct any errors disclosed by such check. Such a check shall not be considered as approval of Contractor's work and shall not relieve Contractor of the responsibility for accurate and satisfactory construction and completion of the entire Work. Contractor shall furnish personnel to assist Engineer in checking lines and grades.

SC-4.06

Hazardous Environmental Conditions at Site:

Delete Paragraphs 4.06.A. and 4.06.B. in their entirety and insert the following in their place:

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

B. Not used.

ARTICLE 5. BONDS AND INSURANCE

SC-5.01

Performance, Payment and Other Bonds:

Amend paragraph 5.01.A to require bond values as follows:

A. Furnish a **100** percent Performance Bond.

Furnish a **100** percent Payment Bond.

SC-5.01

Performance, Payment, and Other Bonds:

Add the following new subparagraphs immediately after Paragraph 5.01.A.:

1. Maintenance Bond:

   a. Before Contractor shall be entitled to receive final payment for Work, Contractor shall provide Owner with a Maintenance Bond in an amount equal to 10% of the Contract Price. This bond shall be in addition to the Performance Bond.

   b. The bond shall be written to comply with the provisions of Paragraph 5.01 of the General Conditions. If Contractor fails to comply within 10 days of Owner's written instructions, Owner may proceed with correcting the defective Work, and the cost of such corrections as described in Paragraph 13.07.A will be recovered from Contractor or from the surety by action brought in any court of competent jurisdiction, but may be brought to a District Court in Iowa.

   c. Contractor shall give notice to Owner by registered mail not more than 4 months and not less than 3 months prior to the expiration of the time established in Paragraph 13.07.A.

Add the following language at the end of Paragraph 5.01.C:

In addition, no further progress payments under the Agreement will be made by Owner until Contractor complies with the provisions of this paragraph.

SC-5.02

Licensed Sureties and Insurers:

Add the following language at the end of Paragraph 5.02.A.:

Insurance is to be placed with insurers having a current A.M. Best's rating of no less than A-VII or equivalent. Insurances is to be provided by carriers that are admitted (licensed) in the State of California.

SC-5.03

Certificates of Insurance:

Delete paragraph 5.03B of the General Conditions.

SC-5.04

Contractor's Insurance:

Delete Section 5.04 of the General Conditions in its entirety and insert the following in its place:

The Contractor shall not commence Work under this Contract until he has obtained all the insurance required under this Section and such insurance has been approved by the Owner, nor shall the Contractor allow any Subcontractor to commence work on his subcontract until the insurance required of the Subcontractor has been so obtained and approved. All insurance required under this Section shall be maintained at the expense of the Contractor continuously during the life of the Contract up to the date of acceptance of the Work by the Owner's governing body.

A. Commercial General Liability and Automobile Liability Insurance – The Contractor shall provide and maintain the following commercial general liability and automobile liability insurance:

    1. Coverage – Coverage for commercial general liability and automobile liability insurance shall be at least as broad as the following:

        a. Insurance Services Office Commercial General Liability coverage (Occurrence Form CG 0001).

        b. Insurance Service Office Form Number CA 0001 (ed. 1/87) covering Automobile Liability, Code 1 (any auto).

    2. Limits – The Contractor shall maintain limits no less than the following:

a. General Liability – Two million dollars ($2,000,000) per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to the project/location (with the ISO CG 2501 or insurer's equivalent endorsement provided to the Owner) or the general aggregate limit shall be twice the required occurrence limit.

b. Automobile Liability – One million dollars ($1,000,000) per accident for bodily injury and property damage combine single limit.

3. Required Provisions – The general liability and automobile liability policies are to contain, to be endorsed to contain the following provisions:

   a. The Owner and the Engineer and their directors, officers, employees, agents and volunteers are to be covered as insureds as respects: liability arising out of activities performed by or on behalf of the Contractors, products and completed operations of the Contractor, premises owned, occupied or used by the Contractor, or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the Owner and the Engineer and their directors, officers, employees, agents, and volunteers.

   b. For any claims related to this project, the Contractor's insurance shall be primary insurance as respects the Owner and the Engineer and their directors, officers, employees, agents and volunteers. Any insurance, pooled coverage or self-insurance maintained by the Owner and the Engineer and their directors, officers, employees, agents and volunteers shall not contribute to it.

   c. Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the Owner and the Engineer and their directors, officers, employees, agents and volunteers.

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

   e. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the Owner.

4. Deductibles and Self-Insured Retentions – Any deductible or self-insured retention must be declared to and approved by the Owner. At the option of the Owner, either the insurer shall reduce or eliminate such deductibles or self-insured retentions.

5. Acceptability of Insurers – Insurance is to be placed with insurers having a current A.M. Best's rating of no less than A-VII or equivalent. Insurance is to be provided by carriers that are admitted (licensed) in the State of California.

B. Workers' Compensation and Employer's Liability Insurance – The Contractor and all Subcontractors shall cover or insure under the applicable laws relating to workers' compensation insurance, all of their employees working on or about the construction site, regardless of whether such coverage or insurance is mandatory or merely elective under law, and the Contractor shall defend, protect and save harmless the Owner and the Engineer and their directors, officers, employees, agents and volunteers from and against all claims, suits, and actions arising from any failure of the Contractor or any Subcontractor to maintain such insurance. Before beginning work, Contractor shall furnish to the Owner satisfactory proof that he has taken out for the period covered by the work under this contract, full compensation insurance for all persons employed directly by him or through Subcontractors in carrying out the work contemplated under this contract, all in accordance with the "Workers' Compensation and Insurance Act," Division IV of the Labor Code of the State of California and any Acts amendatory thereof.

The Contractor shall provide employer's liability insurance in the amount of, at least, one million dollars ($1,000,000) per accident for bodily injury and disease.

The Contractor shall provide the Owner with a certificate of Workers' Compensation and Employers Liability insurance coverage.

In signing the Contract Agreement, Contractor makes the following certification required by Section 1861 of the Labor Code: "I am aware of the provisions of Section 3700 of the Labor Code which requires each employer to be insured against liability for workmen's compensation or to undertake self insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract."

C. Evidences and Cancellation of Insurance – Prior to execution of the contract, the Contractor shall file with the Owner and the Engineer evidence of insurance from an insurer or insurers certifying to the coverage of all insurance required herein. Such evidence shall include original copies of the ISP CG 2010 (or insurer's equivalent) signed by the insurer's representative and certificate of insurance (Accord Form 25-S or equivalent). All evidence of insurance shall be certified by a properly authorized officer, agent or qualified representative of the insurer and shall certify the names of the insured, any additional primary insurers, where appropriate, the type and amount of the insurance, the location and operations to which the insurance applies, the expiration date, and that the insurer will give by certified mail, written notice to the Owner at least thirty (30) days prior to the effective date of any cancellation, lapse or material change in the policy.

The Contractor shall, upon demand of the Owner, deliver to the Owner all such policy or policies of insurance and the receipts for payment of premiums thereon; and should the Contractor neglect to obtain and maintain in force any such insurance or deliver such

policy or policies and receipts to the Owner, then it shall be lawful for the Owner to obtain and maintain such insurance, and the Contractor hereby appoints the Owner his true and lawful attorney-in-fact to do all things necessary for this purpose. All money paid by the Owner for insurance premiums under the provisions of this article shall be charged to the Contractor.

SC-5.05

Owner's Liability Insurance:

Delete paragraph 5.05 of the General Conditions in its entirety.

SC-5.06

Property Insurance:

Delete Section 5.06 in its entirety.

SC-6.05

Substitutes and "Or Equals":

Add the following new subparagraphs immediately after Subparagraph 6.05.A.2.d.:

e. The application for review of a substitute shall be on the Contractor's Application for Consideration of Substitution form provided in the Project Forms of the Project Manual and shall be included with the submittal. The Installation List included with the Application shall include only installations of the proposed substitute in applications of approximately the same size and complexity, and the same design as those proposed to be furnished for this Project. Include in the Installation List, as a minimum, the owner's name, address, and telephone number, Engineer's name, address and telephone number, location and name of project, installation date, startup date, and date of final acceptance by owner; and application of material or equipment.

f. If the experience indicated by the Installation List does not demonstrate at least five years of successful operation of the proposed substitute item, Owner may require Contractor and Supplier to furnish, at Contractor's expense, a special performance guarantee with surety bond as required by Paragraph 6.05.D of the General Conditions with respect to the substitute. Only the time period between final acceptance of the proposed material or equipment on the referenced project and the Bid date for this Project will count towards the required satisfactory experience of the proposed substitute item. Engineer will be the sole judge of acceptability of experience, time credited, and whether the special performance guarantee will be required for a substitute item. Engineer will notify Contractor which proposed substitute(s) will require a special performance guarantee and surety bond.

SC-6.05

Substitutes and "Or Equals":

Delete Paragraph 6.05.E. in its entirety.

SC-6.05

Substitutes and "Or Equals":

Add the following new paragraphs immediately after Paragraph 6.05.F.:

1. When a substitute item of material or equipment is proposed by Contractor and accepted by Engineer, and the substitution will require a change in any of the Contract Documents to adapt the design to the proposed substitute, Contractor shall notify Engineer of the changes and be responsible for the costs involved to revise the design and to make modifications or changes to the construction, including the costs associated with the Work of other contractors due to such changes in design or space requirements.

    a. Redesign and drawing revisions will be prepared by Engineer and Contractor shall reimburse Owner for charges of Engineer for redesign and drawing preparation.

    b. Reimbursement of Engineer shall be based on Engineer's direct labor costs, indirect labor costs, profit on the total labor, and any direct non-labor expenses such as travel or per diem.

SC-6.06

Concerning Subcontractor's, Suppliers, and Others:

Add the following new paragraph immediately after Paragraph 6.06.B.:

1. Contractor shall perform with its own work forces at least 30 percent of the Work, unless written consent to subcontract a greater percentage of the Work is obtained from Owner.

2. A list of the names of Bidder's proposed Subcontractors and Suppliers whose portion of the Work exceeds $10,000, along with the Work to be performed by each.

SC-6.06

Concerning Subcontractor's, Suppliers, and Others:

Renumber subparagraph 6.06F to 6.06G and subparagraph 6.06G to 6.06H and add new subparagraph as follows:

F. Owner or Engineer may furnish to any such Subcontractor, Supplier, or other person or organization, to the extent practicable, information about amounts paid to Contractor in accordance with Contractor's Applications for Payment on account of the particular Subcontractor's, Suppliers, other person's, or other organization's Work.

Add the following new paragraph immediately after Paragraph 6.06.H.:

I. Contractor shall maintain at the Site a list of Subcontractors and Suppliers, to the extent practicable, performing Work or furnishing materials on the Project.

SC-6.10

Taxes:

Add the following new paragraphs immediately after Paragraph 6.10.A.:

1. Contractor shall investigate the statutory requirements for payment of sales taxes and if required shall include the tax in the Contract price.

2. If investigation indicates tax exempt status, Contractor(s) shall forward this information to its Suppliers in order that the sale of such materials and equipment be properly recorded as a tax-exempt sale.

SC-6.16

Emergencies:

Add the following new paragraph immediately after Paragraph 6.16.A.:

B. In emergencies affecting the safety or protection of persons or property or maintenance of temporary construction at the Site or adjacent thereto, and Contractor cannot be reached, Owner may act to attempt to prevent threatened damage, injury, or loss. Owner will give Contractor and Engineer prompt written notice of such action and the cost of the correction or remedy shall be charged against Contractor. A Change Order will be issued to document the change in Contract Price.

SC-6.17

Shop Drawings and Samples:

Add the following new paragraphs immediately after Paragraph 6.17.E.:

F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three submittals. Engineer will record Engineer’s time for reviewing subsequent submittals of Shop Drawings,

samples, or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.

G. After Engineer has reviewed and approved a Shop Drawing or Sample, Contractor shall provide the material or equipment approved. Engineer will not review subsequent submittals of a different manufacturer or Supplier unless Contractor provides sufficient information to Engineer that the approved material or equipment is unavailable, time of delivery will delay the construction progress but not as a result of Contractor's failure to timely pursue the Work or to coordinate various activities properly, or Owner requests a different manufacturer or Supplier.

ARTICLE 7. OTHER WORK

SC-7.04

Claims Between Contractors:

Add the following new paragraph immediately after Paragraph 7.03.:

SC-7.04

Claims Between Contractors:

A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Engineer, or the construction coordinator, then Contractor (without involving Owner, Engineer or construction coordinator) shall either (1) remedy the damage, (2) agree to compensate the other contractor for remedy of the damage, or (3) remedy the damage and attempt to settle with such other contractor by agreement, or otherwise resolve the dispute by arbitration or at law.

B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, Engineer, the construction coordinator and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any other contractor against Owner, Engineer, consultants, or the construction coordinator to the extent said claim is based on or arises out of Contractor's performance of the Work. Should another contractor cause damage to the Work or property of Contractor or should the performance of work by any other contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer, or the construction coordinator or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from

Owner, Engineer, or the construction coordinator on account of any such damage or Claim.

C. If Contractor is delayed at any time in performing or furnishing the Work by any act or neglect of another contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, Engineer, and construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor. This paragraph does not prevent recovery from Owner, Engineer, or construction coordinator for activities that are their respective responsibilities.

SC-7.05

Damages to the Work or Property:

Add the following new paragraph at the end of Article 7 of the General Conditions:

A. Should Contractor cause damage to the work or property of any separate contractor at the site, or should any claim arising out of Contractor's performance of the Work at the site be made by any separate contractor against Contractor, Owner, Engineer, Engineer's Consultants, or any other person, Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold Owner, Engineer, and Engineer's Consultants, harmless from and against all claims, damages, losses, and expenses (including, but not limited to, fees of engineers, architects, attorneys, and other professionals, and court and arbitration costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any separate contractor against Owner, Engineer, or Engineer's Consultants, to the extent based on a claim arising out of the Contractor's performance of the Work. Should a separate contractor cause damage to the Work or property of Contractor or should the performance of Work by any separate contractor at the site give rise to any other claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer or Engineer's Consultants, or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner, Engineer, or Engineer's Consultants, on such damage or claim. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of a separate contractor and Owner and Contractor are unable to agree to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, Engineer, and Engineer's Consultants, for any delay, disruption, interference or hindrance caused by any separate contractor. This paragraph does not prevent recovery from Owner, Engineer, or Engineer's Consultant, for activities that are their respective responsibilities.

ARTICLE 8. OWNER'S RESPONSIBILITIES

SC-8.06

Insurance:

Delete paragraph 8.06 of the General Conditions in its entirety.

SC-8.11

Evidence of Financial Arrangements:

SC-8.13

Owner's Project Representative:

Add the following new paragraph immediately after Paragraph 8.12.:

A. Owner will furnish a site representative, assistants, and other field staff to observe performance and progress of the Work.

B. The duties and responsibilities of Owner's site representative are described as follows:

   1. Become familiar with the Contract Documents to observe the progress and quality of the executed Work, and to determine, in general, if the Work is proceeding in accordance with the Contract Documents.

   2. Promptly forward to Engineer, reports from Contractor indicating conflict, error, ambiguity, or discrepancy in the Contract Documents to enable Engineer to issue a written clarification or interpretation as provided for in Paragraph 9.04 of the General Conditions.

ARTICLE 9. ENGINEER'S STATUS DURING CONSTRUCTION

SC-9.03

Project Representative:

Add the following new paragraphs immediately after Paragraph 9.03.A.:

B. The Resident Project Representative (RPR) will be Engineer's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR'S actions. RPR'S dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR'S dealings with Subcontractors shall be through or with the full knowledge and approval of Contractor. The RPR shall:

1. *Schedules:* Review the progress schedule, schedule of Shop Drawing and Sample submittals, and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.

2. *Conferences and Meetings:*

    a. Conduct a preconstruction conference with Owner, Contractor(s), Utilities, and other appropriate parties affected by the Project.

    b. Attend meetings with Contractor, such as progress meetings, job conferences and other Project related meetings.

3. *Liaison:*

    a. Serve as Engineer's liaison with Contractor, working principally through Contractor's authorized representative, assist in providing information regarding the intent of the Contract Documents.

    b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

    c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

    d. Direct visiting inspectors representing public or other agencies having jurisdiction over the Project to Owner or Contractor as appropriate.

4. *Interpretation of Contract Documents:* Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

5. *Shop Drawings and Samples:*

    a. Record date of receipt of Samples and approved Shop Drawings.

    b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.

6. *Modifications:* Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR'S recommendations, to Engineer. Transmit to Contractor, in writing decisions as issued by Engineer.

7. *Review of Work and Rejection of Defective Work:*

    a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

    b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

8. *Inspections, Tests, and System Startups:*

    a. Verify that tests, equipment, and systems startups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.

    b. Observe, record, and report to Engineer appropriate details relative to the test procedures and system startups.

9. *Records:*

    a. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.

    b. Maintain records for use in preparing Project documentation.

10. *Reports*:

    a. Furnish to Engineer periodic reports as required of progress of the Work and Contractor's compliance with the progress schedule and schedule of Shop Drawing and Sample submittals.

    b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.

    c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition.

11. *Payment Requests:* Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

12. *Certificates, Operation and Maintenance Manuals*: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the times actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

13. *Completion:*

    a. Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed and deficiencies to be remedied.

    b. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.

    c. Coordinate efforts required to prepare record drawings showing those changes made during construction, based on the marked-up prints, drawings and other data furnished by Contractor to Engineer and which Engineer considers significant.

C. The RPR shall not:

1. Authorize any deviations from the Contract Documents or substitution or materials or equipment (including “or equal” items).

2. Exceed limitations of Engineer’s authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor’s superintendent.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor’s work unless such advice or directions are specifically required by the Contract Documents.

5. Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Accept Shop Drawings or Sample submittals from anyone other than Contractor.

8. Authorize Owner to occupy the Project in whole or part.

SC-9.03

Project Representative:

Add the following new paragraph immediately after Paragraph 9.03.A.:

B. Owner will provide a site representative whose responsibilities and duties are described in Paragraph SC 8.13.

SC-9.07

Determinations for Unit Price Work:

Delete the last sentence of Paragraph 9.07.A. in its entirety and insert the following in its place:

"Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor and not subject to appeal."

SC-9.10

Compliance with Safety Program:

Add the following new paragraph immediately after Paragraph 9.10.A.:

B. In the event Engineer determines that Contractor's safety plans, programs, and procedures do not provide adequate protection for Engineer, Engineer may direct its employees to leave the Project Site or implement additional safeguards for Engineer's protection. If taken, these actions will be in furtherance of Engineer's responsibility to its own employees only, and Engineer will not assume any responsibility for protection of any other persons affected by the Work. In the event Engineer observes situations which appear to have potential for immediate and serious injury to persons, Engineer may warn the persons who appear to be affected by such situations. Such warnings, if issued, shall be given based on general humanitarian concerns, and Engineer will not, by the issuance of any such warning, assume any responsibility to issue future warnings or any general responsibility for protection of persons affected by the Work.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

SC-10.01

Authorized Changes in the Work:

Add the following new subparagraph immediately after Paragraph10.01.B.:

1. By submission of a Claim Contractor certifies that the claim is made in good faith, that the supporting data are accurate and complete to the best of Contractor's knowledge and belief, and that the amount or time requested accurately reflects the Contract adjustment for which Contractor believes Owner is liable.

SC-10.03

Execution of Change Orders:

Add the following new paragraph immediately after Paragraph10.03.A.3.:

4. Change Orders will be prepared on the form included in the Project Forms of the Project Manual.

SC-10.05

Claims:

Amend Paragraph 10.05.B. by deleting the words "30 days" in the first sentence and inserting the words "10 days" in their place, and deleting the words "60 days" in the third sentence and inserting the words "30 days" in their place.

Amend the sixth sentence of Paragraph 10.05.B. by deleting the words "believes it."

Amend Paragraph 10.05.B. by deleting the words "30 days" in the first sentence and inserting the words "20 days" in their place, and deleting the words "60 days" in the third sentence and inserting the words "50 days" in their place.

Amend the sixth sentence of Paragraph 10.05.B. by deleting the words "believes it."

Add the following new paragraph immediately after Paragraph 10.05.F.:

G. Contractor acknowledges the applicability of the False Claims Act, 31 U.S.C S3729, et seq., to this Contract, including liability for false and fraudulent claims resulting in civil penalties of $5,000 to $10,000, treble damages, and award of attorneys' fees and costs.

ARTICLE 11. COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

SC-11.01

Cost of the Work:

In the second sentence of paragraph 11.01A.1 delete the word "superintendents".

SC-11.01

Cost of the Work:

Delete Paragraph 11.01.A.5.c. in its entirety and insert the following in its place:

c. Construction Equipment and Machinery:

1) Rentals of all construction equipment and machinery, and the parts thereof in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

2) Costs for equipment and machinery owned by Contractor will be paid at a rate shown for such equipment in the current State of California Business, Transportation, and Housing Agency, Department of Transportation, Division of Construction, Labor Surcharge and Equipment Rental Rates. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs. Costs will include the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than $1,000 will be considered small tools.

SC-11.02

Allowances:

Add the following new paragraph immediately after Paragraph 11.02.B.:

C. *Quantities Allowances*: The allowances include the quantity of material or equipment to be installed or removed from the Site; and

1. Contractor agrees that:

    a. Contractor's cost for unloading and handling on the Site, labor, installation costs, overhead, profit, and other expenses contemplated for the allowance shall have been included in the Contract Price and not in the allowances.

    b. Contractor's cost for removing and loading material or equipment on the Site, transporting and fees for disposal on or off Site, overhead, profit, and other expenses contemplated for the Allowance shall have been included in the Contract Price.

    c. Contractor's cost for furnishing and installing material or equipment to replace the removed material or equipment shall include cost for furnishing and installing the material or equipment, labor, installation costs, overhead, profit and other expenses contemplated for the allowance shall have been included in the Contract Price.

2. No demand for additional payment on account of any of the foregoing will be valid.

Renumber Paragraphs 11.02.C. and D. to 11.02.D. and E. respectively.

SC-11.03

Unit Price Work:

Delete Paragraph 11.03.D. in its entirety and insert the following in its place:

D. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

    1. If the Bid price of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement.

    2. If there is no corresponding adjustment with respect to any other item of Work.

    3. If Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a claim for an adjustment in the Contract Price in accordance with Article 10 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

ARTICLE 12. CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

SC-12.01

Change in Contract Price

Delete Paragraph 12.01.B.2. in its entirety and insert the following in its place:

2. When the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which includes an allowance for overhead and profit in accordance with Paragraph 12.01.C.2); or

SC-12.01

Change of Contract Price:

Amend paragraph 12.01.C.1 to read as follows:

1. The following mutually acceptable fixed fees apply to Changes in the Work:

    a. Ten percent overhead and profit on the net cost of Work performed by the Contractor;

    b. Five percent overhead and profit on the cost of Work performed by any Subcontractor;

    c. On Work deleted from the Contract, credit to the Owner shall be the Engineer approved net cost plus ½ of the overhead and profit percentage noted above.

SC-12.01

Change of Contract Price:

Delete the semicolon at the end of Paragraph 12.01.C.2.c., and add the following language:

> ", provided, however, that on any subcontracted work the total maximum fee to be paid by Owner under this subparagraph shall be no greater than 27 percent of the cost incurred by the Subcontractor who actually performed the work";

SC-12.02

Change of Contract Times:

Add the following new paragraph immediately after Paragraph 12.02.B.:

C. Time extensions provided under Paragraph 12.03 of the General Conditions will only be allowed for controlling items of Work (critical path).

SC-12.03

Delays:

Delete Paragraph 12.03.B. in its entirety and insert the following in its place:

B. If Owner, Engineer, or other contractors or utility owners performing other work for the Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work with the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.02.B.

ARTICLE 13. TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

SC-13.03

Tests and Inspections:

Amend the first sentence of Paragraph 13.03.B. by striking out the word "Owner" and inserting the word "Contractor" in its place.

Delete Paragraph 13.03.D. in its entirety.

SC-13.07

Correction Period:

Amend the first sentence of Paragraph 13.07.A. by striking out the words "Substantial Completion" and inserting the words "completion of the Work" in their place.

Amend the first sentence of Paragraph 13.07.A. by striking out the words "Substantial Completion" and inserting the word "completion" in their place.

ARTICLE 14. PAYMENTS TO CONTRACTOR AND COMPLETION

SC-14.02

Progress Payments:

Amend the first sentence of Paragraph 14.02.A.1. by striking out the words "20 days" and inserting the words "30 days" in their place.

Add the following language at the end of Paragraph 14.02.A.2.:

Owner may at any time require Contractor to furnish lien waivers for labor and materials covered by specified Applications for Payment.

SC-14.02

Progress Payments:

Amend Paragraph 14.02.C.1. by striking out the words "Ten days" and inserting the words "Twenty days" in their place.

Add the following new paragraph immediately after Paragraph 14.02.C.1.:

2. Owner may make direct payment to Subcontractors or to pay prime Subcontractors with checks made payable to Contractor and to one or more Subcontractors.

Add the following new paragraph immediately after Paragraph 14.02.D.:

E. *Payments for Specifically Manufactured Equipment*

1. Payments requested for undelivered equipment or material specifically manufactured for this Project, excluding "off the shelf" or catalog items, will be made to Contractor for payment to the Supplier when the following conditions exist:

    a. The equipment or material to be specifically manufactured for the Project could not be readily utilized on nor diverted to another project.

    b. A fabrication period of more than 6 months is anticipated.

2. Payments will be made in the following percentages of the Supplier's Contract Price of equipment or material with Contractor:

    a. 15 percent at the time the Shop Drawings are approved by Engineer.

    b. 5 percent additional each month thereafter until not more than 60 percent of the above price has been paid.

    c. Balance of payment, less retention, stipulated in the Agreement, upon delivery.

3. From the payment at Shop Drawing approval until delivery to the Project Site, Contractor shall maintain in force multi-peril insurance to afford protection from losses that may occur to the equipment or material.

4. Submission of a request for payment shall be accompanied by a certification furnished by the Supplier of the equipment or material that the amount of the payment claimed is in accordance with the progress of the fabrication of the equipment. The certification shall include a status report on the fabrication.

SC-14.04

Substantial Completion:

Delete Paragraph 14.04 of the General Conditions in its entirety.

SC-14.05

Partial Utilization:

Delete Paragraph 14.05 of the General Conditions in its entirety.

SC-14.07

Final Payment:

Amend the first sentence of Paragraph 14.07.A.1. by striking out the words "and has delivered in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked up record documents (as provided in Paragraph 6.12), and other documents,"

SC-14.07

Final Payment:

Add the following new paragraph after Paragraph 14.07.A.3 of the General Conditions.

4. The amount of retainage with respect to final payment will be as stipulated in the Agreement.

SC-14.07

Final Payment:

Add the following new paragraph after Paragraph 14.07.B.1 of the General Conditions.

2. The Owner shall file for recording a formal Notice of Completion.

SC-14.07

Final Payment:

Amend Paragraph 14.07.C.1 of the General Conditions by striking out the words "Thirty days after the presentation to the Owner of the Application for Payment and accompanying documentation," and inserting the words "Thirty five days from the date of recording by the Owner of the Notice of Completion of the Work," in their place.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

SC-15.02

Owner May Terminate for Cause:

Amend Paragraph 15.02.B. by striking out the words "seven days written notice" and inserting the words "**10** days written notice" in their place.

SC-15.03

Owner May Terminate for Convenience:

Amend Paragraph 15.03.A by striking out the words "seven days written notice" and inserting the words "**10** days written notice" in their place.

SC-15.04

Contractor May Stop Work or Terminate:

Amend Paragraph 15.04.A. by striking out the words "30 days" in two places and inserting the words "**60** days" in their places, and by striking out the words "seven days" and inserting the words "**10** days" in their place.

Amend Paragraph 15.04.B. by striking out the words "30 days" in two places and inserting the words "**60** days" in their places, and by striking out the words "seven days and inserting the words "**10** days" in their place.

ARTICLE 16. DISPUTE RESOLUTION

SC-16.01

Methods and Procedures:

Add a new sentence at the end of paragraph 16.01A of the General Conditions which is to read as follows:

> Contractor shall carry on the Work and maintain the progress schedule during the dispute resolution proceedings unless otherwise agreed in writing by Owner and Contractor.

SC-16.01

Methods and Procedures:

Exhibit GC-A has been deleted.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C. or a denial pursuant to Paragraphs 10.05.C.3. or 10.05.D. shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

   1. Elects in writing to demand arbitration of the Claim, pursuant to Paragraph SC-16.02.

   2. Agrees with the other party to submit the Claim to another dispute resolution process.

Add the following new paragraph immediately after Paragraph 16.01.:

SC-16.02

Arbitration:

A. All Claims or counterclaims, disputes, or other matters in question between Owner and Contractor arising out of or relating to the Contract Documents or the breach thereof (except for Claims which have been waived by the making or acceptance of final payment as provided by Paragraph 14.09) including but not limited to those not resolved under the provisions of Paragraphs SC-16.01A and 16.01.B will be decided by arbitration in accordance with the laws of the State of California**,** subject to the conditions and limitations of this Paragraph SC-16.02. This agreement to arbitrate and any other agreement or consent to arbitrate entered into will be specifically enforceable under the prevailing law of any court having jurisdiction.

B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitrator or arbitration provider, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the 30-day period specified in Paragraph SC-16.01.C, and in all other cases within a reasonable time after the Claim or counterclaim, dispute, or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such Claim or other dispute or matter in question would be barred by the applicable statute of limitations.

C. No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joiner, or in any other manner any other individual or entity including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

1. The inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration.

2. Such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings.

D. The award rendered by the arbitrator(s) shall be consistent with the agreement of the parties, in writing, and include: (i) a concise breakdown of the award; and (ii) a written explanation of the award specifically citing the Contract Document provisions deemed applicable and relied on in making the award.

E. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Controlling Law relating to vacating or modifying an arbitral award.

F. The fees and expenses of the arbitrators and any arbitration service shall be shared equally by Owner and Contractor.

ARTICLE 17. MISCELLANEOUS

SC-17.06

Delete paragraph 17.06 in its entirety and replace with the following:

17.06 Headings:

A. The headings or titles of any article, paragraph, subparagraph, section, subsection, or part of the Contract Documents shall not be deemed to limit or restrict the article, paragraph, section, or part.

SC-17.07

Legal Address of Contractor:

Add new paragraph immediately after paragraph 17.06 of the General Conditions as follows:

A. Contractor's business address and his office at or near the site of the Work are both hereby designated as places to which communications shall be delivered. The depositing of any letter, notice, or other communication in a postpaid wrapper directed to the Contractor's business address in a post office box regularly maintained by the Post Office Department or the delivery at either designated address of any letter, notice, or other communication by mail or otherwise shall be deemed sufficient service thereof upon Contractor, and the date of such service shall be the date of receipt. The first-named address may be changed at any time by an instrument in writing, executed and acknowledged by Contractor and

delivered to Engineer. Service of any notice, letter, or other communication upon the Contractor personally shall likewise be deemed sufficient service.

SC-17.08

Engineering and Inspection Costs and Expenses:

Add a new paragraph immediately after paragraph 17.07 of the General Conditions which is to read as follows:

A. The Contractor shall be responsible and liable for all engineering and inspection costs and expenses incurred by the Owner caused by, or related in any way to, the failure of the Contractor to perform its services in the time and manner set forth in the Agreement, the General Conditions and the Supplemental Conditions. The Owner may charge to the Contractor, and may deduct from the periodical payments and the final payment for the Contractor's work, the full amount of such engineering and inspection costs and expenses including Owner's and Engineer's costs.

   1. The Engineer's charges will be based on the Engineer's actual labor and expenses at the same rate the Owner is charged.

B. For any engineering costs and expenses beyond the regular eight-hour day and for any time work on Saturday, Sunday, or holidays, the charges for such personnel will be one and one-half times the rate established above.

IN CASE OF CONFLICT BETWEEN THE GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS AND APPLICABLE FEDERAL REGULATIONS FOR FEDERALLY ASSISTED PROJECTS (INCLUDING 40 CFR PART 31), THE PROVISIONS OF THE FEDERAL REGULATIONS SHALL GOVERN.

END OF SECTION

SECTION 01 11 01

BID ITEM DESCRIPTIONS

Work under this contract will be paid on a unit price or lump-sum basis as outlined on the Bid Form for the quantity of work installed.

The unit prices and lump-sum prices include full compensation for furnishing the labor, materials, tools, and equipment and doing all the work involved to complete the work included in the contract documents.

The bids for the work are intended to establish a total cost for the work in its entirety. Should the Contractor feel that the cost for the work has not been established by specific items in the Bid Form, include the cost for that work in some related bid item so that the Proposal for the project reflects the total cost for completing the work in its entirety.

Bid Item No. 1 – Mobilization and Demobilization. This item is a lump sum bid item for preparatory work including but not limited to those necessary for the movement of personnel, equipment, supplies and incidentals to the project site; for the establishment of contractor's facilities necessary for work on the project; for obtaining permits, bonds and insurance; and for all other work and operations which must be performed or costs incurred prior to beginning work on the various contract items on the project site. This item also includes demobilization, including the removal of all equipment, supplies, personnel and incidentals from the project at the end of construction. Payment shall not exceed $50,000. Payment for mobilization shall be made with the first progress payment and shall not exceed 80 percent of the item bid amount. Payment for demobilization shall be made with the last progress payment and shall not less than 20 percent of the item bid amount.

Bid Item No. 2 – Sheeting Shoring and Bracing. This item is a lump sum bid item for providing sheeting, shoring and bracing to protect personnel and property in accordance with Cal/OSHA regulations, all safety plans, and these Contract Documents.

Bid Item No. 3 –Storm Water Pollution Prevention Plan and Dust Control. This item is a lump sum bid item for preparation, submittal and implementation of the Storm Water Pollution Prevention Plan (SWPPP) in accordance with NPDES permit provisions to prevent water pollution. The price paid shall include all work associated with preparing and implementing the SWPPP.

Throughout all phase of construction, including suspension of work and until final acceptance of the project, the Contractor shall keep the work site clean and free from rubbish and debris. The Contractor shall also abate dust-nuisance by cleaning, sweeping, and sprinkling with water or other means as necessary. The use of water resulting in mud on public streets will not be permitted as a substitute for sweeping or other methods.

Bid Item No. 4 – Demolition. This item is a lump sum bid item for demolition of existing facilities as indicated in the Drawings. Removal and disposal of demolition items shall not be

measured for payment. Payment shall be made at the lump sum price bid for Demolition in the Bid Schedule. The price paid shall include all costs associated with work including the removal and disposal of material offsite.

Bid Item No. 5 – Earthwork. This item is a lump sum bid item for earthwork associated with detention basin construction. The price shall include all work involved in excavating materials for the basin, dewatering, hauling, placing material in embankments, moistening and compacting, and finishing the slopes of the embankments to the lines and grades shown on the plan.

Bid Item No. 6 – 48-Inch Cast-in-Place Concrete Pipe. This item shall be bid per linear foot for 48-inch cast-in-place pipe measured horizontally over the pipe centerline in accordance with Section 33 42 20 "Cast-in-Place Concrete Pipe (CIPCP)."

The length of CIPCP to be paid for will be the horizontal projection length indicated in the drawings exclusive of structures.

The price paid per linear foot of pipe shall include full compensation for furnishing labor, materials, tools, and equipment and doing the work involved in constructing the pipe in place, including trench excavation, backfill, hauling, compaction, dewatering, grading and testing and replacement of curb, gutter and driveway.

Bid Item No. 7 – 48-Inch Reinforced Concrete Pipe. This item shall be bid per linear foot for 48-inch diameter reinforced concrete pipe (RCP) in accordance with Section 33 42 16 "Reinforced Concrete Culvert Pipe."

The price paid per linear foot of pipe shall include full compensation for furnishing all labor, materials and equipment and doing all work involved in installing the pipe in place, including trench excavation, connections to manholes and pump structures, backfill, hauling, compacting, dewatering, grading and testing and replacement of curb, gutter and sidewalk.

Bid Item No. 8 – 30-Inch Reinforced Concrete Pipe. This item is a lump sum bid item for 30-inch diameter reinforced concrete pipe (RCP) in accordance with Section 33 42 16 "Reinforced Concrete Culvert Pipe."

The lump sum price shall include full compensation for furnishing all labor, materials and equipment and doing all work involved in installing the pipe in place, including trench excavation, connections to manholes, backfill, hauling, compacting, dewatering, grading and testing and replacement of curb, gutter and sidewalk.

Bid Item No. 9 – 10-Inch PVC Gravity Pipe. This item shall be bid per linear foot for furnishing and installing the 10-inch Gravity PVC drainage pipe in place in accordance with Section 33 31 12 "PVC Gravity Pipe." The length of pipe to be paid for will be the horizontal projection as indicated on the drawings. No deduction will be made for catch basins.

The price paid per linear foot shall include full compensation for furnishing all labor, materials and equipment and doing all work involved in installing the pipe in place, including trench

excavation, connecting to catch basins and the inlet/outlet structure, backfill, hauling, compacting, dewatering and testing.

Bid Item No. 10 – Discharge Piping. This item is a lump sum bid item for discharge piping associated with the pumping units, including 10-inch ductile iron pipe, 12-inch Class 150 C900, fittings and flap gates.

Full compensation for all labor, materials, equipment, tools, fittings, elbows and incidentals shall be considered as included in the bid amount for the discharge piping including connections to pump discharge elbows and manholes, and no additional payment will be made therefore.

Bid Item No. 11 – 48-Inch Diameter CIPCP Manholes. This item shall be bid per unit price each for 48-inch diameter CIPCP manholes.

The price paid per completed manhole shall include full compensation for furnishing labor, materials, tools, and equipment and doing the work involved in constructing the manhole including frames, covers and bollards.

Bid Item No. 12 – 48-Inch Diameter Manholes. This item shall be bid per unit price each for 48-inch diameter manholes. Work associated with connecting existing storm drain pipes to manholes shall be included.

The price paid per completed manhole shall include full compensation for furnishing labor, materials, tools, and equipment and doing the work involved in installing the manhole in place including frames and covers.

Bid Item No. 13 – 72-Inch Diameter Manholes. This item shall be bid per unit price each for 72-inch diameter manholes.

The price paid per completed manhole shall include full compensation for furnishing labor, materials, tools, and equipment and doing the work involved in constructing the manhole in place including frames and covers.

Bid Item No. 14 – Catch Basins. This item shall be bid per unit price each for furnishing and installing catch basins and grating in place.

Bid Item No. 15 – Reinforced Concrete Inlet/Outlet Structure. This item is a lump sum bid item for construction of a reinforced concrete inlet/outlet structure including excavation, backfill, forming, finishing, reinforcing steel, miscellaneous metal and fencing.

Bid Item No. 16 – Storm Drain Pump Structure. This item is a lump sum bid item for construction of the reinforced concrete storm drain pump structure and site work as shown on the Drawings.

The lump sum price shall include full compensation for all labor, materials, equipment, tools and incidentals shall be considered as included in the bid amount for the storm drain pump structure

and site work including excavation, forming, reinforcing steel, aggregate base, concrete, backfill, fabricated steel elbow, pump supports, grating with supports and handrails, concrete slab, tubular steel fencing with rolling gate, removal of curb, gutter and sidewalk and construction of commercial driveway access.

Bid Item No. 17 – Submersible Pumps. This item is a lump sum bid item for furnishing and installing two submersible pumps complete with motors, discharge elbows, guide bars, support brackets, lifting chains and appurtenances in accordance with Section 43 21 41 "Pump Station."

Bid Item No. 18 – 48-Inch Slide Gate. This item shall be bid per unit price each for furnishing and installing the 48-inch slide gate with operator in the storm drain pump structure.

Bid Item No. 19 – Electrical Work. This item is a lump sum bid item for complete installation of all electrical work including but not limited to conduits and power wiring to the motor control center, irrigation pump, controller, power and control wiring to the submersible motors, motor control center, supports, concrete bases, and anchors in accordance with Section 26 05 11 "Electrical Work."

Bid Item No. 20 – Aggregate Base. This item shall be bid per ton for furnishing and placing aggregate base associated with repaving of San Luis Street and the parking lot. Payment for placement of aggregate base underneath structures shall be included in the applicable lump sum or unit price for the structure.

Bid Item No. 21 – Asphalt Concrete. This item shall be bid per ton for furnishing and placing asphalt concrete associated with repaving of San Luis Street and the parking lot.

Bid Item No. 22 – Concrete Walkway. This item shall be bid per square foot for construction of walkway in accordance with Section 03 05 00.

The price paid per square foot shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for performing all the work involved in construction of the walkway including aggregate base.

Bid Item No. 23 – Fire Hydrant Removal and Reinstallation. This item is a lump sum bid item for removal and reinstallation of existing fire hydrant.

The lump sum price shall include full compensation for pipe, couplings, thrust blocks, disinfection of water line and hydrant, and all other work required for removal and reinstallation of the fire hydrant.

Bid Item No. 24 – Landscape Planting. This item is a lump sum bid item for furnishing and placing landscape in accordance with Section 02900 "Landscaping."

The lump sum price shall include full compensation for furnishing all labor, materials and equipment necessary to provide and install landscaping including soil amendments, trees and hydroseeding, and maintaining the landscaping during the established maintenance period.

Bid Item No. 25 – Landscape Irrigation. This item is a lump sum bid item for furnishing and installing the irrigation system in accordance with Section 02810 "Irrigation."

The lump sum price shall include full compensation for furnishing all labor, materials, supplies, tools, transportation and equipment and perform all operations in connection with and incidental to the complete installation of the irrigation system including but not limited to; trench excavation, backfill, compaction, sprinkler heads, control valves, control valve wiring, booster pump, controller, hot tap, 4-inch service meter and reduced pressure backflow prevention device.

Bid Item No. 26 – Construction of Playground Area. This item is a lump sum bid item for constructing the playground area as indicated on the Drawings.

The lump sum price shall include full compensation for furnishing all labor, materials, supplies, tools, transportation and equipment and perform all operations in connection with and incidental to construction of the play area including but not limited to; reinforced concrete, weed barrier filter fabric, wood fiber fill, 3-inch drain pipe, inlet with grate, benches and playground equipment.

Bid Item No. 27 – Construction of Horseshoe Pits. This item is a lump sum bid item for furnishing and constructing the horseshoe pits as indicated on the Drawings.

The lump sum price shall include full compensation for furnishing all labor, materials, supplies, tools, transportation and equipment and perform all operations in connection with and incidental to construction of the horseshoe pits including but not limited to; concrete footings, steel rods, header boards, posts, back boards, decomposed granite, soil sterilant, and sand.

END OF SECTION

SECTION 01 14 14

CONTROL OF WORK

PART 1 - GENERAL

1.01 HOURS OF CONSTRUCTION:

A. Normal construction activity shall take place only between the hours of 7 a.m. to 6 p.m., excluding Saturdays, Sundays, and legal holidays. Work outside the above time periods will be permitted only on an emergency basis and only with the approval of the Owner.

1.02 LICENSES

The Contractor and subcontractors shall obtain and pay for a City of Los Banos Business License. Detailed information concerning business license may be obtained from the City. The City's phone number is (209) 827-7000.

1.03 OCCUPYING PRIVATE/PUBLIC LAND:

A. The Contractor shall not (except after written consent from the proper parties) enter or occupy with men, tools, materials, or equipment any land outside the rights of way or property of the Owner. A copy of the written consent shall be given to the Owner.

B. The Contractor shall not stage operations next to the Junior High School or the Child Development Center.

C. The Junior High School driveway and parking lot area is only to be used in conjunction with installing the pipeline in this area. This area shall not be used to store equipment or materials. This area shall not be used to move equipment or access the project site.

1.04 PIPE LOCATIONS:

A. Exterior pipelines will be located substantially as indicated on the Drawings, but the right is reserved to the Owner, acting through the Engineer, to make such modifications in location as may be found desirable to avoid interference with existing structures or for other reasons. Where fittings, etc., are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

1.05 DIMENSION OF EXISTING STRUCTURES:

A. 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.

1.06 OPEN EXCAVATIONS:

A. All open excavations shall be adequately safeguarded by providing temporary barricades, fencing, caution signs, lights, and other means to prevent accidents to persons and damage to property. The length or size of excavation will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such as limiting the length of the open trench, prohibiting stacking excavated material in the street, and requiring that the trench shall not remain open overnight.

B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be well lighted at night.

1.07 TEST PITS:

A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor at the direction of the Engineer. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Engineer.

1.08 INTERFERENCE WITH AND PROTECTION OF STREETS:

A. The Contractor shall not close or obstruct any portion of a street, road, or private way without obtaining permits therefor from the proper authorities. If any street, road or private way shall be rendered unsafe by the Contractor's operations, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the proper authorities.

B. Streets, roads, private ways, and walks not closed shall be maintained passable and safe by the Contractor, who shall assume and have full responsibility for the adequacy and safety of provisions made therefor.

C. The Contractor shall submit a street closure plan including closure schedule and detour routes to the City prior to the pre-construction conference. An approved street closure plan must be in place prior to any street closures.

D. The Contractor shall install a portable changeable message sign at both ends of the street/road to be closed alerting the public of the upcoming closure for at least five (5) days prior to the closure.

1.09 CARE AND PROTECTION OF PROPERTY:

A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the

Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Engineer.

1.10 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES:

A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by him at his expense.

B. Assistance will be given to the Contractor in determining the location of existing services. The Contractor, however, shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing water services, drain lines, and sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the Contractor.

C. Protection and temporary removal and replacement of existing utilities and structures as described in this Section shall be a part of the work under the Contract and all costs in connection therewith shall be included in the Total Price Bid in the Bid Form.

D. If, in the opinion of the Engineer**,** permanent relocation of a utility owned by the Owner is required, he may direct the Contractor, in writing, to perform the work. Work so ordered will be paid at the Contract unit prices, if applicable, or as extra work under Article 11 of the Supplementary Conditions. If relocation of a privately owned utility is required, the Owner will notify the Utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the Owner and Utility, and shall have no claim for delay due to such relocation. The Contractor shall notify all utility companies in writing at least 72 hours (excluding Saturdays, Sundays, and Legal holidays) before excavating in any public way. Contractor shall also notify Underground Services Alert at 1-800-227-2600 for locations of underground utilities at least 72 hours prior to start of work.

1.11 COOPERATION WITHIN THIS CONTRACT:

A. All firms or persons authorized to perform any work under this Contract shall cooperate with General Contractor and his Subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or recommended by the Engineer.

1.12 CLEANUP AND DISPOSAL OF EXCESS MATERIAL:

A. During the course of the work, the Contractor shall keep the site of his operations in as clean and as neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations, and shall leave the entire site of the work in a neat and orderly condition.

B. The Contractor shall provide a truck route for hauling soil to the Owner for approval.

C. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, the Contractor and his subcontractors shall comply with all applicable Federal, State, and local laws, and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and elsewhere in the Specifications.

D. The Contractor is advised that the disposal of excess excavated material in wetlands, stream corridors, and plains is strictly prohibited even if the permission of the property owner is obtained. Any violation of this restriction by the Contractor or any person employed by him, will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. Therefore, the Contractor will be required to remove the fill at his own expense and restore the area impacted.

END OF SECTION

SECTION 01 33 00

SUBMITTALS

1.01 SHOP DRAWINGS

A. Submit shop drawings in accordance with the General Conditions.

B. The use of contract drawing reproductions for shop drawings is subject to rejection.

C. Submit six copies of shop drawings. The Engineer will keep four copies and return two copies. If the Contractor desires more than two copies, he shall transfer the Engineer's comments onto additional copies at his own expense. Clearly indicate the specification section and drawing number to which each shop drawing is referenced.

D. If the Contractor submits shop drawings of equipment by manufacturers other than those listed in the specifications, provide the following information with the submittal:

1. The name and address of at least three companies or agencies that are currently using the equipment.

2. The name and telephone number of at least one person at each of the above companies or agencies whom the Engineer may contact.

3. A description of the equipment that was installed at the above locations. The description shall be in sufficient detail to allow the Engineer to compare it with the equipment that is proposed to be installed in this project.

E. For materials originating outside of the United States for which tests are required, provide recertification and retesting by an independent domestic testing laboratory.

1.02 SAMPLES

A. Furnish samples of the various materials, together with the finish thereon, as specified for and intended to be used on or in the work. Send samples to the office of the Engineer, carriage prepaid.

B. Submit samples before purchasing, fabricating, applying, or installing such materials and finishes.

C. Submit samples, other than field samples, in duplicate. A cover letter shall accompany the sample and shall list all items being transmitted, designating their particular usage and location in the project. One sample marked "Resubmittal Not Required" will be returned to the Contractor; rejected samples will not be returned.

D. Samples shall be submitted and resubmitted until acceptable. Materials, finishes, and workmanship in the completed project shall be equal in every respect to that of the samples so submitted and accepted.

E. Samples shall conform to materials, fixtures, equipment, surface textures, colors, etc., as required by drawings and specifications or as requested by the Engineer.

F. Identify sample as to product, color, manufacturer, trade name, lot, style, model, etc., location of use, and contract document reference, as well as the names of the Contractor, supplier, project, and Engineer.

G. Samples shall be 8 inches by 10 inches in size and shall be limited in thickness to a minimum consistent with sample presentation. In lieu thereof, submit the actual full-size item.

H. Samples of value may be returned to the Contractor for use in the project after review, analysis, comparison, and/or testing as may be required by the Engineer.

I. Furnish one 8-inch by 10-inch sample of the finally reviewed materials, colors, or textures to the Engineer for final record. Such material samples shall carry on the back all identification as previously described including, if paint sample, manufacturer, mix, proportion, name of color, building, Contractor, subcontractor, and surfaces to which applied.

1.03 SUBMITTAL REQUIREMENTS

A. Make submittals promptly in such sequence as to cause no delay in the work. Schedule submission a minimum of 15 calendar days before reviewed submittals will be needed.

B. Submittals shall contain:

1. The date of submission and the dates of any previous submissions.

2. The project title and number.

3. Contract identification.

4. The names of:

a. Contractor.

b. Supplier.

c. Manufacturer.

5. Identification of the product, with the specification section number.

6. Field dimensions, clearly identified as such.

7. Relationship to adjacent or critical features of the work or materials.

8. Identification of deviations from contract documents.

9. Identification of revisions on resubmittals.

10. A 5-inch by 5-inch blank space for stamps of the Engineer.

11. Contractor's stamp, initialed or signed, shall certify Contractor's review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal that the product meets the requirements of the work and of the contract documents. If a shop drawing shows any deviation from the requirements of the Contract Documents, the Contractor shall make specific mention of the deviations in the submittal and provide a description of the deviations in a letter attached to the submittal.

1.04 SUBMITTAL FORMAT

A. Each submittal shall have a transmittal form. A sample transmittal form is included at the end of this section. Every page in a submittal shall be numbered in sequence. Each copy of a submittal shall be collated and stapled or bound, as appropriate. Copies not collated will be rejected.

B. Where product data from a manufacturer is submitted, clearly mark which model is proposed, with all pertinent data, capacities, dimensions, clearances, diagrams, controls, connections, anchorage, and supports. Present a sufficient level of detail for assessment of compliance with the contract documents.

C. Each submittal shall be assigned a unique number. Submittals shall be numbered sequentially. The submittal numbers shall be clearly noted on the transmittal. Original submittals shall be assigned a numeric submittal number. Resubmittals shall bear an alphanumeric system which consists of the number assigned to the original submittal for that item followed by a letter of the alphabet to represent that it is a subsequent submittal of the original. For example, if Submittal 25 requires a resubmittal, the first resubmittal will bear the designation "25-A" and the second resubmittal will bear the designation "25-B" and so on.

D. Disorganized submittals that do not meet the requirements above will be returned without review.

1.05 ENGINEER'S ACTION

A. The Engineer's review is for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the contract plans and specifications or from departures therefrom. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.

B. The review of shop drawings, data, and samples will be general. They shall not be construed:

1. As permitting any departure from the Contract requirements;

2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;

3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.

1.06 RESUBMITTALS

Resubmittal of submittals will be reviewed and returned in the same review period as for the original submittal. It is considered reasonable that the Contractor shall make a complete and acceptable submittal by the second submission of a submittal item. The Engineer reserves the right to withhold monies due to the Contractor to cover additional costs of any review beyond the second submittal.

1.07 CONTRACTOR'S JOBSITE DRAWINGS

Provide and maintain on the jobsite one complete set of prints of all drawings which form a part of the contract. Immediately after each portion of the work is installed, indicate all deviations from the original design shown in the drawings either by additional sketches or ink thereon. Upon completion of the job, deliver this record set to the Engineer.

SHOP DRAWING SUBMITTAL NO. _____

AECOM

ATTN: _____ ATTN: _____

PLACE ROAD AND SAN LUIS STREET
STORM DRAIN AND DETENTION BASIN

AECOM PROJECT NO. OWNER PROJECT NO. CONTRACTOR PROJECT NO.

ITEM NO.	COPIES	DESCRIPTION	PREVIOUS SUBMITTAL NO.	SPEC. SECTION NO.	PLAN SHEET NO.

SUBMITTED BY:_____ _____
CONTRACTOR DATE

SUBMITTAL RETURN (TO BE COMPLETED BY ENGINEER)

ITEM NO.	COPIES	RESUBMIT		COMMENTS
		YES	NO	

COPY: RETURNED BY:_____ _____
ENGINEER DATE

END OF SECTION

SECTION 01 35 43

PROTECTION OF ENVIRONMENT

PART 1 - GENERAL

1.01 SUMMARY:

A. Contractor, in executing Work, shall maintain Work areas on- and off-site free from environmental pollution that would be in violation of federal, state or local regulations.

B. The control of environmental pollution requires consideration of air, water, and land, and involves management of noise and solid waste, as well as other pollutants.

C. Schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. Provide erosion control measures such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching, or other special surface treatments as are required to prevent silting and muddying of streams, rivers, impoundments, lakes, etc. All erosion control measures shall be in place in an area prior to any construction activity in that area.

D. Ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and its surroundings. It is the Contractor's responsibility to determine the specific construction techniques to meet these guidelines.

E. Schedule and conduct all work in a manner that will minimize the level of noise escaping the site, especially at night and on weekends.

F. Submit Storm Water Discharge Plan in accordance with Section 01 33 00.

G. Payment:

1. Consider Work specified in this section incidental and include payment as part of appropriate lump sum or unit prices specified in Bid Form.

1.02 PROTECTION OF STORM SEWERS:

Prevent construction material, pavement, concrete, earth or other debris from entering existing storm sewer or sewer structure.

1.03 PROTECTION OF WATERWAYS:

A. Observe rules and regulations of State of California and agencies of U.S. government prohibiting pollution of lakes, streams, rivers or wetlands by dumping of refuse, rubbish, dredge material or debris.

B. Provide holding ponds or accepted method which will divert flows, including storm flows and flows created by construction activity, to prevent excessive silting of waterways or flooding damage to property.

C. Comply with procedures in "The Construction Site Best Management Practices (BMPs) Manual" by the State of California Department of Transportation.

1.04 STORM WATER DISCHARGE:

A. Contractor shall comply with California State Water Resources Control Board (SWRCB) General Construction Activity Storm Water Permit No. CA S000002 (General Permit) for discharges of storm water associated with construction site activities. As minimum Contractor is required to prepare, submit, and comply with following.

1. Notice of Intent (NOI).

2. Storm Water Pollution Prevention Plan.

B. Comply with procedures in "The Construction Site Best Management Practices (BMPs) Manual" by the State of California Department of Transportation.

1.05 DISPOSAL OF EXCESS EXCAVATED AND OTHER WASTE MATERIALS:

A. Excess excavated material not required or not suitable for backfill and other waste material shall be disposed of in accordance with local regulatory requirements.

B. Provide watertight conveyance for liquid, semi-liquid or saturated solids which tend to bleed during transport. Liquid loss from transported materials is not permitted, whether being delivered to construction site or hauled away for disposal. Fluid materials hauled for disposal must be specifically acceptable at selected disposal site.

C. A grading permit will be required from the Owner for disposal of any excavated material within the City limits.

1.06 USE OF CHEMICALS:

A. Chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall be approved by U.S. EPA or U.S. Department of Agriculture or any other applicable regulatory agency.

B. Use and disposal of chemicals and residues shall comply with manufacturer's instructions.

1.07 NOISE CONTROL:

A. Conduct operations to cause least annoyance to residents in vicinity of Work, and comply with applicable local ordinances.

B. Equip compressors, hoists, and other apparatus with mechanical devices necessary to minimize noise and dust. Equip compressors with silencers on intake lines.

C. Equip gasoline or oil-operated equipment with silencers or mufflers on intake and exhaust lines.

D. Line storage bins and hoppers with material that will deaden sounds.

E. Conduct operation of dumping rock and of carrying rock away in trucks so as to cause minimum of noise and dust.

1.08 DUST CONTROL:

A. Due to close geographic location of Project to a school and residential homes take special care in providing and maintaining temporary site roadways, Owner's existing roads, and public roads used during construction operations in clean, dust free condition.

B. Comply with local environmental regulations for dust control. If Contractor's dust control measures are considered inadequate by Engineer, Engineer may require Contractor to take additional dust control measures.

C. The Contractor shall obtain a permit from the San Joaquin Valley Air Pollution Control District.

1.09 FUELS AND LUBRICANTS:

A. Comply with local, state and federal regulations concerning transportation and storage of fuels and lubricants.

B. Report spills or leaks from fueling equipment or construction equipment to Owner and cleanup as required by local, state or federal regulations.

C. Owner may require Contractor to remove damaged or leaking equipment from Project site.

1.10 FUEL AND LUBRICANTS:

A. Project site is within well recharge area.

B. Minimize use of potentially hazardous materials including fuels and lubricants.

C. Keep motorized equipment in good working order with no fuel or lubricant leakage. Protect ground surface from leakage using tarps or other methods.

D. If grease, oil, solvent, or other residue from Contractor operations occurs, Contractor shall conduct remedial investigation and remediate as required by Owner.

E. Do not change oil on equipment or store or dispose of fuels, solvents, lubricants, or other potentially hazardous materials on site.

1.11 PILE AND SHEATHING DRIVING NOISE:

If piles are required, use only pile driver hammers with mufflers capable of significantly reducing noise and use barriers or shielding techniques to comply with applicable federal, state, and local ordinances.

1.12 NOTIFICATIONS:

The Engineer will notify the Contractor in writing of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements shall notify the Contractor in writing, through the Engineer, of any non-compliance with State or local requirements. The Contractor shall, after receipt of such notice from the Engineer or from the regulatory agency through the Engineer, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later determined that the Contractor was in compliance.

1.13 IMPLEMENTATION:

A. Prior to commencement of the work, meet with the Engineer to develop mutual understandings relative to compliance with this provision and administration of the environmental pollution control program.

B. Remove temporary environmental control features, when accepted by the Engineer, and incorporate permanent control features into the project at the earliest practicable time.

END OF SECTION

SECTION 01 43 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section covers Quality Assurance and Control requirements for this contract.

B. The Contractor is responsible for controlling the quality of work, including work of its subcontractors, and suppliers and for assuring the quality specified in the Technical Specifications is achieved.

C. Refer to the General Conditions Article 6 - Contractor's Responsibilities, paragraphs 6.01, 6.02, and 6.03.

1.02 SUMMARY:

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.

3. Requirements for Contractor to provide quality-assurance and control services required by Engineer**,** or authorities having jurisdiction are not limited by provisions of this Section.

1.03 REFERENCES:

A. American Society for Testing and Materials (ASTM):

1. E329: Standard Specification for Agencies Engaged in Construction Inspection and/or Testing

1.04 DEFINITIONS:

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer.

C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

D. Product Testing: Tests and inspections that are performed by a Nationally Recognized Testing Laboratory (NRTL), an (National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.

2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.05 CONFLICTING REQUIREMENTS:

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.06 SUBMITTALS:

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.

2. Entity responsible for performing tests and inspections.

3. Description of test and inspection.

4. Identification of applicable standards.

5. Identification of test and inspection methods.

6. Number of tests and inspections required.

7. Time schedule or time span for tests and inspections.

8. Requirements for obtaining samples.

9. Unique characteristics of each quality-control service.

1.07 CONTRACTOR'S QUALITY-CONTROL PLAN:

A. Quality-Control Plan, General: Submit quality-control plan within ten (10) days of Notice of Award, and not less than five (5) days prior to preconstruction conference. Submit in format acceptable to Engineer. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.

2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."

3. Owner-performed tests and inspections indicated in the Contract Documents.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of accepted and rejected results. Include work Engineer has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.08 REPORTS AND DOCUMENTS:

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.

2. Project title and number.

3. Name, address, and telephone number of testing agency.

4. Dates and locations of samples and tests or inspections.

5. Names of individuals making tests and inspections.

6. Description of the Work and test and inspection method.

7. Identification of product and Specification Section.

8. Complete test or inspection data.

9. Test and inspection results and an interpretation of test results.

10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.

11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.

12. Name and signature of laboratory inspector.

13. Recommendations on retesting and reinspecting.

B. Manufacturer’s Technical Representative’s Field Reports: Prepare written information documenting manufacturer’s technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical representative making report.

2. Statement on condition of substrates and their acceptability for installation of product.

3. Statement that products at Project site comply with requirements.

4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.

5. Results of operational and other tests and a statement of whether observed performance complies with requirements.

6. Statement whether conditions, products, and installation will affect warranty.

7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative’s Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.

2. Statement that equipment complies with requirements.

3. Results of operational and other tests and a statement of whether observed performance complies with requirements.

4. Statement whether conditions, products, and installation will affect warranty.

5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.09 QUALITY ASSURANCE:

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.

b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

K. Codes and Standards: Refer to General Conditions Article 3 - Contract Documents: Intent, Amending, Reuse, paragraph 3.03 of the General Conditions.

L. Copies of applicable referenced standards are not included in the Contract Documents. Where copies of standards are needed by the Contractor for superintendence and quality control of the work, the Contractor shall obtain a copy or copies directly from the publication source and maintain at the jobsite, available to the Contractor's personnel, subcontractors, and Engineer.

M. Quality of Materials: Unless otherwise specified, all materials and equipment furnished for permanent installation in the Work shall conform to applicable standards and specifications and shall be new, unused, and free from defects and imperfections, when installed or otherwise incorporated in the Work. The Contractor shall not use material

and equipment for any purpose other than that intended or specified unless the Engineer authorizes such use.

N. Where so specified, products or workmanship shall also conform to the additional performance requirements included within the Contract Documents to establish a higher or more stringent standard or quality than that required by the referenced standard.

1.10 MATERIALS AND EQUIPMENT:

A. The Contractor shall maintain control over procurement sources to ensure that materials and equipment conform to specified requirements in the Contract Documents.

B. The Contractor shall comply with manufacturer's printed instructions regarding all facets of materials and/or equipment movement, storage, installation, testing, startup, and operation. Should circumstances occur where the contract documents are more stringent than the manufacturer's printed instructions, the Contractor shall comply with the specifications. In cases where the manufacturer's printed instructions are more stringent than the contract documents, the Contractor shall advise the Engineer of the disparity and conform to the manufacturer's printed instructions. In either case, the Contractor is to apply the more stringent specification or recommendation, unless accepted otherwise by the Engineer.

1.11 QUALITY CONTROL:

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.

2. The Contractor shall furnish a construction schedule and a minimum of 48 hour notice of readiness for testing and inspection of the work. The Engineer shall determine the exact time and location of field sampling and testing, and may require such additional sampling and testing to determine that materials and equipment conform with data previously furnished by Contractor and with the Contract Documents.

3. The Contractor shall schedule the work to permit adequate time for testing and re-testing should test results not conform to the contract documents. Lack of testing or inspection which is attributable to insufficient notice by the Contractor or failure of the Contractor to cooperate, will be cause for rejection of the work.

4. The Contractor shall deliver materials in sufficient quantities to the Owner's testing agency as may be required. Laboratory testing shall be performed within a reasonable time, consistent with the specified standards.

5. The Contractor shall furnish material samples and cooperate in the field sampling and testing activities, interrupting the work when necessary. The Contractor shall furnish personnel, facilities and access to assist in the sampling and testing activities.

6. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

2. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

3. Comply with manufacturers' instructions, including each step in sequence.

4. When manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

5. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

6. Perform Work by persons qualified to produce required and specified quality.

7. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

8. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

9. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

   a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

10. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

11. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

12. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

13. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Tolerances:

1. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

2. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

3. Adjust products to appropriate dimensions; position before securing products in place.

D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

E. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

F. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

G. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.

6. Do not perform any duties of Contractor.

H. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.

4. Facilities for storage and field curing of test samples.

5. Delivery of samples to testing agencies.

6. Preliminary design mix proposed for use for material mixes that require control by testing agency.

7. Security and protection for samples and for testing and inspecting equipment at Project site.

I. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

J. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.12 SPECIAL TESTS AND INSPECTIONS:

A. Special Tests and Inspections: Engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.

2. Notifying Engineer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.

3. Submitting a certified written report of each test, inspection, and similar quality-control service to Engineer with copy to Contractor and to authorities having jurisdiction.

4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.

6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of correct characteristics, and in correct locations.

3.02 QUALITY CONTROL:

A. Quality control is the responsibility of the Contractor, and the Contractor shall maintain control over construction and installation processes to assure compliance with specified requirements.

B. Certifications for personnel, procedures, and equipment associated with special processes (e.g., welding, cable splicing, instrument calibration, surveying) shall be maintained in the Contractor's field office, available for inspection by the Engineer. Copies shall be made available to the Engineer upon request.

C. Means and methods of construction and installation processes are the responsibility of the Contractor, and at no time is it the intent of the Engineer to supersede or void that responsibility.

3.03 TEST AND INSPECTION LOG:

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.

2. Description of the Work tested or inspected.

3. Date test or inspection results were transmitted to Engineer.

4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

3.04 REPAIR AND PROTECTION:

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 74 23

CLEANING UP

PART 1 - GENERAL

1.01 SUMMARY:

A. Execute cleaning during progress of Work and at completion of Work.

B. Refer to specification sections for specific cleaning for Products or Work.

1.02 DISPOSAL REQUIREMENTS:

A. Conduct cleaning and disposal operations to comply with local codes, ordinances, regulations, and anti-pollution laws. Do not burn or bury rubbish or waste materials on Project site. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains. Do not dispose of wastes into streams or waterways.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Use only those cleaning materials which will not create hazards to property and persons or damage surfaces of material to be cleaned.

B. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

PART 3 - EXECUTION

3.01 CLEANING DURING CONSTRUCTION:

A. Comply with General Conditions.

A. At all times maintain areas covered by the contract and adjacent properties and public access roads free from accumulations of waste, debris, and rubbish caused by construction operations.

B. During execution of work, clean site, adjacent properties, and public access roads and dispose of waste materials, debris, and rubbish to assure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish. Unneeded construction equipment shall be removed and all damage repaired so that the public and property owners will be inconvenienced as little as possible.

C. Wet down dry materials and rubbish to lay dust and prevent blowing dust.

D. Cover or wet excavated material leaving and arriving at the site to prevent blowing dust. Clean the public access roads to the site of any material falling from the haul trucks.

E. Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes structures, work done under this contract, or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the work, and the ditches, channels, drains, pipes, structures, and work, etc., shall, upon completion of the work, be left in a clean and neat condition.

F. On or before the completion of the work, the Contractor shall, unless otherwise especially directed or permitted in writing, tear down and remove all temporary buildings and structures built by him; shall remove all temporary works, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.

G. Provide on-site containers for collection and removal of waste materials, debris, and rubbish in accordance with applicable regulations.

3.02 FINAL CLEANING:

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting final inspection for the Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

d. Remove tools, construction equipment, machinery, and surplus material from Project site.

e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

f. Remove labels that are not permanent.

g. Leave Project clean and ready for use.

C. Electrical Contractor shall touch-up paint or repaint damaged finishes on electrical items delivered to Project with finish coat of paint. Engineer will make final determination of items to be repainted or touched-up.

D. Prior to completion, Contractor with Engineer**,** shall conduct inspection of sight-exposed interior and exterior surfaces and work areas to verify Work and site is clean.

END OF SECTION

SECTION 01 77 00

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Final completion procedures.

2. Warranties.

3. Final cleaning.

4. Repair of the Work.

5. Specific closeout and special cleaning requirements for the Work in those Sections.

1.03 SUBMITTALS:

A. Submit the following shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.04 STARTING OF SYSTEMS:

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Engineer seven days prior to start-up of each item.

C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01 33 00 that equipment or system has been properly installed and is functioning correctly.

1.05 DEMONSTRATION AND INSTRUCTIONS:

A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.

B. Required instruction time for each item of equipment and system is specified in individual sections.

1.06 TESTING AND ADJUSTING:

A. Test and adjust operating Products and equipment to ensure smooth and unhindered operation.

1.07 SPARE PARTS AND MAINTENANCE PRODUCTS:

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.

B. Deliver to and place in location as directed by Owner; obtain receipt prior to final payment.

1.08 FINAL COMPLETION PROCEDURES:

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."

2. Submit record documents.

3. Submit a final compaction report for the project. The final compaction report shall be considered an engineering report and shall include the engineering opinion of the Geotechnical Engineer-in-Charge regarding quality assurance.

a. The report shall include the results from all earthworks related testing conducted for the project including in-place densities and moisture contents, maximum curve densities, optimum moisture contents, sampling dates and a USGS materials description for the appropriate materials, equipment, methodologies and standards employed, any relevant observations relating to earthwork conformance, and any other relevant testing conducted such as organic content, unconfined compressive strengths, etc.

b. The report shall disclose and identify any specific discrepancies or deficiencies in the earthwork or related construction that the testing agencies have knowledge of. It shall also include a discussion on resolutions to these discrepancies or deficiencies.

c. The Geotechnical Engineer shall either certify the earthwork for the project or state that the earthwork was not in conformance with applicable federal, state and local regulation and standards, geotechnical recommendation for the project, plans and specifications and standards of practice.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.09 SUBMITTAL OF PROJECT WARRANTIES:

A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.01 FINAL CLEANING:

A. General: Perform final cleaning in accordance with Section 01 74 23.

B. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 35 43 "Protection of Environment."

3.02 REPAIR OF THE WORK:

A. Complete repair and restoration operations before requesting inspection for determination of Final Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

3.03 ADJUSTING:

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

END OF SECTION

SECTION 02 01 20

PROTECTING EXISTING UNDERGROUND UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Protecting existing underground utilities.

1. Removing and plugging abandoned lines.

2. Compaction.

3. Alternative support methods.

4. Protecting thrust blocks.

1.02 REFERENCES:

A. American Society for Testing and Materials (ASTM):

1. C425: Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.

2. C700: Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.

1.03 PROJECT/SITE CONDITIONS:

A. Pipelines will be indicated on the drawings, but the right is reserved to the Owner, acting through the Engineer, to make such modifications in location as may be found desirable to avoid interference with existing utilities.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Except as indicated, or as specifically authorized by the Engineer, where existing utilities to remain must be removed, reconstruct utilities with new material of the same size, type, and quality as that removed.

B. Vitrified Clay Sewer Pipe and Couplings: For pipe 8 inches or less in diameter, replace with plain-end pipe conforming to ASTM C700.

1. Compression Coupling: ASTM C425, compression couplings. Use at least two lengths of pipe in crossing the trench section.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Comply with the requirements in Section 01 14 14.

B. Test Pits: Excavate test pits to field verify the locations, depth of bury, diameter, and pipe material of existing underground utilities at crossings and at tie-in points before ordering materials or commencing excavation. Immediately notify the Engineer if conflicts are encountered.

3.02 PREPARATION:

A. Where utilities are parallel to or cross work, but do not conflict with work, notify the utility owner at least 48 hours in advance of construction at the crossing. Coordinate the construction schedule with the utility owner.

3.03 PROCEDURES:

A. Protect in Place: Protect utilities in place, unless abandoned, and maintain the utility in service, unless otherwise indicated or specified.

B. Damage to Utilities to Remain: If existing utilities to remain are damaged, immediately notify utility owner, and repair to owner's satisfaction.

3.04 COMPACTION:

A. Protecting Existing Utilities:

1. Backfill and compact under and around utilities. Compaction shall conform to Section 31 23 00.

2. Where compaction cannot adequately be performed around utility due to the presence of encroaching existing utilities, utilize Class C Concrete.

3.05 PROTECTION OF THRUST BLOCKS:

A. Protect thrust blocks on existing waterlines or sewer force mains in place or shore to resist the thrust by a means accepted by the Engineer**,** and reconstruct. If the thrust blocks are exposed or rendered to be ineffective in the opinion of the Engineer**,** reconstruct them to bear against firm unexcavated or backfill material.

1. Provide firm support by backfilling affected portion of the trench for a distance of 2 feet on each side of the thrust block to be reconstructed from the pipe bedding to

the pavement subgrade with native material compacted to a relative compaction of 95 percent.

2. Excavate the backfill material for construction of the thrust block.

3. Test compaction of the backfill material before pouring any concrete thrust block.

END OF SECTION

TECHNICAL PROVISIONS

SECTION 03 05 00

GENERAL CONCRETE CONSTRUCTION

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of formwork, reinforcing steel, joints, concrete, and finishing and curing for general concrete construction.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Prepare mix designs in accordance with ACI 318, Chapters 4 and 5, except as modified herein. Submit mix design in writing for review at least 15 days before placing of any concrete.

PART 2 - MATERIALS

2.01 NONDOMESTIC CEMENT AND ADDITIVES

A. The use of nondomestic cement and additives in concrete may be permitted only after review of a written request to use such materials. The request to use nondomestic materials shall include a chemical analysis that indicates the material meets the project specifications. Certifications that state the nondomestic materials meet the project requirements will not be accepted.

B. Test reports for concrete materials shall be current to within three months of inclusion into the project and shall be identifiable to the materials supplied.

2.02 FORMWORK

A. Design forms according to ACI 347.

B. Class I Forms: Use steel forms, ply form, or smooth-surface plywood 3/4-inch minimum thickness for straight surfaces and 1/2-inch minimum thickness for curved surfaces.

C. Class II Forms: Use plywood in good condition, metal, or smooth-planed boards free from large or loose knots with tongue and groove or ship lap joints.

D. Class II forms may be used for exterior concrete surfaces that are 1 foot or more below finished grade. Use Class I forms for all other surfaces.

E. Coat forms with form release agent.

2.03 BOND BREAKER

Bond breaker shall be a nonstaining type which will provide a positive bond prevention, such as Williams Tilt-Up Compound, as manufactured by Williams Distributors, Inc., Seattle, Washington; Silcoseal 77, as manufactured by SCA Construction Supply Division, Superior Concrete Accessories, Franklin Park, Illinois; or equal.

2.04 FORM RELEASE AGENT

A. Form release agent shall effectively prevent absorption of moisture and prevent bond with the concrete. Agent shall be nonstaining and nontoxic after 30 days.

B. For steel forms, release agent shall prevent discoloration of the concrete due to rust.

2.05 REINFORCING STEEL

A. Reinforcement shall conform to ASTM A615 or A706, Grade 60.

B. Fabricate reinforcing in accordance with the current edition of the Manual of Standard Practice, published by the Concrete Reinforcing Steel Institute. Bend reinforcing steel cold.

C. Deliver reinforcing steel to the site bundled and with identifying tags.

2.06 WELDED WIRE REINFORCEMENT

Welded wire reinforcement shall conform to ASTM A185.

2.07 TIE WIRE

Tie wire shall be 16 gauge minimum, black, soft annealed.

2.08 BAR SUPPORTS

Bar supports in beams and slabs exposed to view after form stripping shall be galvanized and plastic coated. Use concrete supports for reinforcing in concrete placed on grade.

2.09 CEMENT

A. Use domestic portland cement that conforms to ASTM C150, Type II. Use only one brand of cement in any individual structure. Use no cement that has become damaged, partially set, lumpy, or caked. Reject the entire contents of the sack or container that contains such cement. Use no salvaged or reclaimed cement.

B. Maximum tricalcium aluminate shall not exceed 8%. The maximum percent alkalies shall not exceed 0.6%.

2.10 AGGREGATES

Aggregates shall be natural rock, sand, or crushed natural rock shall comply with ASTM C33, and shall contain less than 1% asbestos by weight or volume. Aggregates shall be free from any substances that will react with the cement alkalies, as determined by Appendix X-1 of ASTM C33.

2.11 WATER AND ICE

Use water and ice that is clean and free from objectionable quantities of organic matter, alkali, salts, and other impurities that might reduce the strength, durability, or otherwise adversely affect the quality of the concrete. Water shall not contain more than 500 mg/L of chlorides or more than 500 mg/L of sulfate.

2.12 COLOR ADDITIVE FOR EXTERIOR ELECTRICAL DUCT ENCASEMENT

For exterior electrical duct concrete encasements, use a color additive for identification purposes: brick red "Colorfull" as manufactured by Owl Manufacturing Company, Arcadia, California; coral red "Chromix C-22" as manufactured by L. M. Scofield Company, Los Angeles, California; or equal. Add the color additive while the concrete is being mixed using the quantity per cubic yard of concrete recommended by the manufacturer for the class of concrete indicated.

2.13 CONCRETE ADMIXTURES

A. Class A concrete shall contain an air-entraining admixture conforming to ASTM C260. Admixtures shall be Master Builders MB-AE 90, Sika AER, or equal.

B. Class A concrete shall contain a water-reducing admixture conforming to ASTM C494, Type A. It shall be compatible with the air-entraining admixtures. The amount of admixture added to the concrete shall be in accordance with the manufacturer's recommendations. Admixture shall be Master Builders Pozzolith polymer-type normal setting, Plastocrete 161 or Plastiment, Sika Chemical Corporation, or equal.

C. Mineral Admixture: Class A concrete shall contain a mineral admixture, fly ash Class F, conforming to ASTM C618, not to exceed or replace more than 15% of the cement material required without the mineral admixture.

2.14 GROUT

A. Nonshrink grout shall conform to ASTM C1107 and to these specifications. Use a nongas-liberating type, cement base, premixed product requiring only the addition of water for the required consistency. Grout shall be UPCON High Flow, Master Flow 928, or equal. Components shall be inorganic.

B. Ordinary type grout (dry pack) shall consist of one part portland cement to two parts sand (100% passing a No. 8 sieve). Add sufficient water to form a damp formable consistency.

C. Expansive Grout: Premixed, cementitious mixture with a minimum 28-day strength of 3,500 psi. Provide air-entraining admixture as recommended by the manufacturer.

2.15 GROUT BEDDING FOR HORIZONTAL JOINTS

The grout placed on horizontal construction joints shall be a mixture of cement, sand, and water in the same proportions and strength used in the overplaced concrete with coarse aggregate omitted.

2.16 REPAIR MORTAR

A. Mortar used for repair of concrete voids shall be made of the same materials as used for concrete, except that the coarse aggregate shall be omitted or the mortar shall consist of not more than one part cement to two and one-half parts sand by damp loose volume. The quantity of mixing water shall be no more than necessary for handling and placing.

B. Materials for repair of major defects or cracks shall be in accordance with “Repair of Defects and Cracks” specified in Part 3.

2.17 BONDING COMPOUND

A. Epoxy bonding compound shall be Sikadur 32 Hi-Mod, Sika Chemical Corporation, Lyndhurst, New Jersey; Concresive by BASF; Euco Epoxy 452 by Euclid Chemical Company; or equal.

B. Nonepoxy bonding compound shall be Weldcrete by Larsen Products Corp., Link by Sta-Dry Manufacturing Corp., Euco Weld by Euclid Chemical Co., or equivalent. The compound shall be rewettable for up to two weeks.

2.18 CONCRETE MIX DESIGN

A. Conform to ASTM C94, except as modified by these specifications.

B. Air content as determined by ASTM C231 shall be 4% ±1%.

C. Maximum water-cement ratio for Class A concrete = 0.45 by weight.

D. Use classes of concrete as described in the following table:

Class	Type of Work	28-Day Compressive Strength (in psi)	Minimum Cement Content (in lbs per C.Y.)
A	Concrete for all structures and concrete not otherwise specified. Concrete fill at structure foundations, cradle, supports across pipe trenches, and reinforced pipe encasement.	4,000	564
B	Pavement	3,000	500
C	Floor grout and miscellaneous unreinforced concrete.	2,000	376

E. Measure slump in accordance with ASTM C143. Slump shall be as follows:

Slab on grade or heavy sections wider (in plan view) than 3 feet	3 inches maximum
Footings, walls, suspended slabs, beams, and columns	4 inches maximum
Pavement	2 inches maximum
Floor grout	4 inches maximum

Proportion and produce the concrete to have a maximum slump as shown. A tolerance of up to 1 inch above the indicated maximum shall be allowed for individual batches provided the average for all batches or the most recent 10 batches tested, whichever is fewer, does not exceed the maximum limit. Concrete of lower than usual slump may be used provided it is properly placed and consolidated.

F. Aggregate size shall be 3/4 inch maximum for slabs and sections 8 inches thick and less. Aggregate size shall be 1 inch maximum for slabs and sections greater than 8 inches and less than 17 inches. Aggregate size shall be 1 1/2 inches maximum for all larger slabs and sections. Aggregate size for floor grout shall be maximum 3/8 inch.

G. Combined aggregate grading shall be as shown in the following table:

	Maximum Aggregate Size			
	1 1/2"	**1"**	**3/4"**	**3/8"**
Aggregate Grade per ASTM C33	467	57	67	8

H. Mix design for pumped concrete shall produce a plastic and workable mix. The percentage of sand in the mix shall be based on the void content of the coarse aggregate.

2.19 SLURRY CEMENT BACKFILL

A. Slurry cement backfill shall consist of a fluid, workable mixture of aggregate, cement, and water.

B. Aggregate shall be either:

1. Material selected from excavation, imported material, or a combination thereof, free from organic matter and other deleterious materials and meeting the following gradation:

Sieve Sieves	**Percentage Passing**
1 1/2 inches	100
1 inch	80 to 100
3/4 inch	60 to 100
3/8 inch	50 to 100
No. 4	40 to 80
No. 100	10 to 40

2. Commercial quality concrete sand.

C. Proportion the aggregate, cement, and water by either weight or volume. Include at least 188 pounds of cement per cubic yard produced. The water content shall be sufficient to produce a fluid, workable mix that will flow and can be pumped without segregation of the aggregate while being placed.

D. Thoroughly machine-mix the materials for the slurry cement backfill in pugmill, rotary drum, or other mixer. Continue the mixing until the cement and water are thoroughly dispersed throughout the material. Place slurry cement backfill within one hour after mixing.

2.20 CURING COMPOUND

A. Curing compound shall conform to ASTM C309, Type 1, Class B.

B. Curing compound shall be compatible with required finishes and coatings and shall meet the State of California Clean Air Quality Standards which limit the quantity of volatile organic compounds to 100 grams per liter.

2.21 MATS, PAPER, AND SHEETING FOR CURING

A. Burlap mats shall conform to AASHTO M182.

B. Sisal-kraft paper and polyethylene sheets shall conform to ASTM C171.

2.22 REINFORCING DOWEL ADHESIVE

Dowel anchor adhesive shall be HIT-RE 500-SD by Hilti; Sikadur 31, Hi-Mod Gel by Sika; or equal.

PART 3 - EXECUTION

3.01 FORM TOLERANCES

A. Failure of the forms to produce the specified concrete surface and surface tolerance shall be grounds for rejection of the concrete work. Rejected work shall be repaired or replaced at no additional cost to the Owner.

B. The following table indicates tolerances or allowable variations from dimensions or positions of structural concrete work:

	Maximum Tolerance (inch)
Sleeves and inserts	+1/4 -1/4
Projected ends of anchors	+1/4 -0.0
Anchor bolt setting	+1/4 -1/4
Finished concrete, all locations	+1/4 -1/4 in 10 feet
	Max ±1-inch in total length

The planes or axes from which the above tolerances are to be measured shall be as follows:

Sleeves and inserts:	Centerline of sleeve or insert.
Projected ends of anchors:	Plane perpendicular to the end of the anchor as located in the drawings.
Anchor bolt setting:	Centerline of anchor bolt.
Finish concrete:	The concrete surface as defined in the drawings.

Where equipment is to be installed, comply with manufacturer's tolerances if more restrictive than above.

3.02 FORM SURFACE PREPARATION

A. Clean form surfaces to be in contact with concrete of foreign material prior to installation.

B. Coat form surfaces in contact with concrete with a release agent prior to form installation.

3.03 FORM REUSE

Reuse only forms that provide a uniform surface texture on exposed concrete surfaces. Apply light sanding or other surface treatment between uses for uniform texture. Plug unused tie rod holes with corks, shave flush, and sand the concrete surface side. Do not patch forms other than filling tie rod holes, except in the case of Class II forms. Do not use metal patching discs on Class I forms.

3.04 REMOVAL OF FORMS

A. Forms and shoring for elevated structural slabs or beams shall remain in place until the concrete has reached a compressive strength equal to the specified 28-day compressive strength as determined by test cylinders. Do not remove supports and reshore. The following table indicates the minimum allowable time after the last cast concrete is placed before forms, shoring, or wall bracing may be removed:

Sides of footings and encasements	24 hours
Walls, vertical sides of beams, girders, columns, and similar members not supporting loads	48 hours
Slabs, beams, and girders	10 days (forms only)
Shoring for slabs, beams, and girders	Until concrete strength reaches specified 28-day strength
Wall bracing	Until top or roof slab concrete reaches specified 28-day strength

B. Do not remove forms from concrete that has been placed with outside air temperature below 50°F without first determining if the concrete has properly set without regard for time. Do not apply heavy loading on green concrete. Immediately after forms are removed, the surface of the concrete shall be carefully examined and any irregularities in the surface shall be repaired and finished as specified.

3.05 FORMED OPENINGS

Openings shall be of sufficient size to permit final alignment of pipes or other items without deflection or offsets of any kind. Allow space for packing where items pass through the wall to ensure watertightness. Provide openings with continuous keyways and water stops. Provide a slight flare to facilitate grouting and the escape of entrained air during grouting. Provide formed openings with reinforcement as indicated in the typical structural details. Reinforcing shall be at least 2 inches clear from the opening surfaces and encased items.

3.06 EMBEDDED ITEMS

Set anchor bolts and other embedded items accurately and hold securely in position until the concrete is placed and set. Check all special castings, channels, or other metal parts that are to be embedded in the concrete prior to and again after concreting. Check nailing blocks, plugs, and strips necessary for the attachment of trim, finish, and similar work prior to concreting.

3.07 BEVELED EDGES (CHAMFER)

Form 3/4-inch beveled edges on exposed concrete edges and corners, beam soffit corners, and where indicated in the drawings. Reentrant corners in concrete members shall not have fillets, unless otherwise shown in the drawings. The top edges of slabs, walkways, beams, and walls may be beveled with an edging trowel in lieu of using chamfer strips.

3.08 PLACING REINFORCEMENT

A. Place reinforcing steel in accordance with the current edition of Recommended Practice for Placing Reinforcing Bars, published by the Concrete Reinforcing Steel Institute.

B. Place reinforcing in accordance with the following, unless otherwise indicated:

1. Reinforcement indicated in the drawings is continuous through the structure to the farthest extent possible. Terminate bars and hooks 2 inches clear from faces of concrete.

2. Splices may be used to provide continuity due to bar length limitations. Minimum length of bars spliced for this reason is 30 feet. Splicing of reinforcement that is detailed to be continuous in the drawings is not permitted.

C. Reinforcing steel, before being positioned and just prior to placing concrete, shall be free from loose mill and rust scale and from any coatings that may destroy or reduce the bond. Clean reinforcing steel by sandblasting or wire brushing and remove mortar, oil, or dirt to remove materials that may reduce the bond.

D. Do not straighten or rebend reinforcing steel in the field.

E. Position reinforcing steel in accordance with the drawings and secure by using annealed wire ties or clips at intersections and support by concrete or metal supports, spacers, or metal hangers. Do not place metal clips or supports in contact with the forms. Bend tie wires away from the forms to provide the specified concrete coverage. Bars, in addition to those shown in the drawings, which may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the Contractor at his own expense.

F. Place reinforcement a minimum of 2 inches clear of any metal pipe or fittings.

G. Secure reinforcing dowels in place prior to placing concrete. Do not press dowels into the concrete after the concrete has been placed.

H. Roll wire mesh used for reinforcement flat before placing concrete. Support and tie wire mesh to prevent movement during concrete placement.

I. Position dowels for masonry walls to occur at reinforced block cells.

3.09 SITE-MIXED CONCRETE

Conform to ACI 304.

3.10 READY-MIXED CONCRETE

Conform to ASTM C94.

3.11 PLACING CONCRETE

Conform to ACI 304.

3.12 PUMPING CONCRETE

Conform to ACI 304.2R-91.

3.13 WEATHER REQUIREMENTS

A. Conform to ACI 305 for placing during hot weather.

B. Conform to ACI 306 for placing during cold weather.

3.14 BACKFILL AGAINST WALLS

A. Do not place backfill against walls until the concrete has obtained a compressive strength equal to the 28-day compressive strength. Where backfill is to be placed on both sides of the wall, place the backfill uniformly on both sides.

B. Do not backfill the walls of structures that are laterally restrained or supported by suspended slabs or slabs on grade until the slab is poured and the concrete has reached the specified compressive strength.

3.15 PLACING SLURRY CEMENT BACKFILL

Place slurry cement backfill in a uniform manner that will prevent voids in, or segregation of, the backfill. Remove foreign material that falls into the excavation or trench. Do not commence backfilling over or place any material over the slurry cement backfill until at least four hours after placing the slurry cement backfill, except that when concrete sand is used for the aggregate and the in-place material is free draining, backfilling may commence as soon as the surface water is gone.

3.16 CONCRETE FINISHES

Complete concrete surfaces in accordance with the following schedule:

Finish Designation	Area Applied
F-1	Beams, columns, and exterior walls not exposed to view.
F-3	Beams, columns, and walls of structures or buildings exposed to view. Underside of formed floors or slabs.
F-4	Exterior and interior surfaces to be coated.
S-1	Slabs and floors to be covered with concrete or grout.
S-4	Slabs and floors of structures or buildings exposed to view.
S-5	Slabs and floors at slopes greater than 10% and stairs.
E-1	Exposed edges. EXCEPTION: edges normally covered with earth.
E-2	Top of walls, beams, and similar unformed surfaces.

Finish F-3: In addition to Finish F-1, remove fins, fill depressions 1/4 inch or deeper, fill depressions and airholes with mortar. Dampen surfaces and then spread a slurry consisting of one part cement and one and one-half parts sand by damp loose volume, over the surface with clean burlap pads or sponge rubber floats. Remove any surplus by scraping and then rubbing with clean burlap.

Finish F-4: Repair defective concrete, remove fins, fill depressions 1/16 inch or deeper, fill tie holes, remove mortar spatter, and remove bulges higher than 1/16 inch.

Finish S-1: Screed to grade without special finish.

Finish S-4: Steel trowel finish without local depressions or high points and apply a light hair-broom finish. Do not use stiff bristle brooms or brushes. Leave hair-broom lines parallel to the direction of slab drainage.

Finish S-5: Steel trowel finish without local depressions or high points. Apply a stiff bristle broom finish. Leave broom lines parallel to the direction of slope drainage.

Finish E-1: Provide chamfer or beveled edges.

Finish E-2: Strike smooth and float to an F-3 or F-4 finish.

3.17 CURING CONCRETE

A. Conform to ACI 308.

B. Water cure with burlap mats unless optional curing methods are permitted.

C. It is the responsibility of the Contractor to select the appropriate curing method in response to climatical and/or site conditions occurring at the time of concrete placement. Take appropriate measures as described in ACI 305 and 306 for protecting and curing concrete during hot and cold weather.

3.18 REPAIR OF DEFECTS AND CRACKS

A. Do not repair defects until concrete has been evaluated by the Owner's Representative.

B. Surface Defects:

1. Repair surface defects that are smaller than 1 foot across in any direction and are less than 1/2 inch in depth.

2. Repair by removing the honeycombed and other defective concrete down to sound concrete, cut or grind edges perpendicular to the surface and at least 3/8 inch deep, abrasive clean and thoroughly dampen the surface, work into the surface an epoxy bonding agent, and fill the hole with one part cement to one part fine sand. Match the finish on the adjacent concrete, and cure as specified.

C. Severe Defects:

1. Repair severe defects that are larger than surface defects but do not appear to affect the structural integrity of the structure.

2. Repair by removing the honeycombed and other defective concrete down to sound concrete, make edges of the repair area perpendicular to the surface, as required above, sandblast the sound concrete surface, coat the exposed surfaces with epoxy bonding compound, place nonshrink grout, match the finish on the adjacent concrete, and cure as specified.

D. Repair minor cracks in concrete structures that are wider than 1/10 inch by cutting out a square edged and uniformly aligned joint 3/8 inch wide by 3/4 inch deep, preparing exposed surfaces of the joint, priming the joint, and applying polyurethane joint sealant.

E. If the cracks are major or affect the hydraulic capacity or function of the element, the Owner's Representative may require the concrete to be repaired by epoxy injection.

F. Major Defects and Cracks: If the defects affect the structural integrity of the structure or if patching does not satisfactorily restore quality and appearance to the surface, the Owner’s Representative may require the concrete to be removed and replaced, complete.

3.19 CONCRETE TESTS

A. Concrete quality testing will be performed on the concrete as follows:

1. Frequency of Sampling: Cast four concrete test cylinders from each 25 cubic yards, or fraction thereof, of each class of concrete placed in any one day. Sampling and curing of cylinders shall conform to ASTM C31.

2. Strength Testing: Test cylinders in accordance with ASTM C39. Test one cylinder at 7 days for information; test two cylinders at 28 days for acceptance; and hold one cylinder for verification. Strength acceptance will be based on the average of the strengths of the two cylinders tested at 28 days. If one cylinder of a 28-day test manifests evidence of improper sampling, molding, or testing, other than low strength, discard it and use the fourth cylinder for the test result.

3. Determine concrete slump by ASTM C143 with each strength test sampling and as required to establish consistency.

4. Determine air content of the concrete using ASTM C231 to verify the percentage of air in the concrete immediately prior to depositing in forms.

5. The average value of concrete strength tests shall be equal to or greater than the specified 28-day strength. No test shall be less than 90% of the specified 28-day strength.

END OF SECTION

SECTION 03 42 10

PRECAST CIRCULAR CONCRETE MANHOLES

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes design, materials, testing, and installation of precast circular concrete manholes.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Submit manufacturer's catalog data on precast concrete manholes, frames, joint sealing compound and covers. Show dimensions and materials of construction by ASTM reference and grade. Show lettering on manhole covers.

PART 2 - MATERIALS

2.01 PRECAST CIRCULAR CONCRETE MANHOLES

A. Precast circular concrete manholes shall comply with ASTM C478. Minimum manhole diameter shall be 48 inches unless otherwise indicated on the Drawings. Design manholes for the depths shown in the drawings, assuming a soil density of 130 pounds per cubic foot.

B. Minimum allowable steel shall be hoops of No. 4 wire cast into each unit.

C. Precast top sections shall be either eccentric or concentric cone, except where shown otherwise in the drawings.

D. Design joints using a butyl rubber sealant per ASTM C990.

2.02 CONCRETE

A. Cement for manholes shall conform to ASTM C150, Type II or V.

B. Concrete used in pouring the manhole base shall be Class A per Section 03 05 00.

2.03 STEPS OR RUNGS

Cast manholes without steps (ladder rungs).

2.04 MANHOLE FRAMES AND COVERS

A. Manhole frames and covers shall be made of cast iron conforming to ASTM A48, Class 30. Castings shall be smooth, clean, and free from blisters, blowholes, and shrinkage. Frames and covers shall be designed for H20-44 traffic loads. The cover shall seat firmly into the frame without rocking.

B. Grind or otherwise finish each cover so that it will fit in its frame without rocking. Frames and covers shall be matchmarked in sets before shipping to the site.

C. Manhole covers shall have the word “STORM DRAIN” cast thereon. Do not apply any other lettering.

D. Minimum weight of frames and covers shall be 280 lbs.

E. Before leaving the foundry, clean castings and subject them to a hammer inspection.

2.05 SEALING COMPOUND AND MORTAR

Butyl rubber sealing compound shall comply with ASTM C990. Mortar shall comply with ASTM C387, Type S, or use grout complying with Section 03 05 00.

PART 3 - EXECUTION

3.01 MANHOLE BASE

A. Pour concrete bases as one monolithic pour.

3.02 INSTALLING MANHOLES

A. Set each precast concrete manhole unit plumb on a bed of sealant to make a watertight joint at least 1/2 inch thick with the concrete base or with the preceding unit. Point the inside joint and wipe off the excess sealant. Secure the manhole frame to the grade ring with grout and cement mortar fillet. Backfill, compact, and replace pavement.

B. Assemble units so that the cover conforms to the elevation determined by the manhole location as follows:

1. In Paved Areas: Top of cover shall be flush with the paving surface.

2. In Shoulder Areas: Top of cover shall be flush with existing surface where it is in traveled way of shoulder and 0.1 foot above existing surface where outside limits of traveled way but not in the existing roadside ditch.

3. In Roadside Ditch or Unpaved Open Areas: Top of cover shall be 24 inches above the ground surface. Attach the manhole cover frame to the cone using four expansion anchors.

3.03 SEALING AND GROUTING OF MANHOLE SECTIONS

Clean ends of precast sections of foreign materials. Place two wraps of butyl rubber sealing compound around the groove of the lower section. Set next section in place. Fill remaining interior and exterior joint cavity completely with mortar of the proper consistency. Trowel interior and exterior surfaces smooth on tongue-and-groove joints. Wipe off any excess grout from the interior and exterior of the joints. Prevent mortar from drying out by applying curing compound or comparable method. Chip out and replace cracked or defective mortar. Completed manhole shall be rigid and watertight.

3.04 BACKFILL AROUND MANHOLES

Backfill and compact around the manholes using native material, per Section 31 23 33 and the pipe specification.

END OF SECTION

SECTION 05 12 10

MISCELLANEOUS STRUCTURAL STEEL AND GRATING

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes materials, fabrication, and installation of structural steel, handrails, and steel grating.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Submit placing or erection drawings that indicate locations of fabricated items. Reproductions of contract documents will not be accepted for this purpose.

PART 2 - MATERIALS

2.01 STRUCTURAL STEEL

Material for all-purpose bolted or welded construction shall conform to the following:

A. ASTM A992: W shapes (rolled wide flange shapes).

B. ASTM A36 or A572, Grade 50: S, M, HP, and channels.

C. ASTM A36: Angles and plates.

2.02 GRATING

A. Grating shall be as detailed in the Drawings. No single piece of frating shall weigh more than 80 pounds. Length of individual pieces shall not exceed one and one-half times the width, unless limited by installation.

B. Field measure grating for proper cutouts and size.

C. Grating shall be completely banded. For pipe and conduits larger than 1-inch in diameter penetrating grating, cut and band grating before galvanizing.

D. Grating shall be welded steel. Steel grating shall be hot dipped galvanized after fabrication.

2.03 STEEL PIPE FOR HANDRAILS

Conform to ASTM A53, Grade B.

2.04 WELDING ELECTRODES

A. Welding electrodes for structural steel shall conform to AWS A5.5. Use electrodes in the E-70 series.

PART 3 - EXECUTION

3.01 STORAGE OF MATERIALS

Store structural material, either plain or fabricated, above ground on platforms, skids, or other supports. Keep material free from dirt, grease, and other foreign matter and protect from corrosion.

3.02 FABRICATION AND ERECTION

A. Fabricate miscellaneous metal items to straight lines and true curves. Drilling and punching shall not leave burrs or deformations. Continuously weld permanent connections along the entire area of contact. Exposed work shall have a smooth finish with welds ground smooth. Joints shall have a close fit with corner joints coped or mitered and shall be in true alignment. Unless specifically indicated in the drawings, there shall be no bends, twists, or open joints in any finished member nor any projecting edges or corners at intersections. Conceal fastenings wherever possible. Built-up parts shall be free of warp. Exposed ends and edges of metal shall be slightly rounded.

B. Clean the surfaces of metalwork to be in contact with concrete of rust, dirt, grease, and other foreign substances before placing concrete.

C. Set embedded metalwork accurately in position when concrete is placed and support rigidly to prevent displacement or undue vibration during or after the placement of concrete. Unless otherwise specified, where metalwork is to be installed in recesses in formed concrete, said recesses shall be made, metalwork installed, and recesses filled with dry-pack mortar in conformance with Section 033000.

D. Set seat angles for grating so that the grating will be flush with the top of the structure.

3.03 GALVANIZING FOR STEEL PLATES, PIPE, AND TUBING

Zinc coating shall be in accordance with ASTM A123.

3.04 WELDING

A. Perform welding on steel by the SMAW process. Welding shall conform to the AWS D1.1-2008, except as modified in AISC Section J2.

B. Provide a minimum of two passes for metal in excess of 5/16-inch thickness.

C. Produce weld uniform in width and size throughout its length with each layer of weldment smooth; free of slag, cracks, pinholes, and undercuttings; and completely fused to the adjacent weld beads and base metal. Avoid irregular surface, nonuniform bead pattern, and high crown. Form fillet welds of the indicated size of uniform height and fully penetrating. Accomplish repair, chipping, and grinding of welds in manner that will not gouge, groove, or reduce the base metal thickness.

3.05 BOLTING

Anchor bolts shall be as shown on the Drawings.

3.06 REPAIR OF GALVANIZED SURFACES

Repair or replace metal with damaged galvanized surfaces at no additional cost to the Owner. Repair galvanized surfaces using Z.R.C. Galvanizing Compound or equal to a minimum dry film thickness of 3 mils. Apply per ASTM A780, Annex A2. Perform surface preparation in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 26 05 11

ELECTRICAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall design and construct a complete electrical system for providing power and controls for two 15 H.P. submersible pumps, power for a 20 H.P. landscape irrigation booster pump and power for an irrigation controller.

B. Service power shall be 460 VAC – 3 PH – 60 HZ.

C. The motor control panel for the submersible pump shall include an integral utility metering section, a service breaker for the 20 H.P. booster pump and a 120 VAC breaker for the irrigation controller.

1.02 CODES, RULES AND REGULATIONS

All work shall be in full accord with the latest edition of the National Electrical Code and all state, federal, local and other laws. However, when these Specifications call for materials or construction of a better quality or larger sizes than required by the above mentioned rules and regulations, the provisions of the Specifications shall take precedence. Work shall comply with Title 24, Part 3, state of California Administrative Code.

1.03 PERMITS

All permits shall be obtained and paid by Contractor.

1.04 TYPE OF SERVICE

The Contractor shall arrange for underground power service from Pacific Gas and Electric and shall provide underground conduit(s) and metering facilities in accordance with the requirements of the serving utility. (Application for service has been made by the Owner.)

1.05 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Submit design drawings for the electrical system consisting of a minimum of:

1. A Single Line Diagram

2. Grounding Details

3. Panel Schedule

4. Electrical Site Plan

PART 2 - MATERIALS

2.01 MOTOR CONTROL CENTER

A. Enclosure

1. The enclosure shall be a NEMA 3R pedestal mounted enclosure with an integral utility metering section approved by Pacific Gas and Electric Company. The exterior of the enclosure shall be constructed of 12 gauge sheet metal steel with an oven baked powder finish. The controls shall be mounted behind a dead front steel enclosure with a padlockable door which uses a three point latching system for ease of access. The control center and all electrical components shall bear the Underwriters Laboratory (UL) label.

2. An interior aluminum or steel dead front inner door shall be mounted on a continuous aircraft type hinge and shall contain cutouts for mounted equipment and provide protection of personnel from live internal wiring. Cutouts for breaker handles shall be provided to allow operation of breakers without entering the compartment. All control switches, indicator pilot lights, elapsed time meters, and other operational devices shall be mounted on the external surface of the dead front.

3. The back plate shall be manufactured of 12 gauge sheet steel and be finished with a primer coat and two [2] coats of baked on white enamel. All hardware mounted to the back plate shall be accomplished with machine thread tapped holes. Sheet metal screws are not acceptable. All devices shall be permanently identified using engraved name plates. Use of DYMO type labels is not acceptable.

B. Breakers, Motor Starters and Transformers

1. The panel power distribution shall include all necessary components and be completely wired with tinned, stranded copper conductors rated at 90 degrees C. All conductor terminations shall be as recommended by the device manufacturer.

2. All circuit breakers shall be heavy duty thermal magnetic or motor circuit protectors similar and equal to SQUARE D type FAL. Each motor breaker shall be adequately sized to meet the pump motor operating characteristics and shall have a minimum of 10,000 amps interrupting capacity for 230 VAC and 18,000 amps at 460 VAC. The control circuit and shall individually be controlled by a heavy duty breaker.

a) Circuit breakers shall be indicating type, providing "on-off-trip" positions of the operating handle. When the breaker is tripped automatically, the handle shall assume a middle position indicating "trip".

b) Thermal magnetic motor breakers shall be quick-make and quick-break on manual and automatic operation and have inverse time characteristics secured through the use of bimetallic tripping elements supplemented by a magnetic trip.

c) Breakers shall be designed so that an overload on one pole automatically trips and opens all legs. Field installed handle ties shall not be acceptable.

3. Motor starters shall be open frame, across the line NEMA rated with individual overload protection in each leg. Motor starter contact and coil shall be replaceable from the front of the starter without removing from its mounted position. Overload heaters shall be block type, utilizing melting alloy spindles, and shall have visual trip indication. Overload shall be sized for the full load amperage draw of the pumps. Definite purpose contactors, fractional size starters and IEC contactor relays shall not be acceptable.

4. A 5 KVA transformer shall be provided to provide the 120 VAC service for GFI's, irrigation controller and control circuits when required. If required a control transformer shall be provided to provide 24 VAC. Transformers shall be fused on the primary and secondary circuits. The secondary windings shall be grounded.

5. A lightning-transient protector with tell-tale warning lights on each phase to indicate loss of protection on the individual phases shall be provided. The device shall be solid state with a response time of less then 5 nanoseconds with withstanding surge capacity of 6500 amperes. Unit shall be instant recovery, long life and have no holdover currents.

6. The Phase Monitor shall be a 12 pin, plug in style unit. The Phase Monitor shall monitor Under Voltage, Phase Reversal, Loss of Power and Phase Imbalance. The motor starter circuits shall be de-energized upon sensing of any of the faults and shall automatically restore service upon return to normal power. The Phase Monitor shall be available to monitor Over Voltage as an option. The output relay shall be DPDT rated at 10A at 240 VAC.

C. Manual Transfer Switch and Generator Receptacle

1. A manual transfer switch shall be provided with a CROUSE HINDS Model AR 2042 S22 M80 receptacle. (No substitutions.)

2. The transfer switch shall be listed per UL 1008 as a recognized component for emergency systems and rated for all classes of loads.

D. Controller for Submersible Pumps

The controller shall be a Motor Protection Electronics, Model SC 2000. (No substitutions.)

E. Alarm System

The alarm light shall be a weatherproof, shatterproof, red light fixture, mounted on the enclosure, with a 40 watt bulb to indicate alarm conditions. The alarm light shall be turned on by the high level alarm and flash until the condition has been corrected. An open contact shall be provided for remote monitoring.

F. Ancillary Equipment

1. A three position HOA switch shall be provided for each pump. The switch shall be NEMA 4x rated with 10 amp contacts except when provided on a dedicated controller it. A position indicating legend plate shall be provided. The HOA switches shall be mounted on the inner dead front door.

2. A green run pilot indicator shall be mounted on the inner dead front door for each pump.

3. An elapsed time meter shall be mounted on the inner dead front door for each pump. The meter shall operate on 120 VAC, shall indicate in hours [6 digits] and tenths and shall be non-resetable.

4. The alternator shall be a plug in, solid state unit with lead-lag-auto selector and test switches except when provided in a dedicated control device. The unit shall operate on 120 VAC and provide DPDT ten amp rated contacts. Two LEDs shall indicate the next position to run as lead pump.

5. A thermal heater and thermostat shall be installed to maintain the internal temperature of the enclosure above the dew point.

6. A 120 Volt, 20 amp GFI receptacle with its own breaker shall be provided in the enclosure.

7. Control wiring shall be copper, tinned, UL1015, 18ga. minimum.

8. Each pump shall be protected by thermal switches embedded in the motor windings. In the event of an overtemperature condition, the pumps shall shut down and remain inactive until the motor hosing cools off.

9. One Mini-Cas 120 unit shall be supplied for each pump to monitor the pump for over-temp and leakage. The unit shall have an 11pin, round base to mate with a standard 11 pin socket. The unit shall also be flanged in order to allow deadfront door mounting with use of 11 pin reverse socket, Omron part number P3GA-11.

   The unit is to be able to be powered by 24VAC, or 120VAC, and to contain LED indication for power on, over-temp, and leakage conditions. The unit shall contain

an over-temp reset bush-button to reset the unit after the fault has cleared, as well as a selector switch that that allows the selection of manual or auto reset.

The sensor input circuitry is to contain both hardware and software filters for noise immunity, as well as sensor input short circuit protection. The Mini-Cas 120 unit shall be model 14-407129, as supplied by Flygt Corporation or equal.

G. Wiring

All wiring shall be neat and color coded. Each wire shall have a different color or stripe (except for ground) and all incoming wiring shall terminate in a box type terminal.

2.02 WATER LEVEL SENSOR

The level sensor shall be a Siemens SITRANS Probe ultrasonic level transmitter. The sensor shall be provided with a stainless steel mounting bracket.

2.03 POWER AND CONTROL WIRING CONDUITS

All conduits shall be rigid non-metallic Schedule 40.

2.04 CONDUCTORS

General wiring shall be 600 Volt type THW Anaconda, Okonite, Rome, or equal. All wire shall be stranded copper. Aluminum will not be accepted.

PART 3 - EXECUTION

3.01 CONDUITS

A. Buried conduits, other than Pacific Gas and Electric utility conduits, shall be backfilled with sand to a minimum of 3 inches above the top of the conduit per Section 31 23 33. Compact all trench backfill under pavement, concrete slabs and sidewalks to 90% of maximum dry density per ASTM D1557. In open or grassy areas, compact trench backfill to 85% of maximum dry density per ASTM D1557.

B. Provide conduit sealant at motor control center, booster pump and irrigation controller. Sealant shall be a non-toxic, non-shrink, non-hardening, putty-type hand applied material providing an effective barrier under submerged conditions.

3.02 MOTOR CONTROL CENTER

The motor control center shall be mounted on a 3-½ inch high concrete housekeeping pad. Anchorage shall be in accordance with the manufacturer's recommendation.

3.03 WIRING

A. Joints, splices, taps and connections of conductors shall be made with solderless connectors as approved. Splices shall be pigtailed, separated, color coded and made mechanically strong. Use “Scotchlok”, “Hydent”, or approved equal connectors. All pigtailed ends shall be “extra long”.

B. Grounding shall be executed in accordance with applicable codes and regulations of the authorities having jurisdiction.

3.04 START-UP

3.05 TESTS AND ACCEPTANCE

Upon completion of the Work and adjustment of all equipment, all systems shall be tested in the presence of the Owner to demonstrate that all equipment furnished and installed, and/or connected under the provisions of these Specifications, shall function electrically in the manner required.

END OF SECTION

SECTION 31 11 00

CLEARING, STRIPPING, AND GRUBBING

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes the work included in clearing, stripping, grubbing, and preparing the project site for construction operations.

1.02 CLEARING

Remove and dispose of trees, snags, stumps, shrubs, brush, limbs, sticks, branches, and other vegetative growth. Remove rocks, tiles, and lumps of concrete. Remove all evidence of their presence from the surface. Remove and dispose of trash piles, and rubbish. Protect structures and piping above and below ground, trees, shrubs, and vegetative growth and fencing which are not designated for removal.

1.03 STRIPPING

A. Remove and dispose of organic sod, grass, sprinkler pipes and other objectionable material remaining after clearing from the areas designated to be stripped.

B. Remove topsoil to a depth of 12 inches and retain topsoil material onsite for dressing the basin and park areas before planting.

1.04 GRUBBING

After clearing and stripping, remove and dispose of wood or root matter, including stumps, logs, trunks, roots, or root systems greater than 1 inch in diameter or thickness to a depth of 12 inches below the ground surface.

PART 2 - MATERIALS

2.01 TREES AND SHRUBBERY

Existing trees, shrubbery, and other vegetative material may not be shown in the drawings. Inspect the site as to the nature, location, size, and extent of vegetative material to be removed or preserved, as specified herein. Preserve in place trees that are specifically shown in the drawings and designated to be preserved.

2.02 PRESERVATION OF TREES, SHRUBS, AND OTHER PLANT MATERIAL

A. Save and protect plant materials (trees, shrubbery, and plants) beyond the limits of clearing and grubbing from damage resulting from the work. No filling, excavating,

trenching, or stockpiling of materials will be permitted within the drip line of these plant materials. The drip line is defined as a circle drawn by extending a line vertically to the ground from the outermost branches of a plant or group of plants. To prevent soil compaction within the drip line area, no equipment will be permitted within this area.

B. Cut and remove tree branches where necessary for construction. Remove branches other than those required for a balanced appearance of any tree. Treat cuts with a tree sealant.

PART 3 - EXECUTION

3.01 CLEARING, STRIPPING, AND GRUBBING AREAS AND LIMITS

A. Clear, strip, and grub excavation and embankment areas associated with new structures, slabs, walks, and roadways.

B. Clear and strip stockpile areas.

C. Limits of clearing, stripping, and grubbing:

1. Excavation, Excluding Trenches: 5 feet beyond tops of cut slopes.

2. Trench excavation for piping and electrical conduits: 3 feet from edge of trench.

3. Earth Fill: 5 feet beyond toe of permanent fill as indicated in the drawings.

4. Structures: 15 feet beyond footings.

5. Sidewalks: 2 feet beyond edges.

6. Landscaped Areas: 2 feet beyond areas designated to receive landscaping.

3.02 DISPOSAL OF CLEARING AND GRUBBING DEBRIS

Do not burn combustible materials. Remove cleared and grubbed material from the worksite and dispose.

3.03 DISPOSAL OF STRIPPED MATERIAL

Remove stripped material and dispose offsite, except topsoil.

END OF SECTION

SECTION 31 23 00

EARTHWORK

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, testing, and installation of earthwork for excavations, fills, structures, and sites.

1.02 SUBMITTALS

A. Submit excavation and shoring drawings for worker protection in accordance with the General Conditions.

1.03 TESTING FOR COMPACTION

A. Test for compaction and relative density as described below.

B. Determine the density of soil in place by the sand cone method, ASTM D1556 or by nuclear methods, ASTM D6938. Additional sand cones and densities will be required if the backfill material is visually variable. The minimum depth for the sand cone test hole shall be 12 inches. Compaction tests will be performed for each lift or layer.

C. Determine laboratory moisture-density relations of soils per ASTM D1557. If nuclear methods are used for in-place density determination, the compaction test results for maximum dry density and optimum water content shall be adjusted in accordance with ASTM D4718.

D. Determine the relative density of cohesionless soils per ASTM D4253 and D4254.

E. Sample materials per ASTM D75.

F. "Relative compaction" is the ratio, expressed as a percentage, of the inplace dry density to the laboratory maximum dry density.

G. Compaction shall be deemed to comply with the specifications when no test falls below the specified relative compaction.

1.04 BASIN OVER-EXCAVATION AND TOP SOIL RE-USE

The top 12 to 15 inches of earthen material excavated from the basin area shall be stockpiled at the site for re-use as top soil for the completed basin.

1.05 DISPOSAL OF EXCESS MATERIALS

A. Excess site excavated or wasted material shall be disposed of offsite by the Contractor at his expense. No prearranged disposal site or related permits have been determined or secured by the Owner.

B. Contractor shall submit a truck route for hauling excess materials offsite to the City for approval prior beginning hauling activities. The Contractor will not be allowed to utilize San Luis Street west of the project and local residential streets (i.e., Racquet Club Drive, Miller Lane, Nickel Street) to haul excess material offsite. The Contractor will have the option of utilizing San Luis Street east of the project to Place Road or Ward Avenue.

C. Trucking will be limited during school hours to avoid interference with dropping off and picking up of students.

PART 2 - MATERIALS

2.01 STRUCTURAL FILL

A. Structural fill is material that is to be placed beneath structures to the limits indicated in the drawings.

B. Material shall be free from deleterious material and the following gradation:

Sieve Size	**Percent Passing by Weight**
1 inch	100
3/4 inch	90 to 100
1/2 inch	30 to 60
3/8 inch	0 to 20
No. 4	0 to 5

2.02 STRUCTURAL BACKFILL

A. Structural backfill is material that is to be placed adjacent to and around structures. Excavated material may be used for structural backfill provided all deleterious materials have been removed from the stockpiled material.

2.03 FILL

Fill material is material that is to be placed in locations that are not to be constructed as structural fill or structural backfill. Fill material shall be native material.

2.04 WATER FOR COMPACTION

Water shall be free of organic materials and shall have a pH of 7.0 to 9.0, a maximum chloride concentration of 500 mg/L, and a maximum sulfate concentration of 500 mg/L. Provide all water needed for earthwork. Provide temporary piping and valves to convey water from the source to the point of use

PART 3 - EXECUTION

3.01 DEWATERING

Provide and operate equipment adequate to keep excavations and trenches free of water. Dewater subgrade to a minimum of 3 feet below bottom of excavation. Remove water during period when concrete is being deposited, when pipe is being laid, and during the placing of backfill. Avoid settlement or damage to adjacent property. Dispose of water in a manner that will not damage adjacent property. When dewatering open excavations, dewater from outside the structural limits and from a point below the bottom of the excavation. Obtain and comply with discharge permit from the City of Los Banos.

3.02 EXCAVATION

A. Excavations shall have sloping, sheeting, shoring, and bracing conforming with 29CFR1926 Subpart P-Excavations, CAL/OSHA requirements, and the General Conditions.

B. Excavation is unclassified. Perform excavation regardless of the type, nature, or condition of the material encountered to accomplish the construction. Do not operate excavation equipment within 3 feet of existing structures or newly completed construction. Excavate with hand tools in these areas.

C. After the required excavation has been completed, the Owner will observe the exposed subgrade to determine the need for any additional excavation. It is the intent that additional excavation is to be conducted in all areas within the influence of the structure where unacceptable subgrade materials exist at the exposed subgrade. Overexcavation shall include the removal of all such unacceptable material that exists directly beneath the structure or within a zone outside and below the structure defined by a line sloping at 1-horizontal to 1-vertical from 1 foot outside the edge of the footing. Refill the overexcavated areas with structural fill.

D. Over excavate the basin 12 inches deeper than shown on the plans. Backfill the over excavated area with the topsoil previously excavated.

3.03 LIMITS OF FOUNDATION EXCAVATION

Excavate to the depths and widths needed to accomplish the construction. Allow for forms, working space, structural backfill, and site grading. Do not excavate for footings, slabs, or conduits below elevations indicated. Unless unacceptable material is encountered and overexcavation is authorized by the Owner, backfill overexcavations with compacted structural fill material. Correct cuts below grade by benching adjoining areas and creating a smooth transition. The Contractor shall bear all costs for correcting unauthorized overexcavated areas.

3.04 PREPARATION OF FOUNDATION SUBGRADE

A. The finished subgrade shall be within a tolerance of ±0.08 of a foot of the grade and cross section indicated, shall be smooth and free from irregularities, and shall be at the specified relative compaction. The subgrade shall extend over the full width and extend 1 foot beyond the edge of the foundations.

B. Compact the top 12 inches of the subgrade to 90% relative compaction. Recompaction will not be required if rock is exposed at final subgrade.

C. Remove soft material encountered and replace with structural fill material. Fill holes and depressions to the required line, grade, and cross sections with structural fill.

3.05 PREPARATION FOR PLACING FILL OR BACKFILL

A. After excavation of existing material or removal of unacceptable material at the exposed subgrade, scarify the final subgrade surface to a depth of 12 inches and compact to 90% relative compaction.

B. Do not scarify and compact the area of the basin that has been over-excavated to receive topsoil.

C. Remove foreign materials and trash from the excavation before placing any fill material. Obtain the specified compressive strength and finish of concrete work per Section 03 05 00 before backfilling.

3.06 PLACING AND COMPACTING FILL AND STRUCTURAL FILL

A. Place top soil in maximum lifts of 8 inches and compact each lift to not less than 85% and not more than 88% relative compaction.

B. Place in maximum 8-inch lifts and compact each lift to 90% relative compaction.

C. Where fill is to be constructed on slopes steeper than 4:1 bench the fill into competent undisturbed materials as the fill progresses up the slope. Benches shall be sloped at least 2% into the slope and shall be of a width at least equal to the height of fill lift.

3.07 PLACING AND COMPACTING STRUCTURAL BACKFILL

A. Place structural backfill material around, structures, channels, and other areas, to the lines and grades shown or specified. Do not exceed loose lifts of 8 inches.

B. Compact each lift to 90% relative compaction, unless otherwise shown in the drawings. Stop structural backfill at least 12 inches below finished grade in all areas where topsoil is to be placed.

C. Backfill around concrete structures as specified in Section 03 05 00.

D. Do not operate earthmoving equipment within 5 feet of walls of concrete structures. Place and compact backfill adjacent to concrete walls with hand-operated tampers or other equipment that will not damage the structure.

3.08 MOISTURE CONTROL

During the compacting operations, maintain uniform moisture content throughout the lift. Insofar as practicable, add water to the material at the site of excavation. Supplement by sprinkling the material. At the time of compaction, the water content of the material shall be at one to four percentage points above optimum. Aerate material containing excessive moisture by blading, discing, or harrowing to hasten the drying process.

3.09 SITE GRADING

Perform earthwork to the lines and grades shown in the drawings. Shape, trim, and finish slopes of channels to conform to the lines, grades, and cross sections as shown. Remove exposed roots and loose rocks exceeding 3 inches in diameter.

END OF SECTION

SECTION 31 23 33

TRENCHING AND BACKFILL

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Section includes trench excavation width and safety, backfill materials and placement, soil and aggregate materials and compaction and testing. (See Section 33 42 20 for trenching and backfill associated with Cast-in-Place Pipe.)

1.02 DEFINITIONS:

A. Percent Compaction or Compaction Density: The field dry density of compacted material, expressed as a percentage of the maximum dry density.

B. Field Dry Density or Field Density: In-place density as determined by ASTM D1556 (Sand Cone Method), or ASTM D6938 (Nuclear Method).

C. Maximum Dry Density: Laboratory density as determined by ASTM D1557 (Modified Proctor) and occurring at the optimum moisture content of the soil being tested.

D. Pipe Embedment: Comprised of the following or combination thereof:

1. Foundation: Required only when the native trench bottom does not provide a firm working platform or the necessary uniform and stable support for the install pipe.

2. Bedding: Placed directly underneath the pipe and brings the trench bottom to grade. Provides a firm, stable, and uniform support of the pipe.

3. Haunching: From bottom of pipe to springline.

4. Initial Backfill: From top of bedding or foundation to 6 inches above top of pipe, unless noted otherwise.

5. Final Backfill: Above the initial backfill to a level below that required for the trench restoration area.

6. Backfill: Includes initial and final backfill.

1.03 SUBMITTALS:

A. Submit the following in accordance with Section 01 33 00.

1. Temporary excavation and shoring drawings for worker protection in accordance with the General Conditions.

2. Gradation analysis.

3. Dewatering plan including disposition of groundwater.

4. Materials Sources: Name of source, location, date of sample, sieve analysis, and laboratory compaction characteristics.

5. Compaction method and removal sequence of shoring.

1.04 QUALITY ASSURANCE:

A. Comply with the requirements specified in Section 01 43 00.

B. Sustainability Standards Certifications.

C. Provide testing in accordance with Part 3 of this section.

D. Employ an independent testing laboratory with the following qualifications:

1. Accreditation by the American Associates of State Highway and Transportation Officials (AASHTO) Accreditation Program.

2. Minimum of three years experience in sampling, testing and analysis of soil and aggregates, and monitoring field compaction operations. Minimum of three references from previous work.

E. Protect excavations by shoring, bracing, sheet piling, underpinning or other methods required to prevent cave-in of loose soil. Protection shall be in accordance with OSHA 29 CFR 1926, Subpart P.

1.05 SITE CONDITIONS:

A. Existing Conditions:

1. Geotechnical Report, by Moore Twining Associates, Inc. for Project Number E53606.01 dated April 5, 2011: The report is available for information only and is not part of the contract documents. Logs of borings are included in the report and indicate conditions encountered only at test boring locations. Nothing in the contract documents shall be construed as guarantee that other materials will not be encountered or that proportion of materials will not vary from proportions shown on the logs of test borings.

2. As part of the Geotechnical Investigation, piezometers were installed for monitoring groundwater in borings B-1, B-3 and B-7. Groundwater measurements taken at these locations are as follows:

Date	Location – B1 Groundwater Depth Below Groundline	Location – B3 Groundwater Depth Below Groundline	Location – B7 Groundwater Depth Below Groundline
3/2/2011	19.6 feet	21.0 feet	*
3/9/2011	19.6 feet	21.0 feet	*
3/23/2011	19.3 feet	20.9 feet	*
3/31/2011	19.0 feet	20.7 feet	*
4/15/2011	19.1 feet	20.5 feet	*
4/27/2011	19.1 feet	20.4 feet	*

∗ Pizometer terminated approximately 21.2 feet below groundline. Water level is below bottom of pixometer.

PART 2 - PRODUCTS

2.01 BACKFILL MATERIALS:

A. Suitable Material: Material from on-site excavation and permitted off-site sources that meets all of the specified requirements for its intended use and is not unsuitable. Wet subgrade material which meets other requirements for suitable material is suitable.

B. Unsuitable Material: Material that fails to meet requirements for suitable materials; or contains any of the following:

1. Organic clay, organic silt, or peat; as defined in ASTM D2487.

2. Vegetation, wood, roots, leaves, and organic, degradable material.

3. Stones or rock fragments over 6 inches in any dimension.

4. Porous biodegradable matter, excavated pavement, construction debris, rubbish, or refuse.

C. Bedding: ASTM C33, coarse aggregate, No. 57.

D. Initial Backfill: ASTM D2321, Class I material for flexible walled pipe and sand for rigid walled pipes unless otherwise noted.

E. Final Backfill: Suitable, unclassified material excavated from trench; free of rocks with dimensions greater than 1/2 the compacted lift; and rocks provide less than 50 percent of the final backfill volume.

F. Sand: AASHTO M145, Classification A-3, Natural sand**.**

G. Base Aggregate for Pavement: Class 2 aggregate base, ¾-inch size per Section 26 of the Caltrans Standard Specifications.

2.02 EQUIPMENT:

A. Compaction equipment shall be capable of consistently achieving the specified compaction requirements.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Verify that dewatering support systems are in place before commencing with excavation.

B. Verify that excavation safety and support systems meeting the requirements of OSHA 29 CFR 1926, Subpart P are in place before commencing with excavation.

1. Minimum slopes for laying back excavations or materials are contained in OSHA 29 CFR 1926, Subpart P; Appendices A and B.

2. Minimum requirements for shoring and bracing are contained in OSHA 29 CFR 1926, Subpart P; Appendix C.

C. Verify that fill materials submittals have been accepted by Engineer before commencing with work requiring the use of these materials.

D. Verify that erosion and sediment control measures are in place and functioning properly.

E. Immediately notify the Engineer if unexpected subsurface facilities or suspected hazardous materials are encountered during excavation. Discontinue affected work in area until notified to resume work.

F. Test Pits:

1. Excavate test pits to field verify the locations of existing underground utilities at crossings and at tie-in points before ordering materials or commencing excavation. Immediately notify the Engineer if conflicts are encountered.

3.02 PREPARATION:

A. Underpin adjacent structures that could be damaged by excavation work.

B. Cut pavement with saw or pneumatic tools to prevent damage to remaining pavement. Dispose of large pieces of demolished pavement before proceeding with excavation.

3.03 PROTECTION OF IN-PLACE CONDITIONS:

A. Support and protect from damage – existing pipes, poles, wires, fences, curbs, property line markers, and other features or structures which must be preserved in place to avoid being temporarily or permanently relocated.

B. Excavation Near Existing Structures:

1. Discontinue digging by machinery when excavation approaches pipes, conduits, or other underground structures. Continue excavation by use of hand tools. Include such manual excavation in work to be done when incidental to normal excavation and under items involving normal excavation.

2. Excavate test pits near, or at intersection with, existing utilities or underground structures to determine the exact location of existing features.

C. Excavation Near Private Property:

1. Enclose uncut tree trunks adjacent to work in wooden boxes of such height necessary to protect tree from injury due to piled material, equipment, or operations. Operate excavating machinery and cranes so as to prevent injury to overhanging branches and limbs.

2. Protect cultivated hedges, shrubs, and plants which would otherwise be damaged by the work.

3. Where protection of vegetation is not possible, dig up, temporarily transplant, and maintain. After active construction operations in the area have ceased, transplant vegetation to the original positions and provide water and nursery care until growth is re-established.

4. Do not use or operate tractors, bulldozers, or other power-operated equipment on paved surfaces. Provide protection on pavement or tracks if construction traffic is unavoidable.

3.04 RESTORATION:

A. Restore private property and structures promptly. Begin restoration work within 24 hours of when damage occurred.

B. Existing surfaces, features, or utilities that are to remain but are damaged during construction shall be repaired or replaced to at least the condition in which they were found immediately before work began, unless noted otherwise.

C. Damaged Trees To Remain: Cut all damaged branches, limbs, and roots smoothly and neatly without splitting or crushing. Neatly trim, cut the injured portions and cover with an application of grafting wax or tree healing paint. Replace damaged trees which subsequently die or continue to show lack of growth due to damage.

D. Cultivated Vegetation: Includes, but is not limited to: sod or lawns, hedges, shrubs, and plants. Vegetation that is damaged shall be replaced with equal kind and of at least the quality before work began.

3.05 TRENCH EXCAVATION:

A. Provide dewatering system to allow for working conditions in dry, stable soil. Properly dispose of water to avoid damage to property and in accordance with laws and regulations. Lower groundwater table prior to excavation and keep a minimum of 24 inches below lowest excavation subgrade until structure has sufficient strength to withstand soil and water pressures.

B. Sheet and brace trenches, excavations, and adjacent structures to comply with laws and regulations and to provide protection of life, property, and the Work. Where close sheeting is necessary, drive to prevent adjacent soil from entering excavation. Remove close sheeting only when removal would not damage property or the Work. Sheeting left in place shall be cut off 18 inches below ground surface.

C. Preserve material below and beyond the lines of excavations.

D. Excavate the trench to the line and grade shown on the Drawings with allowance for pipe thickness, sheet and shoring if used and for pipe base or special bedding. If the trench is excavated below the required grade, refill any part of the trench excavated below the grade with initial backfill material. Place the refilling material over the full width of trench in compacted layers not exceeding 8 inches deep to the established grade.

E. Trench width in the pipe zone shall be as shown on the Drawings. If no details are shown, minimum width shall be 24 inches greater than the pipe outside diameter. Comply with 29 CFR Part 1926 Subpart P—Excavations. Trench width at top of trench will not be limited except where width of excavation could undercut adjacent structures or footings. In such case, width of trench shall be such that there is at least 2 feet between the top edge of the trench and the structure or footing.

F. Locate stockpiled excavated material at least 3 feet from edge of excavations to prevent cave-ins or bank slides.

3.06 BACKFILL:

A. Fill to lines and grades necessary to provide finish grades.

B. Use a placement method that does not disturb or damage other work or existing features.

C. Maintain fill materials one to four percentage points above optimum moisture, to attain required compaction density.

D. Place and compact material in equal continuous layers.

E. Maximum compacted depth is 6 inches for aggregate materials and 8 inches for soil materials, unless noted otherwise.

3.07 COMPACTION:

A. Compact to density specified and indicated for various types of material. Control moisture content of material being placed as specified.

B. Compaction Density: Provide trench backfill densities according to Table 31 23 33-3. The values listed are minimum percentages, unless noted otherwise on the Drawings.

Table 31 23 33-3	
Area	**Percentage of Maximum Dry Density as defined by ASTM D1557 (Modified Proctor)**
Trench Backfill (under pavement, slabs)	95
Trench Backfill (under structures or within 25 feet of structures)	95
Trench Backfill (through basin embankment)	95
Trench Backfill (under exterior concrete slab and sidewalks)	90
Trench Backfill (in open or grassed areas)	85

3.08 FIELD QUALITY CONTROL:

A. See Section 01 43 00 for general requirements for field inspection and testing.

B. Compaction shall be deemed to comply with the specifications when no test falls below the specified relative compaction.

C. Where compaction tests indicate a failure to meet the specified compaction, the testing laboratory will take additional tests every 50 feet in each direction until the extent of the failing area is identified. Rework the entire failed area until the specified compaction has been achieved.

D. Perform field density testing in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.

E. Evaluate field density test results in relation to maximum dry density as determined by testing material in accordance with ASTM D1557 (Modified Proctor).

F. Location of field density tests shall be mutually acceptable to testing laboratory and the Engineer.

G. Frequency of field density tests:

Table 31 23 33-4	
Area	**Frequency**
Trench (Structural Areas)	1 per lift for each 150 linear feet of trench
Trench (Non-Structural Areas)	1 per lift for each 250 linear feet of trench
Manholes	1 per lift at each manhole
Regardless of the minimum testing frequency specified, field density tests shall be performed by the Contractor in sufficient number for the Contractor's quality control purposes to ensure that specified density is obtained and for the Geotechnical Engineer of Record to certify the earthworks.	

H. Owner may retain the services of an independent testing laboratory to conduct confirmatory testing and inspection.

3.09 ADJUSTING:

A. Shrinkage:

1. Backfill to a height above finished grade which will allow for the shrinkage or consolidation of material. Initially, provide at all points, an excess of at least one percent of total height of backfill measured from stripped surface to top of finished surface.

2. Supply specified materials and build up low places, without additional cost if embankment or backfilling settles so as to be below the indicated level for proposed finished surface at any time before final acceptance of the work.

3.10 PROTECTION:

A. Formulate excavation, backfilling, and filling schedule and procedures to eliminate possibility of undermining or disturbing foundations of partially and completed structures, pipelines and embankments or existing structures and pipelines.

3.11 CLOSEOUT ACTIVITIES:

A. Provide in accordance with Section 01 77 00.

END OF SECTION

SECTION 32 12 16

ASPHALT CONCRETE PAVING

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, testing, and installation of asphalt concrete pavement, aggregate base course, herbicide, tack coat, and striping paint.

1.02 SUBMITTALS

A. Submit six copies of a report from a testing laboratory verifying that aggregate material conforms to the specified gradations or characteristics.

B. Submit manufacturer's certificate of compliance or product literature for the following materials in accordance with the General Conditions and Section 01 33 00.

1. Aggregate: Gradation.

2. Asphalt for Binder: Type and grade.

3. Tack Coat: Type and grade of asphalt.

4. Mixes: Conforms to job-mix formula.

5. Herbicide.

6. Paint for traffic and parking lot striping.

1.03 TESTING FOR COMPACTION

A. Test for compaction as described in Section 31 23 33.

1.04 STANDARD SPECIFICATIONS

Wherever reference is made to the Caltrans Standard Specifications such reference shall mean the State of California, Business, Transportation, and Housing Agency, Department of Transportation Standard Specifications, 2006 edition.

PART 2 - MATERIALS

2.01 ASPHALT CONCRETE PAVING

Asphalt concrete paving shall conform to Type B in Section 39 of the Caltrans Standard Specifications, having 1/2-inch-maximum medium grading.

2.02 AGGREGATE BASE COURSE

Aggregate base shall be Class 2 aggregate base, 3/4-inch-maximum size per Section 26 of the Caltrans Standard Specifications.

2.03 TACK COAT

Tack coat shall conform with Section 94, Grade SS1h in the Caltrans Standard Specifications.

2.04 ASPHALT

Asphalt shall be Performance Grade PG 70-10 per Section 92 in the Caltrans Standard Specifications. Asphalt content in the pavement shall be 5.5% to 6.0%.

2.05 AGGREGATE FOR ASPHALT CONCRETE

Aggregate shall be Type B per Section 39-2.02 in the Caltrans Standard Specifications.

2.06 HERBICIDE OR WEED KILLER

Use Gallery (Isoxaben) or Surflan (Oryzalin) by Dow AgroSciences, Pre-M (Pendimethalin) by American Cyanamid Co., or equal.

2.07 PAINT FOR TRAFFIC AND PARKING LOT STRIPING AND MARKING

Provide thermoplastic paint per Section 84 of the Caltrans Standard Specifications.

PART 3 - EXECUTION

3.01 PAVEMENT REMOVAL

A. Initially cut asphalt concrete pavement with pneumatic pavement cutter or other equipment at the limits of the excavation and remove the pavement. After backfilling the excavation, saw cut asphalt concrete pavement to a minimum depth of 2 inches at a point not less than 9 inches outside the limits of the excavation or the previous pavement cut, whichever is greater, and remove the additional pavement.

B. Saw cut concrete pavement, including cross gutters, curbs and gutters, sidewalks, and driveways, to a minimum depth of 1 1/2 inches at a point 1 foot beyond the edge of the excavation and remove the pavement. The concrete pavement may initially be cut at the

limits of the excavation by other methods prior to removal and the saw cut made after backfilling the excavation. If the saw cut falls within 3 feet of a concrete joint or pavement edge, remove the concrete to the joint or edge.

C. Make arrangements for and dispose of the removed pavement.

D. Final pavement saw cuts shall be straight along both sides of trenches, parallel to the pipeline alignment, and provide clean, solid, vertical faces free from loose material. Saw cut and remove damaged or disturbed adjoining pavement. Saw cuts shall be parallel to the pipeline alignment or the roadway centerline or perpendicular to same.

E. The Owner's Representative has reviewed existing street improvement data along the route of the project to try to determine the type and depth of the existing pavement sections within the trench prism. The Owner does not guarantee the accuracy of this determination of the pavement sections.

Name of Street	**Station**	**Existing Pavement Sections**			
		A.C. Pave. (in.)	**Agg. Base (in.)**	**Agg. Sub. (in.)**	**Cement-Treated Base (in.)**
San Luis Street	17+00	4½	9½	-0-	-0-
San Luis Street	20+00	5¼	12	-0-	-0-
Parking Lot		4½	12½	-0-	-0-

3.02 PAVEMENT REPLACEMENT

A. The pavement replacement shall be as follows:

Name of Street	**A.C. Pavement (inches)**	**Aggregate Base (inches)**
San Luis Street	5¼	12
Parking Lot	4½	12½

3.03 INSTALLATION

Producing, hauling, placing, compacting, and finishing of asphalt concrete shall conform to Section 39 of the Caltrans Standard Specifications.

3.04 CONNECTIONS WITH EXISTING PAVEMENT

Meet lines shall be straight and the edges vertical. Paint the edges of meet line cuts with liquid asphalt or emulsified asphalt prior to placing asphalt concrete. After placing the asphalt concrete, seal the meet line by painting with a liquid asphalt or emulsified asphalt and then immediately cover with clean, dry sand.

3.05 APPLYING HERBICIDE OR WEED KILLER

Apply weed killer or herbicide on base prior to placing pavement. Apply herbicide along with water at the rate recommended by the manufacturer to control dawny brome grass, puncture vine, and plaintain. Apply from outside of curb to opposite outside of curb and for the full width of roadways and parking areas.

3.06 PLACING TACK COAT

Apply tack coat on surfaces to receive finish pavement per Section 39-4.02 in the Caltrans Standard Specifications. Apply tack coat to metal or concrete surfaces that will be in contact with the asphalt concrete paving.

3.07 PLACING ASPHALT PAVING

Place asphalt paving in accordance with Section 39-6 in the Caltrans Standard Specifications.

3.08 COMPACTION OF ASPHALT CONCRETE PAVING

Compact until roller marks are eliminated and a density of 92% minimum to 98% maximum has been attained per ASTM D2041.

3.09 SURFACE TOLERANCE

A. Finished grade shall not deviate more than 0.02 foot in elevation from the grade indicated in the drawings. Slopes shall not vary more than 1/4 inch in 10 feet from the slopes shown in the drawings.

3.10 APPLYING PAINT FOR TRAFFIC AND PARKING LOT STRIPING AND MARKING

Apply in accordance with Section 84 of the Caltrans Standard Specifications.

3.11 INSTALLING FIRE HYDRANT MARKERS

Install a blue reflective marker opposite each fire hydrant. Place the marker on the pavement and locate 6 inches off the centerline of the traffic striping or reflective pavement markers towards the hydrant. Install markers in accordance with Section 85 of the Caltrans Standard Specifications.

END OF SECTION

SECTION 32 16 13

CONCRETE CURBS, GUTTERS, SIDEWALKS AND WALKWAYS

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and installation of concrete curbs, gutters, sidewalks and walkways.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. General Concrete Construction: 03 05 00.

B. Earthwork: 31 23 00.

1.03 SUBMITTALS

Submit six copies of a report from a testing laboratory verifying that aggregate material conforms to the specified gradations or characteristics.

1.04 TESTING FOR COMPACTION

A. Test for compaction as described in Section 31 23 00.

1.05 STANDARD SPECIFICATIONS

Wherever reference is made in this section to the State Specifications, such reference shall be understood to mean the State of California, Business, Transportation, and Housing Agency, Department of Transportation Standard Specifications, 2006.

PART 2 - MATERIALS

2.01 FORMS

A. Forms shall conform to the requirements of Section 03 05 00. Provide stakes and bracing materials to hold forms securely in place.

B. Materials for sidewalk forms shall be 2-inch dressed lumber straight and free from defects, or standard metal forms. Where short-radius forms are required, 1-inch dressed lumber or plywood may be used. Provide stakes and bracing materials to hold forms securely in place.

2.02 CONCRETE

Concrete shall be Class B per Section 03 05 00, except that the maximum water-cement ratio for concrete in curbs and gutters shall be 0.55.

2.03 REINFORCING STEEL

Conform to Section 03 05 00.

2.04 CURING COMPOUND

Curing compound shall be as specified in Section 03 05 00.

2.05 EXCAVATION AND BACKFILL

Conform to Section 31 23 00.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBGRADE

Excavate and shape subgrade to line, grade, and cross-section. Compact subgrade as indicted on the Drawings. Remove all soft material disclosed by compacting and replace with Class 2 aggregate base. The finished subgrade shall be within a tolerance of 0.04 of a foot of the grade and cross-section shown and shall be smooth and free from irregularities at the specified relative compaction. The subgrade shall be considered to extend over the full width of the base course.

3.02 PLACING AGGREGATE BASE

After the subgrade for curb and gutters, driveways, sidewalks and walkways are compacted and at the proper grade, spread aggregate base material. Sprinkle with water and compact. Top of the aggregate shall be at the proper level to receive the concrete. Compact aggregate base to 90% relative density unless a greater density is indicated on the Drawings.

SETTING FORMS

A. Conform to Section 030 50 0.

B. Forms on the face of the curb shall not have any horizontal joints within 7 inches of the top of the curb. Brace forms to prevent change of shape of movement in any direction resulting from the weight of the concrete during placement. Construct short-radius curved forms to exact radius. Tops of forms shall not depart from gradeline more than 1/8 inch when checked with a 10-foot straightedge. Alignment of straight sections shall not vary more than 1/8 inch in 10 feet.

3.03 CURB CONSTRUCTION

A. Construct curbs to line and grade shown. Curbs shall conform to the details shown.

B. Place contraction joints in the curb at uniform intervals not exceeding 10 feet. Contraction joints shall be of the open-joint type. Construct by inserting a thin, oiled steel sheet vertically in the fresh concrete to force coarse aggregate away from the joint. Insert the steel sheet the full depth of the curb. After initial set has occurred in the concrete and prior to removing the front curb form, remove the steel sheet with a sawing motion. Finish top of curb with a steel trowel and finish edges with a steel edging tool.

C. As soon as the concrete has set sufficiently to support its own weight, remove the front form and finish exposed surfaces. Finish formed face by rubbing with a burlap sack or similar device that will produce a uniformly textured surface, free of form marks, honeycomb, and other defects. Remove and replace defective concrete at the Contractor's expense. Upon completion of the finishing, apply curing compound to exposed surfaces of the curb. Curing shall continue for a minimum of five days.

D. Upon completion of the curing period, but not before seven days have elapsed since pouring the concrete, backfill the curb with earth free from rocks 2 inches and larger and other foreign material. Tamp backfill firmly in place.

E. Finished curb shall present a uniform appearance for both grade and alignment. Remove any section of curb showing abrupt changes in alignment or grade or that is more than 1/4 inch away from its location as staked and construct new curb in its place at no additional cost to the Owner.

3.04 SIDEWALK AND WALKWAY CONSTRUCTION

A. Sidewalks and walkways shall be 3-5/8 inches thick in walk areas and 6 inches thick in driveway areas, unless otherwise shown in the drawings. Install thickened edges/keys as shown on the Drawings.

B. At locations where the new sidewalk is to abut existing concrete, saw concrete for a depth of 2 inches, chip the old concrete down to sound material and a plane surface, clean the surface, and apply a neat cement paste just prior to pouring the new sidewalk.

C. Expansion joint material shall not be used in sidewalks and walkways.

D. Provide contraction joints transversely to the walks at locations opposite the contraction joints in the curb and at intervals along the sidewalk and walkways such that the distance between contraction joints does not exceed 5 feet. These joints shall be 3/16 inch by one-fourth of the slab thickness weakened plane joints. They shall be straight and at right angles to the surface of the walk

E. Prior to placement of concrete, the underlying clay soils shall be pre-saturated to a minimum moisture content of 3 percent above optimum moisture content to a minimum depth of 18 inches below the bottom of the slab. This minimum soil moisture content

shall be established and maintained within 48 hours prior to placement of concrete. Place, process, finish, and cure concrete in conformance with Section 03 05 00.

F. Broom the surface with a fine-hair broom at right angles to the length of the walk and tool at all edges, joints, and markings. Upon completion of the finishing, apply a curing compound to exposed surfaces. Protect the sidewalk from damage.

G. Finished sidewalk shall present a uniform appearance for both grade and alignment. Remove any section of sidewalk showing abrupt changes in alignment or grade or that is more than 2 inches away from its location as shown in the drawings and construct new sidewalk in its place at no additional cost to the Owner.

END OF SECTION

SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Section includes:

1. Chain link fence framework, fabric, and accessories.

2. Excavation for post bases.

3. Manual gates and related hardware.

1.02 REFERENCES:

A. American Association of State Highway and Transportation Officials (AASHTO):

1. M181: Standard Specification for Chain-Link Fence.

B. American Society for Testing and Materials (ASTM):

1. A53/A53M: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

2. A392: Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.

3. F567: Standard Practice for Installation of Chain-Link Fence.

4. F900: Standard Specification for Industrial and Commercial Swing Gates.

C. Chain Link Fence Manufacturers Institute (CLFMI):

1. PM 2445: Chain Link Fence Manufacturers Institute Product Manual.

1.03 SUBMITTALS:

A. Submit the following in accordance with the General Conditions and Section 01 33 00.

1. Submit Manufacturer's specifications, drawings, details and fence layout with appurtenances.

2. Submit certified test reports with results of tests for fence finish.

3. Submit shop drawings, samples and certificates simultaneously as one complete package.

1.04 QUALITY ASSURANCE:

A. Comply with the requirements specified in Section 01 43 00.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION:

A. Provide chain link fence in accordance with AASHTO M181; Fabric: Type I, Class D fabric coating; Posts: Grade 1.

B. Provide framework, fabric, accessories and gates in accordance with ASTM F567.

C. Fence heights as indicated with top rail and bottom rail.

D. Gates:

1. Industrial and Commercial:

a. Provide swing gates in accordance with ASTM F900.

2.02 FENCE FABRIC:

A. Galvanized steel.

B. Galvanized steel chain-link fabric conforming to ASTM A392, with Class 2 zinc coating (2.0 ounces (610 grams) of zinc per square foot (square meter) of uncoated wire surface); Fabric woven in 2-inch (50 mm) mesh from No. 9 gage wire in a 7-foot height with barbed selvages top and bottom.

2.03 TIE WIRES:

A. Tie wires, for fastening fence fabric to line posts and rails, not less than No. 6 gage aluminum wire.

2.04 LINE POSTS:

A. 2-3/8 inches (60.3 mm) outside diameter steel pipe weighing not less than 3.65 lb/ft (5.4 kg/m).

2.05 END, CORNER, AND PULL POSTS:

A. 2-7/8 inch (73 mm) outside diameter steel pipe weighing not less than 5.79 lb/ft (8.6 kg/m).

2.06 GATE POSTS:

A. 2-7/8 inches (73 mm) outside diameter steel pipe and gate posts, for gate leaves up to and including 6 feet (1.8 m) wide, weighing not less than 5.79 lb. per ft.

B. 4 inch (100 mm) outside diameter steel pipe, gate posts for gate leaves over 6 feet (1.8 m) wide and up to and including 13 feet (4 m) wide and weighing not less than 9.10 lb/ft (13.5 kg/m).

2.07 RAILINGS:

A. 1-5/8 inch (41.3 mm) outside diameter steel pipe with minimum weight of 2.27 lb/ft (3.4 kg/m) for all railings.

2.08 TRUSS:

A. 3/8 inch (9.5 mm) diameter steel rod diagonal truss braces between terminal and adjacent line posts and for gate framework.

2.09 FITTINGS:

A. Heavy-duty malleable iron or pressed steel fittings of suitable size to produce strong construction.

2.10 STRETCHER BARS:

A. Flat bars with minimum cross section dimensions of 1/4-inch (6.4 mm) by 3/4 inch (19 mm), full height of fabric, secured with bar bands of minimum 11-gage sheet steel, spaced approximately 15 inches (380 mm) on centers and bolted with 3/8-inch (9.5 mm) diameter bolts, for attaching fabric to terminal posts.

2.11 GATE LEAF FRAMEWORK:

A. 1-7/8 inch (47.6 mm) inch outside diameter steel pipe weighing 2.72 lb/ft (4 kg/m), minimum.

2.12 GATE HINGES:

A. Heavy pattern of adequate strength for gate size, with large bearing surfaces for clamping or bolting in position.

2.13 LATCH:

A. Gates with suitable latch, accessible from both sides and with provision for padlocking.

2.14 GATE PADLOCKS:

A. Manufacturers:

1. Eaton Corp. Lock & Hardware Div., Yale Marketing Dept., Charlotte, NC.

2. P&F Corbin, Div. of Emhart Corp., Berlin, CT.

3. Best Universal Lock Co., Inc., Indianapolis, IN.

4. Or acceptable equivalent product.

B. Solid brass cases hardened steel shackles, removable core cylinders, and galvanized steel chains attached to shackle by a clevis.

2.15 CONCRETE FOOTINGS:

A. Section 03 05 00 General Concrete, Class A concrete.

2.16 ACCESSORIES:

A. Steel pipe dimensions and weights: ASTM A53/A53M, Schedule 40. Dimensions specified are nominal pipe sizes.

B. Dimensions and weight tolerances: Plus or minus 5 percent.

C. Zinc Coating: Minimum 2.0 ounces per square foot (610 grams per square meter).

D. Provide posts with tops of same material, and designed to fit securely over post and carry top rail. Carry apron around outside of post at base of top fitting.

E. Ferrous metal fittings, posts, fence, gate framework, and accessories galvanized with heavy coating of 2.0 oz/ft2 (610 g/m2) pure zinc spelter per square foot or surface area to be coated. Use hot-dip process. Thinner zinc coatings, electro-galvanizing, zinc paint or cold galvanizing compounds not used as substitute for hot-dipped galvanized finish not acceptable.

F. Fabricate and weld before hot-dip galvanizing. Weld conforming to American Welding Society standards.

G. Hot-dip galvanized gate frame, after welding, if bolted or riveted corner fittings not used.

H. Single and double leaf swing gates with center bolt, center stop, and automatic backstops.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Examine conditions under which fence and gates are to be installed. Notify Engineer, in writing, of improper conditions of work.

B. Do not proceed with work until unsatisfactory conditions have been corrected.

C. Verify measurements at site.

D. Check location of underground work to make sure fence footings clear utilities and drainage work.

E. Do not install fence until final grading is complete and finish elevations are established.

F. Do not drive equipment on areas to be landscaped, except as accepted by Engineer. Areas not accessible from roads shall be protected with heavy wood planking. Remove barricades and protection at completion of project. Repair damaged landscape surfaces.

3.02 INSTALLATION:

A. Footings:

1. Vertical sides to minimize up-lift. Dispose of excavated material in accordance with Section 01 74 23.

2. Rod and compact concrete around posts. Terminate top of footings at bottom of slab to be constructed around fence enclosure. If no slab is to be installed over footings, slope top of footings above level of adjacent grade and trowel finish.

3. Size:

a. 6 inches minimum diameter, plus outside dimension of post.

b. Set corner, end, pull, and gate posts 42 inches into concrete.

c. Set line posts set 36 inches into concrete.

d. Total depth of concrete 6 inches greater than required for post embedment.

4. Time of Set: 48 hours before rails are erected or before fabric is applied or stretched.

B. Framing:

1. Install line posts not more than 10 feet apart.

2. Install pull posts not more than 600 feet apart where a straight run of fence exceeds 600 feet and where fence line changes direction by more than 15 degrees but less than 30 degrees.

3. Set posts in concrete footings, plumb and true to line.

4. Brace and truss end, pull, corner, and gate posts to adjacent line posts. Provide brace to match top rail spaced midway between top and bottom rails and extending

to adjacent line posts. Truss diagonally with 5/16-inch diameter tension rod with turnbuckle.

5. Fasten top rail to end, pull, gate and corner posts. Pass top rail through fittings of line posts.

6. Provide expansion and contraction joints in top rail for each 100 linear feet of fence.

7. Maximum area of unbraced fence shall not exceed 1,500 square feet.

C. Fabric:

1. Place fabric on outside of posts and stretch to avoid bulging or buckling.

2. Fasten at line posts and top and bottom rails with aluminum ties. Space ties not more than 15 inches apart on line posts and not more than 24 inches apart on rails.

3. Fasten at terminal posts at intervals not exceeding 15 inches using flat or beveled galvanized steel bands with 5/16-inch x 1-1/4 inch galvanized carriage bolts and nuts.

4. Make tie connections on interior side of fence.

5. Install gates plumb, level, and secure for full width of opening and hardware adjusted for smooth operation.

6. Electrical Ground where a power line carrying more than 600 volts passes over fence, install ground rod at nearest point directly below each point of crossing.

3.03 REPAIR:

A. Remove and replace fencing which is improperly located or is not true to line, grade and plumb within tolerances as indicated.

END OF SECTION

SECTION 32 31 21

TUBULAR STEEL ORNAMENTAL FENCING AND GATES

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and installation of tubular steel fencing and gates.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Submit manufacturer's descriptive literature and drawings of fence and gate installation.

PART 2 - MATERIALS

2.01 MANUFACTURERS

Fencing and gates shall be manufactured by Builders Fence Company, Inc., Heavy Aristocrat Model or equal.

2.02 FENCING

A. Fabricate fencing in accordance with ASTM F2589. Fence height shall be 7 feet if no height is indicated in the drawings.

B. Pickets shall be 1-inch square, 16 gauge. Space at 4 inches on center. For fencing adjoining rolling gates with automatic operators, spacing shall be 2 1/8 inches on center.

C. Top and bottom rails shall be 1-1/2-inch square, 14 gauge.

2.03 SWING GATES

A. Swing gates shall be manually opened and closed.

B. Pickets shall be same size and spacing as for fencing. Top and bottom rails shall be same size as for fencing.

C. Provide accessories for padlocking. For double-leaf gates, provide cane bolts. Provide hardware and heavy-duty hinges for attachment to fence post.

2.04 ROLLING GATE

A. Refer to the drawings for gate opening dimension. Provide sufficient gate length and support for stability.

B. The rolling gate shall have pickets the same size and spacing as for fencing. Bottom rail shall be 2 inches by 4 inches, 14 gauge.

C. Provide V-groove steel wheels and accessories for support.

D. Provide accessories for padlocking.

2.05 FENCE POSTS

Posts shall be 3 inches square, 12 gauge. Each post shall have a pressed steel cap.

PART 3 - EXECUTION

3.01 PAINTING AND COATING

Coating shall be a powder-applied polymer material: polyester or epoxy and polyester combinations having a minimum thickness of 3 mils or polyolefin elastomer having a minimum thickness of 7 mils.

3.02 INSTALLATION

Install per manufacturer's recommendations.

3.03 SETTING POSTS INTO POSTHOLES IN EARTH

A. Space line posts uniformly at maximum intervals of 8 feet between gateposts and corner posts.

B. At line posts for picket height of less than 72 inches, insert post 24 inches into footings. At line posts for picket height of 72 inches and more, insert posts 30 inches into footings. At end and corner posts, provide 6 inches more than at line posts. At gateposts, provide 12 inches more than at line posts.

C. Excavate postholes so concrete will be 3 inches below and around metal posts, except that minimum diameter of concrete footing for end, corner, pull, and gateposts is 12 inches.

D. Set posts plumb to within 1/4 inch of the post vertical centerline.

E. Fill postholes with concrete to 1 inch above bottom of slab or footing grade and crown to slope away from post.

END OF SECTION

SECTION 32 84 21

IRRIGATION

PART 1 - GENERAL

1-01 DESCRIPTION

A. Irrigation System shall be installed to conform to these Standards by Contractor holding an appropriate license for such work under the provisions of the State of California Business and Professional Code and shall conform to Section 20-5.03A of the State Standards.

B. Furnish all labor, materials, supplies, tools, and transportation and perform all operations in connection with and incidental to the complete installation of the irrigation system in accordance with the approved plans and these specifications. The work shall include, but shall not necessarily be limited to the following:

1. Ordering materials to complete the irrigation system.

2. Trenching, stockpiling excavation materials and refilling and compacting trenches.

3. Furnishing materials and installation for complete system including piping, valves, fittings, sprinklers, bubblers, emitters, backflow prevention assemblies, controllers, and final adjustment of valves and pressure regulators to ensure proper operation of irrigation system.

4. Replacement of unsatisfactory materials.

5. Tests.

6. As-built drawings.

7. Cleanup, inspection and approval.

8. All work of every description mentioned in the specification and/or addenda thereto, and all other labor and materials incidental to the satisfactory completion of the work, including cleanup of the site as directed by the Owner.

1.02 RULES AND REGULATIONS

A. All work and materials shall be in full accordance with the latest rules and regulations of the Uniform Plumbing Code, published by the Western Plumbing Officials Association,

and other applicable State or local laws or regulations. Nothing in these Drawings or Specifications is to be considered to permit work not conforming to these Codes.

B. When the specifications call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, the provision of the Specifications shall take precedence over the requirements of the said rules and regulations.

C. The Contractor shall furnish without any extra charge any additional material and labor when required for compliance with these rules and regulations, though the work may not be mentioned in these particular Specifications or shown on the Drawings.

D. The Contractor shall erect and maintain barricades, guards, warning signs, and lights as necessary or required by OSHA regulation for the protection of the public or workers.

E. Any existing buildings, equipment, domestic water piping, pipe covering, sewers, storm drains, electrical wiring, sidewalks, landscaping, etc., damaged by the Contractor during the course of his work shall be replaced or repaired by the Contractor in a manner satisfactory to the Engineer and at the Contractor's own expense, and before final payment is made. The Contractor shall be responsible for damage caused by leaks in the piping systems, being installed or having been installed by him. He/she shall repair, at his/her expense, all damage so caused, in a manner satisfactory to the Engineer.

F. Supervision and Workmanship: The Contractor, personally or through an authorized and competent representative, shall supervise the work constantly, and shall as far as possible, keep the same foreman and workers on the job from commencement to completion. The workmanship of the entire job must in every way be first class, and only experienced and competent workers will be allowed on the job.

PART 2 - MATERIALS

2.01 GENERAL

Certain numbers on the Drawings and in the Specifications are taken from the catalogs of the manufacturer named. Equipment equal in quality and utility may be accepted, upon prior approval by the Owner in writing.

2.02 MATERIALS

A. Main line (from point of connection to RCVs) shall be C900, Class 200. Line sizes shall be as shown on the Drawings.

B. Lateral lines (non-pressure) shall be PVC 1120-200 psi plastic pipe with Schedule 40 Type 1, Grade 1, PVC solvent weld fittings. Lateral lines under sidewalk shall be PVC 1120 Schedule 40. Lateral lines shall not be smaller than 3/4". Velocity in lines shall not exceed 4.75 feet per second. Line sizes shall be as shown on the Drawings.

C. Connections between main lines and RCVs shall be of Schedule 80 PVC nipples and fittings.

D. Riser stock shall be as shown on the Drawings.

E. Control wire shall be copper with UL-approved for direct burial in ground. Common ground wire shall have white insulating jacket; control wires shall have jacket of color other than white. Common ground and control wire shall be #12-1 AWG-UF and control wire shall be #14-1 AWG-UF. Splices shall be made with Rainbird Pentite connector or with 3M-DBY connectors. Run one extra valve wire to each group of two or more valves.

F. Controllers shall conform to the Irrigation Schedule.

G. Remote Control Valves (RCV) shall be as listed on the Irrigation Schedule.

H. Rain sensor shall be per Irrigation Schedule. Mount per instructions.

I. Gate valves shall be per Irrigation Schedule.

J. Boxes for RC valve assembly in area subject to vehicle traffic shall be concrete 17” x 30” with concrete body, bolt down steel traffic cover marked “IRRIGATION” and 6” extension, Brooks 66 series or approved equal. Boxes in non-vehicular area may be plastic.

K. Sprinklers and quick coupler valves shall be of the types listed on the Drawings or an approved equal. Provide two (2) quick coupler valve keys for each project.

L. Miscellaneous installation materials:

1. Solvent cement and primer for solvent weld joints shall be of marked and type approved by the manufacturer(s) of pipe.

2. Lubricant for assembling rubber rings and seal joints shall be of make and type recommended by manufacturer(s) of pipe.

3. Pipe joint compound shall be non-hardening, non-toxic materials designed specifically for use on threaded connections in water carrying pipe. Performance shall be same as Teflon, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Preparation: Schedule and coordinate placement of materials and equipment in a manner to effect earliest completion of work in conformance with construction and progress schedule.

B. Handling and Storage:

1. Protect work and materials from damage during construction and storage.

2. Plastic pipe. Handle carefully; protect from prolonged exposure to sunlight.

C. Layout:

1. Lay out work as correctly as possible in accordance with diagrammatic drawings.

2. Where site conditions do not permit locating piping, valves and heads where shown, notify the Owner immediately and determine relocation in joint conference.

3. Run pipelines and automatic control wiring in common trenches wherever practical.

4. A minimum spray/rotor pattern overlap of 110% (pattern of each head's radius to overlap all adjacent heads by minimum of 10%) shall be measured. If pattern fails this test additional heads are to be installed or existing heads relocated to conform to this standard.

D. Excavating and trenching:

1. Excavation shall be in all cases ample in size to permit the pipes to be laid at the elevations intended and to permit ample space for joining.

2. Make trenches for pipelines deep enough to provide minimum cover from finish grade as follows:

a. 24" minimum cover over main lines to control valves and quick coupling valves.

b. 24" minimum cover over control wires from controller to valves.

c. 18" minimum cover over RCV-controlled lines (lateral) to sprinkler heads.

E. Assembling pipelines:

1. All pipe shall be assembled free from dirt and pipe scale. Field cut ends shall be reamed only to full pipe diameter with rough edges and burrs removed. All pipe labeling to be installed facing upward.

2. Solvent weld joint:

a. Prepare joint by first making sure the pipe end is square, then deburring the pipe end and cleaning pipe and fittings of dirt, dust, and moisture.

b. Dry-insert pipe into fitting to check for mis-sizing. Pipe should enter fitting 1/3 to 2/3 depth of socket.

c. Coat the inside socket surface of the fitting and the external surface of the male end of the pipe with primer. Then, without delay, apply solvent cement lightly to the inside of the socket. At this time, apply a second coat of cement to the pipe end.

d. Insert pipe immediately into fitting and turn ¼ turn to distribute cement and remove air bubbles. The pipe must seat to the bottom of the socket and fitting. Check alignment of the fitting. Pipe and fitting shall be aligned properly without strain to either.

e. Hold joint still for approximately thirty (30) seconds and then wipe the excess cement from the pipe and fitting.

f. Cure joint a minimum of thirty (30) minutes before handling and at least six (6) hours before allowing water in the pipe.

3. Threaded joints:

a. All threaded PVC and /or plastic joints to be made using Teflon tape. All threaded brass and/or galvanized joints to be made using pipe compound. Apply compound to male threads only.

b. All threaded joints shall be made up with pipe joint compound. Apply compound to male threads only.

c. Where assembling to threaded plastic fitting, take up joint no more than one full turn beyond hand tight.

d. Where assembling threaded plastic fittings, use strap-type friction wrench only; do not us metal jawed wrench.

4. Cap or plug openings as pipeline is assembled to prevent entrance of dirt or obstruction. Remove caps or plugs only when necessary to continue assembly.

5. Where pipes or control wires pass through sleeves, provide removable non-decaying plugs at ends of sleeve to prevent entrance of earth.

6. PVC plastic main lines not having control wire running in same trench shall have 2” plastic coated metallic tape running continuously on top of pipe for future detection.

F. Remote control valves:

1. Install where shown and group together where practical. Limit one RCV per box (below grade valves only).

2. Install valves no farther than 12” from main line unless absolutely necessary.

3. Locate valves adjacent to walkways, pads, mow strips, but no closer than 12” from edge of concrete. Locate RCV’s and QCV’s outside future construction areas.

4. Thoroughly flush main line before installing valve.

5. Provide 3” of pea gravel in bottom of valve box. No soil shall be in contact with RCV.

6. Support valve box with four (4) bricks (one at each corner). Maintain a minimum of 2” clearance between PVC pipe and valve box (below grade valves only).

7. Label control line wire at each RCV with a 2 ¼” x 2 ¾” Polyurethane I.D. Tag, indicating identification number of valve (controller and station number). Attach label to control wire and place next to solenoid.

G. Automatic control wiring:

1. Connections shall be made with brass connectors and sealing with Pentite or 3MDBY connectors. See detail.

2. If splicing is required between controller and remote control valve, splices shall be located in valve box and so noted on as-built drawings.

3. All splices and connections to include 3’ of excess wire shaped into a coil.

H. Booster Pump

1. Watertronics variable speed booster pump, Model # CLTBV-2-20-240-3-74. Contact Phil Vangene @ Jack Prust Sales (925) 250-5885 for ordering information and current data. No substitutions.

I. Backfilling:

1. Backfill only after piping has been inspected and approved.

2. Backfill material shall be the earth excavated from trenches, free from rock, concrete chunks, and other foreign or coarse materials. If additional backfill material is needed, it shall be import material to match existing soil. Carefully select backfill that is to be placed next to plastic pipe to avoid any sharp objects which may damage pipe.

3. Place backfill materials in 6” layers and compact by tamping to a minimum compaction of 85% relative compaction

4. Dress off areas to obtain finish grades and remove excess soil, rocks, or debris remaining after backfill is completed.

5. If settlement occurs along trenches and adjustments in pipes, valves, sprinkler heads, soil, sod or paving are necessary to bring the system, soil, sod or paving to the proper level of the permanent grade, the Contractor, as part of the work under this Contract, shall make all adjustments without extra cost to the City.

6. Install a 2-inch wide continuous flexible metal or direct burial irrigation wire. Detection tape or wire shall be used on all main lines that do not have control wire sharing a common trench.

J. Sprinkler Heads

1. Thoroughly flush lines before installing heads.

2. Locate heads as shown in plan and detail.

3. Adjust sprinkler heads for proper distribution and trim.

4. Use Teflon tape on all swing joints. No pipe compounds are to be used.

K. Testing:

Perform tests as specified. Remake any faulty joints with all new materials. Use of cement or caulking to seal leaks is absolutely prohibited.

3.02 TESTING

After the entire irrigation system has been completely installed, a complete test of the entire installation shall be made by the Contractor in the presence of the Owner or his representative. The Contractor shall perform testing at his/her own expense.

A. Testing Plastic Pipe – After all new sprinkler piping and risers are in place and connected, control valves shall be opened and a full head of water used to flush out the system. After flushing the risers shall be capped off and the system pressure tested. Request the presence of the Owner in writing at least 72 hours in advance of testing. Center load piping with small amount of backfill to prevent arching or slipping under pressure. No fittings shall be covered. When welded plastic joints have cured at least 24 hours apply a continuous static water pressure with the risers capped as follows:

1. Test main and lateral lines at 125 psi for 4 hours.

2. Repair any leaks resulting from tests. Pressure testing shall continue until no leakage or loss of pressure is shown over the prescribed test period. At the conclusion of the pressure test, the heads may be installed and tested for operation in accordance with design requirements under normal operating pressure.

B. Testing of Electrical System

Prior to acceptance of the work the Contractor shall cause the following tests to be made:

1. For continuity of each circuit.

2. For grounds in each circuit.

3. A megger test on each circuit.

4. A functional test in which it is demonstrated that each and every part of the system functions as specified or intended herein.

3.03 GUARANTEE

It shall be the responsibility of the irrigation contractor to fill and repair all depressions and replace all turf/planting lost due to the settlement of irrigation trenches for one (1) year following completion and acceptance of the job. The Contractor shall also guarantee all materials, equipment and workmanship and shall agree to replace at his/her expense, at any time within one (1) year after installation is accepted, and all defective parts that may be found.

3.04 AS-BUILT DRAWINGS

A. The Contractor shall maintain in good order in the field office one complete set of black line prints of all sprinkler Drawings which form a part of this Contract, showing all water lines, sprinklers, valves, controllers, and stub-outs. In the event any work is not installed as indicated on the Drawings, such work shall be corrected and dimensioned accurately from sidewalks, fence posts or other permanent park elements on these as-built drawings.

B. All underground stub-outs for future connections, gate valves and remote control valves shall be located and dimensioned accurately from sprinkler heads, walks, on all as-built drawings.

C. As-built plans must be accurate and up-to-date with the approval of the Owner before each progress payment will be made.

D. Upon completion of the work submit clean and neatly drawn as-built drawings.

END OF SECTION

SECTION 32 90 11

LANDSCAPING

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Included: Furnishing all labor, materials and equipment necessary to provide and install planting and construction items as specified herein.

B. In all cases, materials shall be furnished as needed to complete work in quantities designated in these specifications, including turf replanting, redressing and maintenance during the contract period. The Contractor shall provide valid invoices to verify amounts of various materials to be used.

1.02 QUALITY ASSURANCE:

A. The source of the planting materials shall be furnished, if requested by the Landscape Architect.

B. Any sampling, testing, or inspection costs of materials shall be borne by the Contractor and copies of Inspection Certificates, required by law, shall be furnished to the Owner without charge.

C. Qualifications of Workmen: Provide at least one person who shall be thoroughly trained and experienced in the skills required, and who shall be completely familiar with the design and application of work required by this section and who shall be present at all times during progress of the work of this section and shall direct all work performed under this section.

1.03 PRODUCT HANDLING:

A. Protection: Use all means necessary to protect the materials of this section before, during and after installation, and to protect the work of other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the satisfaction of the Landscape Architect and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. All materials shall conform to the requirements of the Agricultural Code of the State of California, these Specifications and the Drawings.

PART 3 - EXECUTION

3.01 INSPECTION OF WORK:

A. Installation and planting operations must be approved by the Owner.

3.02 GENERAL INSPECTION:

A. Periodic inspections shall be required for basic operations and installations during progression of the project.

B. Such inspections will include, but not necessarily be limited to, the following items:

1. Approval of all planting material prior to installation.

2. Placement of the planting material.

C. All planting material delivered to the project site is to be inspected to see that it is sound, healthy, vigorous, free of disease, free of pests, free from physical-damage and well developed root systems. Plant materials not passing inspection are to be removed from job site immediately. Replacement plants are subject to same quality requirements. Plant material will be inspected for circling/girdling roots. Extra effort should be given to purchase and install healthy and sound plant material.

3.03 TURF

A. GRADING AND SOIL PREPARATION:

1. Before soil preparation is to begin, the entire area that is to be planted shall be finished graded to lines and grades established by the Engineer or as indicated in the Drawings and Specifications. Water shall be applied if necessary to provide ideal moisture for planting as herein specified. All soil for areas specified for lawn planting shall be loose and friable. The Contractor shall finish grade the lawn area one inch (1") below the surfaces of all adjacent walks, curbs, mowstrips, paved areas, etc., in all cases without abrupt changes in gradient. The Contractor shall legally dispose of buried debris, found upon excavation, to any convenient dump or off-site location at no expense to the Owner.

2. Weed Eradication: Chemical weed eradication of the site prior to planting will be required. The contractor shall notify the Owner of site conditions prior to planting. All existing weeds shall be removed and/or eradicated as determined by a licensed advisor in writing, (PCA) The Contractor is also responsible for broadleaf weed control in the planted turf areas. The landscape areas at final acceptance shall be

weed free. The Contractor shall verify the method of weed eradication employed whether by fumigating, chemical methods, mechanical methods or others as determined by a licensed advisor in writing (PCA). The Contractor shall use and apply weed control materials in accordance with manufacturer's recommendations and all local codes and ordinances. The materials applied shall be done by a licensed applicator.

3. Scheduling: Planting operations (including hydroseeding) shall not commence until completion and approval of all construction work, clear and grubbing, grading, soil preparation and sprinkler system installation.

4. Soil preparation: All landscape areas shall be ripped and cultivated evenly and consistently so the soil is loose and friable. The contractor shall obtain soil samples of the site and submit to Sunland Analytical Lab, Inc, 11315 Pyrites Way, Suite 4, Rancho Cordova, CA (916) 852-8557 for their testing of landscape suitability. One (1) sample each shall be taken at the bottom of the basin in the west and east ends. One (1) sample each shall be taken from the northeast and southwest upper areas of the site. Submit soils reports to the Owner. The contractor shall follow recommendations. For bidding purposes the contractor shall prepare the soil as follows:

5. After ripping of site incorporate six (6) cubic yards of WonderGrow organic material available (or equal), through Recology Environmental Products (209) (209) 872-0734 and ten (10) lbs/1,1000 sf of 15-15-15 fertilizer into the soil by rototilling into soil at a depth of 6”. If the recommended analysis differs from this rate the landscape contractor shall notify the Owner for a possible Change Order with credit or extra fees. Do no soil preparation without prior approval.

   a. The top three inches (3") of the surface soil shall be cleared of all concrete, large stones, roots, wire, sticks and other foreign material. The areas to be planted shall be evenly graded to present a smooth and even surface free of humps and hollows. Immediately prior to planting, the surface of the area to be planted shall be sufficiently loose and friable to receive the lawn seed.

B. PLANTING:

1. Lawn Seed Mixture: Seed shall be of the quality and mixture specified. Before packaging, the seeds shall be mixed together in a mechanical mixer to obtain thorough dispersion of the various types of seeds. Date on Certification tag shall be within five (5) months of proposed planting date.

   a. The seed used in this contract shall be 98 % pure, not to exceed 0.10 other crop, both noxious and weed free, with a minimum of 88% germination. All seed shall be re-cleaned Grade A “new crop” seed, delivered in the original unopened containers, and shall bear a guaranteed analysis and dealer’s label. The dealer may mix the seed provided a guaranteed statement of composition

of mixture and percentages of purity and germination of each variety is attached to the sealed container. The seed shall be treated with a pre-emergent fungus preventative in accordance with manufacturer specifications. The seed containers shall be stored immediately in a dry, weather and damp proof structure. The seed mix shall consist of:

1) 90% Hybrid Bermuda Grass

2) 10% Red Fescue

b. Seeding rate of 12 lbs/ 1,000 sq. ft.

2. Fertilizer: The commercial fertilizer shall be added evenly to the soil at a rate per thousand square feet to apply a minimum of one (1 lb.) pound of actual nitrogen at the time of seeding and repeated every thirty (30) calendar days after planting until acceptance of the turf by the Owners Representative. The Contractor shall apply fertilizer to the turf areas just prior to the final inspection.

3. Cellulose: The mulch shall be green colored, fibrous, wood cellulose mulch containing no growth or germination inhibiting factors. It shall be manufactured in such a manner that, after addition and agitation in slurry tanks with fertilizer, seed, water, and other approved additives, the fibers in the material will become uniformly suspended to form a homogeneous slurry, and that when hydraulically sprayed on the ground, the material will form a blotter-like ground cover impregnated uniformly with seed and, which after application, will allow the absorption of moisture and allow the rainfall to percolate to the underlying soil. Cellulose shall be certified to indicate that laboratory and field testing of the product has been accomplished and that it meets all of the foregoing requirements. Weight specification of this material from suppliers and for all application shall refer only to air dry weight of the fiber material. Each package of the cellulose fiber shall be marked by the manufacturer to show the air dry weight content, 1800 lbs. per acre.

4. Water: Water for hydromulching shall be clean, potable and added to the slurry mixture in sufficient amount to spread uniformly the required quantity of hydromulch solids (approximately 3,000 gallons per acre).

5. Hydromulching Equipment: This equipment shall have a built-in agitation system and operating capacity sufficient to agitate, suspend and homogeneously mix the slurry. The slurry distribution lines shall be large enough to prevent stoppage. This discharge line shall be equipped with a set of hydraulic spray nozzles which will provide a continuous non-fluctuating discharge and delivery of the slurry in the prescribed quantities uniformly, without misses, waste, or erosion. The slurry tank shall have a minimum capacity of 1,000 gallons

6. Watering: After completing the planting operations, the Contractor shall apply water by means of a gentle spray, to make all planted areas moist, but not flooded. The areas shall not be watered to the extent of saturating the soil and causing "flotation" or "flowing" of the top surface of the soil. After water has once been applied, no portion of the planted areas shall be allowed to dry out during the entire maintenance period. The contractor shall be responsible to monitor the site and alter the watering items and frequencies to meet site conditions.

3.04 TREES

A. STANDARDS:

1. Quality and Size: All trees shall have a habit of growth that is normal to the species, be sound, healthy, vigorous, and free from excessive abrasions, bark or other objectionable disfigurements. Tree trunks shall be sturdy and well hardened off. All trees shall have normally well developed branch systems with straight stems, with well balanced tops of vigorous growth and with vigorous and fibrous root systems which are neither root nor pot bound. Root bound trees will not be accepted. Trees shall be grown in nurseries that have been inspected by the State Department of Agriculture and have complied with its regulations. Container stock shall have grown in the containers in which it was delivered for at least six months, but not over two years.

2. Minimum Standards:

a. Fifteen Gallon Tree Standard:

1) Trees shall be at least three-fourth inch (3/4") in diameter, measured six inches (6") from the container soil level. Tree height shall be at least six feet (6') measured from the container soil level.

b. Twenty Four inch Box Tree Standard:

1) Trees shall be at least one and one-half inch (1 ½") in diameter, measured six inches (6") from the container soil level. Tree height shall be at least eight feet (8') measured from the container soil level.

B. PLANTING:

1. Tree Pits: Tree pits shall be dug with level bottoms, width two times the diameter of root ball and eight inches (8") deeper than length of root ball. See Drawings for details. For palms, see details.

2. Setting: Planting shall bear same relation to soil level when planted as they did when in container. Each plant shall be placed in center of plant pit. Note: Trees shall be planted to assure positive drainage away from the trunk. In no case shall water be able to pond around the crown. Trees that settle and are subject to

ponding shall be lifted and reset at no cost to the Owner. Maintain 48" diameter area with 2" layer composted organic material around each tree. No hydroseed within this area.

3. Pit Backfill: Each plant pit shall be backfilled with prepared soil mix in accordance with the Drawings.

4. Backfill Procedure: Place plants on firm base with sides of plant hole scarified to assist in root penetration.

5. Removal from Containers: Carefully remove plant from container assuring that the rootball remains intact.

6. Handling: No canned plant material shall be planted if the ball is broken or cracked either before or during the process of planting.

7. Tree Tying: See Drawings for details.

8. Fertilizer:

   a. During the planting operation, apply Agriform planting packets follows:

      1) Position the plant in the hole and backfill halfway up the root ball.

      2) Place the recommended number of tablets evenly around the perimeter of, and immediately adjacent to the root ball at a depth that is between the middle and the bottom of the root ball. Complete backfilling, tamp firm the soil, and water.

9. Tree Staking: Stake all trees as shown on the Drawings.

10. Tree Guards: All trees to receive plastic Arbor Guards in lawn areas.

11. Scheduling: Planting shall not commence until completion and approval of all construction work, clearing and grubbing, grading, soil preparation and sprinkler system installation. Trees may be planted just prior to final site acceptance and the required maintenance period to be enforced and start when planting is completed.

12. Quantities: Trees shall be furnished as needed to complete work in quantities designated on the Drawings or these specifications, including replacement, redressing and maintenance during the contract period. The Contractor shall provide upon request valid invoices to verify the amounts of various materials to be used.

13. Spacing: When trees are spaced in rows, the total dimensions shall be verified and the trees equally spaced within the designated area. Where trees are shown in a

"loose" pattern, the Contractor shall space the material as shown at all times, maintaining an unequal spacing as shown on the plans and desired by the Owner.

C. ADDITIONAL TREE WORK:

1. Palm care: Contractor shall trim fronds on all existing palms. Palms shall have ‘pineapple’ trimmed to existing fronds no less than 45 degree upright from the horizontal. Tree Workers (excluding Groundsmen) shall have current Certified Tree Worker status as issued by International Society of Arboriculture. All palm work shall be accomplished by aerial lift truck. No climbing with spikes is allowed.

2. Non-Palm Trees: Prune existing non-palm trees to remove dead material. Remove cross branching material. Chip pruned material, haul offsite and dispose. City shall have option of directing disposal of chipped material on city property. Report significantly diseased or distressed trees to the City with remedial recommendations.

3. The Contractor shall meet with the Owners representative prior to beginning tree work, for a work progress review and final walk through of tree work done in the project.

3.05 ESTABLISHMENT MAINTENANCE PERIOD:

A. The Contractor shall continuously maintain all areas included in the contract during the progress of the work, through the maintenance period and until final acceptance of the work or end of the prescribed maintenance period whichever is later.

B. After all work indicated on the drawings or herein specified has been completed, inspected, and approved by the Landscape Architect, the Contractor shall commence a ninety (90) calendar day maintenance period.

C. Maintenance work includes all watering, weeding, replacement, mulching, cultivating, spraying, and trimming necessary to bring the planted areas to a healthy growing condition, and any additional work needed to keep the areas neat, edged and attractive.

D. Any date when the Contractor fails to adequately water, replace unsuitable plants, weed and other work determined to be necessary by the Landscape Architect, will NOT be credited as part of the Maintenance Period.

E. During the Maintenance Period any plant indicating weakness or probability of dying, shall be replaced by the Contractor at his own expense.

F. Tree stakes that for any reason are damaged or rendered inadequate for support shall be replaced to their original condition.

G. Constant diligence shall be maintained for the advent of disease, insects, and/or rodent infestations and proper preventative or control measure taken.

H. Maintain trees in their natural shapes. Tall or scraggly branches shall be thinned out where necessary. In no case shall trees be trimmed by heading or shearing. Any plants severely pruned in this manner shall be removed and replaced at Contractor's expense.

I. At completion of the Maintenance Period or upon acceptance of the Work; whichever is later, all areas included in the Contract shall be substantially clean and free of debris. All plant materials shall be live, healthy and free of infestations.

J. Any erosion or slippage of soil caused by watering shall be repaired by the Contractor at his expense.

K. All walks, curbs and gutter shall be kept clear of debris, mud, dust and standing water by sweeping, mopping or hosing down as required for complete cleanliness.

L. Protection: the Contractor shall carefully and continuously protect all areas included in the contract, including lawn and shrub areas, plant materials, supports, etc., until final acceptance of the work by the Owner.

M. Cleanup: After all planting operations are completed, the Contractor shall remove all trash, excess soil, empty plant containers, or other accumulated debris, from the site and at no extra cost to the Owner. Contractor shall repair all scars, ruts or mars in area caused by work operations. Areas shall be left in a neat and orderly condition. All this work shall be at the Contractor's expense.

3.06 GUARANTEE:

A. All trees shall be guaranteed for growth and health for a period of one (1) year following the date of the Notice of Completion. Trees not having positive drainage shall be lifted and reset at no expense to the Owner.

B. Trees that die or lose more than 30% of their original leaves shall be replaced under this section at no additional cost to the Owner.

C. The Contractor, within seven (7) calendar days of written notification by the Owner, shall remove and replace all guaranteed plant materials that for any reason fail to meet the requirements of the guarantee. Replacement shall be made with plant materials as indicated or specified for the first planting, and all such replacement materials shall be guaranteed as specified for the original guaranteed material.

END OF SECTION

SECTION 33 31 12

PVC GRAVITY PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of PVC gravity pipe conforming to ASTM D3034. Sizes are 4 through 15 inches.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Submit reports on testing per ASTM D3034 (pipes 3 inches through 15 inches), ASTM D3212, and ASTM F477.

PART 2 - MATERIALS

2.01 PVC MATERIAL

Additives and fillers, including stabilizers, antioxidants, lubricants, colorants, etc., shall not exceed 10 parts by weight per 100 of PVC resin in the compound.

2.02 PIPE

Pipe 4 through 15 inches shall conform to ASTM D3034, SDR 35.

2.03 JOINTS

Provide elastomeric gasket joints of the push-on type, conforming to ASTM D3212.

2.04 GASKETS

Gaskets for push-on joints shall conform to ASTM F477.

2.05 FITTINGS

Fittings for pipe 4 through 15 inches shall conform to ASTM D3034, SDR 35.

2.06 MANDREL FOR FIELD TESTING OF PIPE DEFLECTION

The mandrel shall:

A. Be a rigid, nonadjustable, odd-numbering-leg (nine legs minimum) mandrel having an effective length not less than its nominal diameter.

B. Have a minimum diameter at any point along the full length as follows:

Pipe Material	Nominal Size (inches)	Minimum Mandrel Diameter (inches)
PVC-ASTM D3034 (SDR 35)	6	5.619
	8	7.524
	10	9.405
	12	11.191
	15	13.849

C. Be fabricated of steel; be fitted with pulling rings at each end; be stamped or engraved on some segment other than a runner indicating the pipe material specification, nominal size, and mandrel outside diameter (e.g., PVC, D 3034-8"-7.524"); and be furnished in a carrying case labeled with the same data as stamped or engraved on the mandrel.

D. All costs incurred by the Contractor attributable to mandrel and deflection testing, including any delays, shall be borne by the Contractor at no cost to the Owner.

PART 3 - EXECUTION

3.01 LABORATORY TESTING

A. Conduct tests required in ASTM D3034, D3212, and F477.

B. The acceptable rates of failure for quality control tests shall be as follows:

1. Outer Diameter: 0%.
2. Minimum Wall Thickness: 0%.
3. Other Dimensions: 0%.
4. Flattening: 0%.
5. Impact: Six of six samples must pass; if one fails, test six more; all six must pass.

3.02 INSTALLING PVC SEWER PIPE

A. Install in accordance with Section 31 23 33, ASTM D2321, and as described below.

B. Pipe shall not deviate more than 1 inch from line or 1/2 inch from grade. Measure for grade at the pipe invert.

C. Minimum bedding thickness shall be 4 inches as shown on the Drawings.

D. Lay pipe without break, upgrade from structure to structure, with the socket ends of the pipe upgrade.

E. Do not use the pipe as a drain for removing water that has infiltrated into the trench.

F. After joint assembly, bring the bedding material up to pipe spring line. Bedding material shall be Class 1 material per ASTM D2321. Place the bedding material on each side of the pipe. Tamp the bedding material into final position at pipe spring line and continue to the top of the pipe. Relative compaction shall as shown on the Drawings.

G. Then place bedding material to 6 inches above the top of the pipe and compact to the relative compaction as shown on Drawings. The remainder of the trench backfill shall be native material, installed per Section 31 23 33.

H. Do not use hydro-hammers to compact bedding or backfill.

3.03 INSTALLING PIPE AT MANHOLES AND STRUCTURES

A. Place a 2-foot PVC length of pipe of the same inside diameter as the adjoining pipe at the inlet and outlet to each manhole or structure. Use a GPK Sanded Manhole Adaptor cast directly into each manhole or structure. If precast structures are utilized, grout the sanded manhole adaptor into the structure.

B. The pipe shall have a plain end, flush with the inside wall of the manhole or structure, or as shown in the drawings.

3.04 TESTING FOR DEFECTS OF INSTALLED PIPE

Following placement and compaction of backfill and prior to placing permanent pavement, ball and mandrel the pipe to measure for obstructions (excessive deflections, joint offsets, and lateral pipe intrusions).

3.05 FIELD TESTING FOR PIPE DEFLECTION

A. Test installed pipe to ensure that vertical deflections for plastic pipe do not exceed the maximum allowable deflection. Maximum allowable deflections shall be governed by the mandrel requirements stated herein and shall nominally be:

Nominal Pipe Size	**Percentage**
Up to and including 12 inches	5.0
Over 12	4.0

B. The maximum average inside diameter shall be equal to the average outside diameter per applicable ASTM standard minus two minimum wall thicknesses per applicable ASTM standards. Manufacturing and other tolerances shall not be considered for determining maximum allowable deflections.

C. Perform deflection tests not sooner than 30 days after completion of placement and compaction of backfill. Clean and inspect the pipe for offsets and obstructions prior to testing.

D. Pull a mandrel through the pipe by hand to verify that maximum allowable deflections have not been exceeded. Prior to use, the mandrel shall be certified by an independent testing laboratory. Use of an uncertified mandrel or a mandrel altered or modified after certification will invalidate test. If the mandrel fails to pass, the pipe will be deemed to be overdeflected.

E. Uncover any overdeflected pipe and, if not damaged, reinstall. Remove damaged pipe from the site. Any pipe subjected to any method or process other than removal, which attempts, even successfully, to reduce or cure any overdeflection, shall be uncovered, removed from the site, and replaced with new pipe.

3.06 TESTING FOR ALIGNMENT AND GRADE

After the pipe has been installed, backfilled to existing grade, and manholes raised to grade and resurfaced, "ball" the pipe from manhole to manhole with a sewer scrubbing ball. After balling the pipe, request television inspection by the Owner. If deficiencies are observed, the Owner will make a digital video recording and note defects requiring correction. Upon completing the corrective work, notify the Owner; the Owner will retelevise the affected portion of the pipeline system. Costs for retelevision will be billed to the Contractor.

END OF SECTION

SECTION 33 42 16

REINFORCED CONCRETE CULVERT PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, fabrication, testing, and installation of circular reinforced concrete culvert pipe complying with ASTM C76.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Prior to delivery of pipe from each manufacturing lot or run, submit:

1. Test results for external load crushing strength test per Section 11 of ASTM C76.

2. Certification of compliance with cited ASTM specifications of cement, aggregate, and reinforcement.

3. Manufacturer's description of admixtures used.

4. Adsorption test results per Section 11 of ASTM C76.

5. Manufacturer's report of visual inspection.

PART 2 - MATERIALS

2.01 CIRCULAR REINFORCED CONCRETE CULVERT PIPE

A. Comply with ASTM C76. Method of manufacture shall be cast, spun or packer head. Obtain class or D-load rating from drawings. If no class or D-load is shown, use D-1350 pipe.

B. Cement shall comply with ASTM C150, Type II.

C. Acceptance shall be on the basis of plant load-bearing tests, material tests, and inspection of manufactured pipe for visible defects and imperfections as defined in ASTM C76. Conduct three-edge bearing test for load to produce a 0.01-inch crack. Conduct tests on 2% of the number of each size of pipe furnished for the project. For extended delivery schedules, conduct tests on two pipe sections for each size preliminary to delivery of pipe. Conduct remainder of tests during extended delivery schedule.

2.02 ELECTRICAL REINFORCED CONCRETE PIPE

Electrical reinforcement in pipe is not allowed.

2.03 JOINTS

A. Use push-on rubber-gasketed watertight type.

B. Bells, spigots, and rubber gaskets shall conform to ASTM C361 or C443 and shall be compatible with ASTM C76 pipe barrel. Use flared or flush bell design.

2.04 BASE, BEDDING, AND BACKFILL MATERIAL

Use the following materials as specified in Section 31 23 33:

Zone	Material
Haunching	Sand
Initial Backfill Excluding Haunching	Native earth backfill
Final Backfill	Native earth backfill

PART 3 - EXECUTION

3.01 PRODUCT MARKING

Letter on the interior of each section of pipe the following:

A. Class designation or corresponding D-load to produce a 0.01-inch crack.

B. Date of manufacture.

C. Name of manufacturer and plant.

3.02 REJECTION

Reject and replace pipe exhibiting any of the following:

A. Fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.

B. Defects that indicate imperfect proportioning, mixing, and molding.

C. Surface defects indicating honeycombed or open texture.

D. Damaged or cracked ends where such damage would prevent making a satisfactory joint.

E. Any continuous crack having surface width of 0.01 inch or more and extending for a length of 12 inches or more, regardless of position in the wall of the pipe.

F. Exposure of any reinforcement indicating incorrect placement.

G. Any tested pipe that fails to meet the specified D-load.

3.03 INSTALLING BURIED PIPE

A. Install in accordance with Section 31 23 33 and as follows.

B. When installing pipe in trenches, do not deviate more than 2 inches from line or 1/2 inch from grade. Measure elevation at the pipe invert.

C. Lay pipe upgrade from structure to structure, with the bell ends of the pipe upgrade.

D. After joint assembly, bring the pipe zone and bedding material up to 1 foot above the top of pipe. Place the material in even lifts on each side of the pipe.

END OF SECTION

SECTION 33 42 20

CAST-IN-PLACE CONCRETE PIPE (CIPCP)

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of CIPCP. Size range is 30 through 96 inches.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Submit structural design of CIPCP signed and sealed by a civil or structural engineer licensed in the state of California.

C. Submit results of tests specified in ACI 346-01 and herein.

D. Submit concrete mix design.

E. Furnish evidence of successful experience and in-service performance of pipe produced by the pipe-casting machine under similar working conditions.

PART 2 - MATERIALS

2.01 PIPE DESIGN

Comply with ACI 346-01, except as modified herein.

2.02 CONCRETE

A. Concrete used in the construction of nonreinforced CIPCP shall be Class A per Section 03 05 00 with a minimum compressive strength of 4,000 psi at 28 days for pipe 84 inches and smaller and 5,000 psi for pipe larger than 84 inches. Cement mortar used for patching, smoothing, or repair of CIPCP shall conform to the requirements of Section 03 05 00.

B. Use admixtures only in conformance with the requirements of Section 03 05 00.

C. Coarse and fine aggregate gradation shall conform to the requirements of Section 03 05 00 and the following coarse aggregate maximum size limitations:

Pipe Diameter (inches)	Maximum Aggregate Size (inches)
30 to 48	1
48 and over	1 1/2

D. Coarse and fine aggregate shall also conform to ASTM C33, Grade 57.

E. Reinforced concrete pipe per Section 33 42 16 may be substituted for CIPCP at any location and shall comply with the following provisions:

1. Reinforced concrete pipe shall have the same internal diameter as specified for CIPCP. The pipe class shall be as specified or as determined by the Owner's Representative.

2. Joints on reinforced concrete pipe shall be the cement-mortar or rubber-gasket type unless for a starter joint or otherwise indicated in the drawings.

3. Payment shall be at the unit price bid for CIPCP.

2.03 NOMINAL INTERNAL DIAMETER

The nominal internal diameter shall be the size indicated in the drawings. The actual internal diameter of the pipe at any point shall not be more than 5% less than the nominal internal diameter, and the actual internal cross-sectional area of the pipe at any point shall not be less than the cross-sectional area of a circle computed from the nominal internal diameter. The Contractor may be allowed to construct pipe of larger sizes than that specified in the drawings; however, the Owner's Representative must approve any deviations in sizes from those specified.

2.04 WALL THICKNESS

Minimum wall thickness for the various sizes of pipe shall conform to the following table:

Internal Diameter (inches)	Minimum Wall Thickness for Pipe (inches)
30	3
36	3 1/2
42	4
48	5
54	5 1/2
60	6
66	6 1/2
72	7
78	7 1/2
84	8
90	8 1/2
96	9

PART 3 - EXECUTION

3.01 PIPE SELECTION AND TRENCH CONDITIONS

A. Where unstable trench conditions are encountered, stabilize the trench by shoring or, wherever practical, by sloping the sides of the trench above the top of the pipe.

B. Where it is not feasible to place CIPCP due to unstable trench conditions, place reinforced concrete pipe per Section 33 42 16 of the same size and class indicated.

C. Construction of CIPCP will be considered as not feasible when the trench walls are not stable below the pipe periphery.

D. The Contractor may substitute reinforced concrete pipe per Section 33 42 16 at any location in place of CIPCP.

3.02 CIPCP TRENCH

A. The trench shall be excavated to lines and grades shown on the Drawings. The trench shall be shaped to form the bottom outside of the pipe and shall be graded and prepared to provide full, firm and uniform support by undisturbed earth, or compacted fill over a minimum of the bottom 210 degrees of the outside of the trench hereinafter referred to as the “trench form.”

B. When the soil around the trench form must be over-excavated and then backfilled and compacted, trenching shall be performed to produce the above-mentioned stable trench

form. All unstable strata or lenses of loose sand, silt, cohesive or non-cohesive soils below the contact line of the concrete pipe and trench form, shall be over-excavated to such depths and widths as required, backfilled with select cohesive soils and compacted to not less than 90% of maximum dry density in accordance with ASTM D1557.

C. Onsite native soils used for trench backfill shall be moisture conditioned to between one and four percentage points above optimum moisture content, placed in loose lifts not exceeding 8 inches thick and compacted to 90% of maximum dry density in accordance with ASTM D1557 unless a higher percentage of compaction is indicated on the Drawings.

3.03 PIPE CONSTRUCTION

A. Comply with ACI 346-01, Part 3 except as follows.

B. Construct CIPCP in one placement around the complete periphery of the pipe by means of a traveling pipe-casting machine.

C. Surfaces against which concrete is to be placed shall be free from standing water, mud, and debris and shall be firm enough to prevent contamination of the concrete by earth or other foreign material.

D. Absorptive surfaces against which concrete is to be placed shall be moistened thoroughly so that the moisture will not be drawn from the freshly placed concrete.

E. When placing operations cease or are delayed for more than 30 minutes, leave the end of the pipe rough with a slope of approximately 30 degrees and close the ends of the pipe securely by plastic membrane or other material to prevent dehydration of the concrete already placed. The joint so formed when placing operations again commence shall conform to the requirements of subsection on “Construction Joints.”

F. Pipes 30 inches in diameter shall be cast-in-place in a manner such that as forms are lapped, the lap ridges formed in the interior walls of the pipe face downstream in the direction of flow. Pipes 36 inches and larger may be cast in either direction.

G. Use forms that are clean and reasonably free of concrete adhering to the surface of the forms from previous operations. Use forms of sufficient strength to withstand vibrating of concrete and that will provide interior dimensions of the pipe in accordance with the tolerances of subsection on “Nominal Internal Diameter.” Do not use damaged forms and remove them from the jobsite.

3.04 CONSTRUCTION JOINTS

Where construction stops short of a manhole or other structure and construction will continue at a later time, or where CIPCP is to be joined to precast reinforced concrete pipe, complete the resulting joint by constructing a concrete collar around the joint. This collar shall extend at least 1 foot each side of the joint around the full periphery of the pipe and shall be at least equal in thickness to the wall thickness of the joined pipe, but

in no case less than 4 inches. The gap between the two pipes to be joined shall not be greater than half the diameter of the pipes joined. Immediately prior to constructing the collar, thoroughly clean and dampen the area to receive the collar.

3.05 REPAIRING

A. Repair rock pockets, blisters, voids, or similar defects not extending through the wall immediately by removing the defective concrete and replacing it with mortar as specified in Section 03 05 00.

B. Repair rock pockets, blisters, voids, or other defects that extend through the pipe wall by removing the entire pipe for 1 foot on each side beyond the limits of the defect.

C. Do not repair cracks until the entire backfill is in place. Paint cracks less than 0.01 inch in width with a cement paste. Repair longitudinal cracks exceeding 0.01 inch in width by epoxy pressure grouting. If the total length of longitudinal cracks exceeds 25% of the reach, remove and replace the entire reach. A reach is any length between two structures.

D. Repair circumferential cracks exceeding 0.01 inch in width and 12 inches in length by removing at least 1 inch of concrete in width for a depth of at least one-half the wall thickness and fill with mortar as specified in Section 03 05 00.

3.06 CURING

A. Immediately after finishing of the exposed exterior surface of the pipe, cover the pipe with a polyethylene or plastic membrane, anchored sufficiently to keep the surface covered.

B. Unless the pipe terminates at a structure that is closed to the air, securely close the ends of the pipe, as well as any other openings, with an impermeable membrane for a minimum of seven days or until the structure is constructed, if sooner. Make the structure reasonably airtight for a minimum of seven days, except when work is taking place inside the pipe.

3.07 FINISH

A. The exterior exposed surface of the pipe shall have a steel screed finish. As construction progresses, use a hand trowel to smooth areas not sufficiently smoothed by the pipe-casting machine. Finishing of the exterior shall be accomplished immediately as pipe construction progresses.

B. The interior surface of the pipe shall be equivalent to a steel screed finish. Chip out honeycombed or minor voids, fill, and smooth with cement mortar. Repair major voids with portland cement concrete (Class A).

C. Chip back excessive longitudinal ridges along the sides of the interior of the pipe and smooth with cement mortar.

D. Chip back form lap offsets exceeding the limits established below and smooth with mortar.

Pipe Diameter (inches)	Maximum Offset (inches)
30	3/8
33 to 42	1/2
48 to 66	5/8
72 to 90	7/8
96	1

E. Perform interior finishing as soon as possible or practical after placing of the pipe.

3.08 REJECTION

Pipe will be rejected for any of the following reasons:

A. Cracks exceeding 0.01 inch in width and 12 inches or greater in length unless repaired.

B. Rock pockets, honeycombing, blisters, voids, or other defects that extend through the pipe wall.

C. Application of any unauthorized wash coat of cement, grout, or other material.

D. Air bubble voids (bugholes) on the interior surface of the pipe exceeding 1/4 inch in depth unless pointed with mortar or other appropriate material.

E. Unrepaired offsets or indentations, including transverse and longitudinal form offsets exceeding those specified.

F. Deviation or departure from true grade or alignment exceeding that specified.

G. Concrete used that has a slump of less than 1 inch or more than 3 inches. Concrete that has had water added after slump or cylinder samples have been taken or that does not meet the proportioning requirements specified.

H. Concrete that has a core compressive strength less than specified.

I. The pipe does not pass the specified tests.

J. The pipe has been damaged in any manner including placing or compacting the backfill.

K. Concrete that has been placed when the concrete temperature exceeded 90°F or was less than 50°F or when the soil adjacent to the trench was below freezing.

L. The trench does not provide full, firm, and uniform support over the bottom 210 degrees of the pipe or the trench width exceeds the outside diameter by more than 2 inches.

M. The interior of the pipe is not at least as smooth as a steel trowel finish except for the form lap ridges.

3.09 CONCRETE TESTS

During the pouring operations, secure four standard test cylinders for each 50 cubic yards, or portions thereof, per day. Comply with the procedures established in ASTM C39. Cylinders shall be tested for strength by a recognized testing laboratory. The cost of such tests will be at the Contractor's expense. Submit certified copies of the results to the Engineer. One of the cylinders will be tested at the end of 7 days, two of the test cylinders will be tested at the end of 28 days, and one of the test cylinders will be held to be tested at the discretion of the Engineer.

3.10 BACKFILL

Perform backfill in accordance with ACI 346-01, paragraph 3.2.3.4 except where modified in Section 31 23 16.

3.11 COMPACTION

Compaction shall be in accordance with Section 31 23 16.

3.12 FIELD QUALITY CONTROL

Field quality control shall be in accordance with Section 31 23 16.

3.13 PROTECTION OF PIPE

Prevent damage to the pipe, including damage caused from subsequent backfill or compaction operations. Remove damaged pipe from the worksite or repair.

END OF SECTION

SECTION 40 05 96

CAST-IRON SLIDE GATES

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes requirements for materials, installation, and testing of cast-iron slide gates conforming to AWWA C560 and as supplemented herein.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Submit certificate of compliance with AWWA C560.

C. Submit dimensional drawings.

D. Submit manufacturer’s catalog data and detail drawings showing slide gate parts and described by material of construction, specification (such as AISI, ASTM, SAE, or CDA), and grade or type. Show coatings. Submit calculations showing lift and stem sizing.

E. Submit manufacturer's installation instructions.

1.03 MANUFACTURER'S SERVICES

A. One labor-day to check the installation and advise during start-up, testing, and adjustment of the equipment.

PART 2 - MATERIALS

2.01 MANUFACTURERS

Slide gates shall be manufactured by Rodney Hunt, Hydro Gate Corp., or equal.

2.02 DESIGN CRITERIA

A. Slide gates and appurtenances shall comply with AWWA C560, except as modified herein.

B. Design slide gates for a seating head of 30 feet and an unseating head of 16 feet, minimums.

C. Provide self contained gate design.

D. Provide rising stem design.

2.03 MATERIALS OF CONSTRUCTION

Materials of construction shall be as listed in AWWA C560, except as described below.

Component	Material
Stems couplings, fasteners (including anchor bolts)	Stainless steel

2.04 SLIDES

The deflection of the top and bottom ribs shall not exceed 0.032 inch.

2.05 STEMS AND STEM GUIDES

The finish on the stem threads shall be 63 microinches or better per ASME B46.1. Support the stems with stem guides such that the L/R ratio (as defined in AWWA C560) of the unsupported part of the stem shall not exceed 200.

2.06 STEM COVER

Provide clear plastic stem cover with position indication, graduated in feet and inches. Provide vent holes to prevent condensation.

2.07 MANUAL LIFTING DEVICE

Provide crank actuators per AWWA C560. A maximum effort of 30 pounds shall operate the gates at the specified operating head. Actuators having a gear reduction greater than 4:1 shall be two-speed. Centerline of the crack actuator shall be located 3’-6” above the adjacent groundline or slab elevation.

PART 3 - EXECUTION

A. Installation

B. In accordance with AWWA C560, Section 4.6.

C. Provide the manufacturer's recommended lubricants.

3.02 FIELD TESTING

A. Operate each slide gate through two complete cycles. Gates shall operate without sticking or binding.

B. Determine pulling force required to turn handwheel with a torque wrench. Measured handwheel force shall be less than the limit specified.

C. Perform field testing per AWWA C560, paragraph 4.6.

END OF SECTION

SECTION 402051

INSTALLATION OF CONCRETE PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes placement of pipelines fabricated of reinforced concrete.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

PART 2 - MATERIALS

2.01 PIPE MATERIAL

See Section 33 42 16.

PART 3 - EXECUTION

3.01 DELIVERY AND TEMPORARY STORAGE OF PIPE AT SITE

A. Deliver the pipe alongside the pipelaying access road over which the pipe trailer-tractors can travel under their own power. Place the pipe in the order in which it is to be installed as estimated from station stakes at approximately 100-foot intervals and secure it from rolling.

B. Transport pipe to the jobsite on padded bunks with nylon tie-down straps to protect the pipe.

C. Store pipe on earth berms or timber cradles adjacent to the trench in the numerical order of installation.

3.02 HANDLING OF PIPE

A. Lift pipes with spreader beams or wide belt slings or as recommended by the pipe manufacturer. Do not use cable slings or chains directly bearing on the pipe. Lift pipes at two points, at approximately 1/3 to 1/4 of the pipe length from the pipe ends.

3.03 SANITATION OF PIPE INTERIOR

A. During laying operations, do not place tools, food, clothing, trash, or other materials in the pipe.

B. When pipelaying is not in progress, including the noon hour, close the ends of the pipe with a vermin- and child-proof plug.

3.04 PLACEMENT OF PIPE IN TRENCH

A. Control water in trench per Section 31 23 33.

B. Lay pipes uphill if the grade exceeds 10%.

C. Excavate as shown in the drawings.

D. Place and compact the bedding as detailed in the drawings to bring the trench bottom to grade.

E. Cut a depression to accommodate the pipe bell and spaces to permit removal of the pipe handling slings.

F. Lay each section of pipe in the order and position shown on the installation schedule. Lower the pipe onto the bedding and install it to line and grade along its full length on firm bedding, except at the bell and at the sling depressions. Tolerances on grade are 1/4 inch. The tolerance on line is 1 inch.

G. When installing beveled pipe, do not deviate from the pipe top mark by more than 2 inches from the vertical line passing through the pipe center.

3.05 ASSEMBLING RUBBER RING JOINTS

A. Clean the ends of the pipe to be joined of foreign material.

B. Immediately prior to lowering each section of pipe into the trench, apply a nontoxic water-soluble vegetable soap solution to the inside of the bell of the pipe in the trench and to the rubber gasket and spigot groove of the pipe to be installed. Stretch the rubber gasket into the groove of the spigot end of the pipe to be inserted and distribute it uniformly around the circumference.

C. Without tilting the pipe to be installed, enter its spigot into the bell of the pipe in the trench. Use come-a-longs or pipe jacks to drive spigot end home horizontally. Where deflections at joints are required for curved alignment, do not exceed the pipe manufacturer's recommended maximum joint opening on one side.

END OF SECTION

SECTION 402092

PVC DISTRIBUTION PIPE (AWWA C900)

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of PVC distribution pipe conforming to AWWA C900. Size range is 4 through 12 inches.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Trenching, Backfilling, and Compacting: 31 23 33.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Provide affidavit of compliance with AWWA C900.

C. Submit fully dimensioned cross-section of the bell and barrel of the pipe. Show the bell maximum outside diameter in the pressurized area and its minimum wall thickness at the same location.

D. Submit manufacturer's literature of gray iron and ductile-iron fittings including dimensions, thickness, weight, coating, lining, and a statement of inspection and compliance with the acceptance tests of AWWA C110 or C153.

PART 2 - MATERIALS

2.01 PIPE

AWWA C900 rubber-ring gasket bell end or plain end with elastomeric gasket coupling, cast iron equivalent outside diameter, material cell classification 12454-B per ASTM D1784. Pressure rating shall be 150 psi unless otherwise shown on the Drawings.

2.02 PVC PIPE COLORING AND MARKING FOR IRRIGATION SERVICE

PVC pipe shall be purple (Pantone 522) and shall be marked on both sides of the pipe with the wording "CAUTION: IRRIGATION WATER--DO NOT DRINK." The lettering shall be minimum 1 inch high, black, and shall be repeated at intervals not exceeding 60 inches. The purple coloring shall be achieved by adding pigment to the PVC material as the pipe is being manufactured

2.03 FITTINGS

A. Fittings shall conform to AWWA C110 with a minimum pressure rating of 250 psi. Size bells specifically for outside diameter of cast-iron equivalent PVC pipe including rubber-ring retaining groove.

B. Mechanical joint fittings conforming to AWWA C153 may be used in lieu of AWWA C110 fittings.

2.04 FLANGES

Flanges on outlets of fittings shall be Class 125 per ASME B16.1.

PART 3 - EXECUTION

3.01 PRODUCT MARKING

Legibly mark pipe at 5-foot intervals and each coupling to identify the nominal diameter, the outside diameter base, that is, cast-iron or steel pipe (IPS), the material code for pipe and couplings, the dimension ratio number, AWWA C900, and the seal of the testing agency that verified the suitability of the material for potable water service (NSF in the United States).

3.02 DELIVERY AND TEMPORARY STORAGE OF PIPE

A. Ship, store, and place pipe at the installation site, supporting the pipe uniformly. Avoid scratching the pipe surface. Do not stack higher than 4 feet or with weight on bells. Cover to protect from sunlight.

B. Do not install pipe that is gouged or scratched forming a clear depression.

3.03 HANDLING PIPE

Hoist pipe with mechanical equipment using a cloth belt sling or a continuous fiber rope that avoids scratching the pipe. Do not use a chain. Pipes up to 12 inches in diameter may be lowered by rolling on two ropes controlled by snubbing. Pipes up to 6 inches in diameter may be lifted by hand.

3.04 INSTALLING BURIED PIPING

A. Install in accordance with AWWA C605, Section 31 23 33

B. Compact trench backfill to the specified relative compaction. Do not float pipe. Do not use high-impact hammer-type equipment except where the pipe manufacturer warrants in writing that such use will not damage the pipe.

3.05 ASSEMBLY OF PIPE JOINT

A. The spigot and bell or bell coupling shall be dirt free and slide together without displacing the rubber ring. Lay the pipe section with the bell coupling facing the direction of laying.

B. Insert the rubber ring into the groove in the bell in the trench just before joining the pipes. First clean the groove. Observe the correct direction of the shaped ring. Feel that the ring is completely seated.

C. Lubricate the spigot over the taper and up to the full insertion mark with the lubricant supplied by the pipe manufacturer. If the lubricated pipe end touches dirt, clean the pipe end and reapply lubricant.

D. Insert the spigot into the bell and force it slowly into position.

E. Check that the rubber ring has not left the groove during assembly by passing a feeler gauge around the completed joint.

END OF SECTION

SECTION 43 21 41

SUBMERSIBLE PUMPS AND DISCHARGE PIPES

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of two constant speed, submersible non-clog wastewater pumps with slide rail systems and discharge pipes.

1.02 SUBMITTALS

A. Submit shop drawings in accordance with the General Conditions and Section 01 33 00.

B. Submit dimensional drawings.

C. Submit manufacturer's catalog data and detail drawings showing all pump parts and describe by material of construction, specification (such as AISI, ASTM, SAE, or CDA), and grade or type. Show linings and coatings. Show outline dimensions and weights of pumps, bases, and motors.

D. Submit pump curves from manufacturer's catalog data on which the specified operating points are marked. Show efficiency, brake horsepower, and NPSH required for the selected pump curve for each specified operating point. Show maximum operating speed.

E. Submit setting drawings. Show anchor bolt layout and anchor bolt dimensions.

F. Submit manufacturer's reports on hydrostatic tests and performance tests.

G. Provide an affidavit of compliance on all ductile iron piping and fittings with standards referenced in this section, e.g. AWWA C151.

H. Submit joint and fitting details and manufacturer’s data sheets on ductile iron fittings.

1.03 DEFINITIONS

Terms shall be as defined in ANSI/HI 11.6-2001 and ASME PTC 8.2. If there is a discrepancy in definitions between the two publications, the definitions given in ANSI/HI 11.6-2001 shall govern.

1.04 MANUFACTURER'S SERVICES

Provide equipment manufacturer's services at the jobsite for a minimum of one labor day, travel time excluded, to check the installation and advise during start-up, testing, and adjustment of the pumps and to instruct the Owner’s personnel in the operation and

maintenance of the pumps. A minimum of 2 hours of this time shall be devoted to instructing the Owner's personnel in the operation and maintenance of the pumps.

PART 2 - MATERIALS

2.01 PUMP DESIGN

A. The Contractor shall assign unit responsibility to the pump supplier for the complete pump system, including motors and cooling system control assembly.

B. Each pump shall be of the vertical, nonclog, single-suction, centrifugal type and shall be suitable for pumping unscreened raw sewage.

C. The pump, with its appurtenances and electric cable, shall be capable of continuous submergence under water without loss of watertight integrity to a minimum depth of 65 feet.

D. Design the casing to withstand a hydrostatic test of at least 150% of the pump discharge pressure (suction pressure plus pump differential pressure) at shutoff.

E. Pump curve shall be continuously rising and shall be free of dips and valleys from the design point to the shutoff head. The shutoff head shall be at least 200% of the head that occurs at the design point.

F. Design the pump and its components to operate continuously over a flow range of 50% to 140% of the flow at the BEP.

2.02 DISCHARGE CONNECTIONS

A. Discharge connections shall be flanged, ASME B16.1, Class 125. Flanges shall be flat faced. Bolt holes shall straddle the horizontal and vertical centerlines.

B. The pump shall be automatically connected to the discharge connection elbow when lowered into place and shall be easily removed for inspection or service. Sealing of the pumping unit to the discharge elbow shall be accomplished by a simple linear downward motion of the pump. A sliding guide bracket shall be an integral part of the pump unit. The entire weight of the pump unit shall be guided by no less than two stainless steel guide bars pressed tightly against the discharge connection elbow. No portion of pump shall bear directly on the floor of the sump.

2.03 POWER SUPPLY

Power supply will be 460 volts, 60 hertz, 3 phase.

2.04 VOLUTE CASING

Volute casing shall be of a single piece, nonconcentric design with smooth fluid passages at all points to pass any size solids which can pass through the impeller. Casing

shall be accurately machined to fit the mechanical seal and suction cover assemblies. Fit the bottom of the volute with a Type 316 or 420 stainless steel or rubber-lined carbon steel replacement wear ring. The volute shall have a center discharge nozzle. Provide a 3/4-inch drain with plug in the volute.

2.05 IMPELLER

A. Impeller shall be enclosed type with a maximum of three vanes. Each impeller shall be cast in one piece and shall be statically and dynamically balanced, double-shrouded thrulet with smooth water passage to prevent clogging by stringy or fibrous materials and other matter found in normal raw wastewater applications.

B. Each impeller shall be keyed to the shaft, and the fastening of the impeller to the shaft shall be made by a locking device. The locking device shall be sealed from the liquid by means of an O-ring and covered and secured to the end face of the shaft by a single bolt.

2.06 SHAFTS

A. The pump and motor shaft shall be a stainless steel single piece unit.

B. Pump shaft diameter shall be such that it will not deflect more than 0.002-inch at the mechanical seal face with the largest impeller installed while operating at the maximum pump speed. Tolerance on the shaft diameter shall not exceed 0.002 inch. Dynamic shaft deflection at the stuffing box face shall not exceed 0.002 inch.

C. The first lateral critical speed of the rotating assembly shall be at least 120% of the maximum pump operating speed.

D. Surface finish of the shafts through the mechanical seal and at the rubbing contact-bearing housing seals shall not exceed a roughness of 32 microinches.

2.07 PUMP SEAL

A. Provide each pump with a tandem mechanical shaft seal system. The upper of the tandem set of seals shall operate in an oil chamber located just below the stator housing. This set shall contain one stationary tungsten carbide or cast chromium ring and one positively driven rotating carbon ring functioning as an independent secondary barrier between the pumped liquid and the stator housing. The lower of the tandem set of seals shall function as the primary barrier between the pumped liquid and the stator housing. This set shall consist of a stationary ring and a positively driven rotating ring, both of which shall be tungsten carbide.

B. Each interface shall be held in contact by its own spring system supplemented by external liquid pressures. The seals shall require neither maintenance nor adjustment but shall be easily inspected and replaceable.

C. Shaft seals without positively driven rotating members or conventional double mechanical seals with a common single or double spring acting between the upper and

lower units requiring a substantial pressure differential to offset external pressure and effect sealing shall not be considered acceptable or equal to the dual independent seal system specified.

D. The shaft sealing system shall be capable of operating submerged to depths of or pressures equivalent to a minimum of 65 feet. No seal damage shall result from operating the pumping unit out of its liquid environment. The seal system shall not rely upon the pumped media for lubrication.

2.08 OIL CHAMBER

Provide each pump with an oil chamber for the shaft sealing system. Design the oil chamber to assure that air is left in the oil chamber to absorb the expansion of the oil due to temperature variations. The drain and inspection plug, with positive anti-leak seal, shall be easily accessible from the outside.

2.09 BEARINGS

A. Each pump shaft shall rotate on two permanently lubricated bearings. The upper bearing, providing for radial thrust, shall be a single row, roller bearing. The lower bearing shall consist of one double row or two single row angular contact bearing(s) for combined axial and radial loads.

B. Pump bearings shall be of the antifriction type designed to give 50,000 hours minimum life by L-10 calculations at maximum speed and operating load in continuous operation.

2.10 CABLE ENTRY

Each cable entry shall be comprised of a dual cylindrical elastomer grommet, flanked by stainless steel washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the entry body containing a strain relief function, separate from the function of sealing the cable. The assembly shall bear against a shoulder in the pump top. The cable entry system shall utilize one of the two designs specified below.

A. The cable entry junction chamber and motor shall be separated by two terminal boards, which shall isolate the motor interior from foreign material gaining access through the pump top. Both the terminal boards shall be bolted to the interior of the motor housing and sealed by O-rings.

B. Provide cast-iron, pressure-tight cable entry gland, which shall be sealed by a nitrile rubber ring and compression gland. Design the compression gland to conform to the allowable bending radius of the power cable. In addition, cast each individual conductor wire in resin in such a manner to avoid any water leakage into the motor through capillary action, because of external cable damage or other causes.

2.11 MATING SURFACES

A. Machine and fit mating surfaces of major parts with nitrile O-rings where watertight sealing is required. Machining and fitting shall be such that sealing is accomplished by automatic compression in two planes and O-ring contact made on four surfaces, without the requirement of a specific torque limit. Rectangular cross-sectioned gaskets requiring specific torque limits to achieve compression shall not be considered adequate or equal.

B. Tolerances of parts shall be such that they allow replacement of any part without additional machining required to ensure sealing as described above. No secondary sealing compounds, greases, or other devices shall be used.

2.12 COOLING SYSTEM

Pumps shall be equipped with an integral motor cooling system. A stainless steel cooling jacket system shall encircle the stator housing. An impeller, integral to the cooling and driven by the pump shaft, shall provide the necessary circulation of the cooling liquid through the jacket. The cooling system shall provide for continuous operation in liquid or ambient temperatures of up to 104°F.

2.13 ELECTRIC MOTORS

A. Each pump shall be driven by a 15 H.P. vertical, submersible squirrel cage induction motor, shell type design, housed in an air-filled, watertight chamber. The stator winding and stator leads shall be insulated with moisture-resistant Class H insulation which will resist a temperature of 155°C, 40°C ambient plus 115°C rise, and designed for continuous duty, capable of sustaining a minimum of 10 starts per hour.

B. The stator shall be dipped and baked three times in Class F varnish and shall be shrink-fitted into the stator housing. The use of bolts, pins, or other fastening devices requiring penetration of the stator housing shall be rejected.

C. The motor shall be sized to be nonoverloading when the pump is operated at any point on the pump performance characteristic curve drawn through the design point and shall have a minimum service factor of 1.15. Motor service factor shall not be used in satisfying pumping requirement.

D. Equip the stator with three sensors or thermistors embedded in the end coils of the stator winding to monitor stator temperature. Provide one sensor or thermistor in each stator phase, to switch off the unit if a winding temperature of 285°F is exceeded.

E. If the pump manufacturer uses thermistors in the motor windings, the pump manufacturer shall provide the motor winding thermistor relay and any motor bearing thermistor relays and shall arrange for their installation in the pump motor starter. Both relays shall operate in a 120-volt control circuit and have contacts as shown in the electrical drawings. Adjust and arrange relays to properly respond to the thermistors mounted within the pump-motor housing.

F. Each pump motor shall have a sensor system to monitor moisture in the stator cavity and temperature sensors within the motor stator windings. Provide a supervision relay for installation in the pump motor starter to trip an alarm if moisture content indicates a failure of the outer mechanical seal or if high temperature is detected in the stator. Supervision relay system shall be Flygt MiniCAS II or equal.

G. Connect sensors and thermistor relays to the pump motor starter in such a manner that their signal can actuate an alarm or provide for immediate shutdown or both.

2.14 MOTOR CABLES

Pump motor power cables installed shall be made of a Hypalon or Protolon synthetic rubber-jacketed, Type SPC multiconductor cable, suitable for submersible pump applications and heavy mechanical stresses. The power cable shall also be sized according to NEC and ICEA standards and also meet with P-MSHA approval or equivalent. Use a separate Hypalon or Protolon synthetic rubber-jacketed, Type SPC cable for temperature and moisture pilot protection signals. The total length of each cable shall be a minimum of 50 feet.

2.15 MATERIALS OF CONSTRUCTION

A. Materials of construction shall be as listed below:

Component	Material	Specification
Casing, volute, suction and discharge elbows	Cast iron	ASTM A48, Class 30 (minimum)
Shaft	Stainless steel	AISI 420
Impeller wear ring	Bronze or Stainless steel	
Drain and vent plugs	Malleable iron	ASTM A197
Cap screws, bolts, and nuts	Stainless steel	AISI Type 304

B. Do not construct the impeller wear ring and case wear ring of the same material. Impeller and bowl wear ring materials shall have a minimum Brinell hardness difference of 50 unless both the stationary and the rotating wear surfaces have Brinell hardness numbers of at least 50.

2.16 ANCHOR BOLTS, NUTS, AND WASHERS

A. Anchor bolts, nuts, and washers for pumps installed in wet wells shall be 304 stainless steel conforming to ASTM 193, Grade B8 for bolts and ASTM A194, Grade 8 for nuts. Provide washer for each nut. Washers shall be of the same material as the nuts..

2.17 LIFTING CHAINS

A. For each pump, provide 25 feet minimum of stainless steel lifting cable of adequate strength to permit raising and lowering of the pump. Provide a stainless steel hook style hanger for attachment of the chains at the top of the structure.

2.18 SUPPORT BRACKETS AND GUIDE BARS

A. Lower guide bar brackets shall be integral with the discharge connection. Upper bar holders and hardware shall be 304 stainless steel and shall be attached to the support beam with stainless steel bolts, nuts and washers. Intermediate guide bar holders and hardware shall be 304 stainless steel and shall be attached to the discharge piping.

B. Guide bars shall be a minimum of 2-inch schedule 40 stainless steel pipe (Type 304).

2.19 DUCTILE IRON PIPE

A. Ductile iron pipe shall conform to AWWA C151.

B. Minimum wall thickness for pipe having push-on or mechanical joints, restrained joints, plain ends or cast flange ends shall be Special Class 50, unless otherwise shown on the Drawings.

C. Minimum wall thickness for pipe having threaded flanges shall be Special Class 53 or Pressure Class 350.

2.20 JOINTS

A. Joints in aboveground or submerged piping or piping located in vaults and structures shall be flanged.

B. Joints in piping shall be push on or mechanical joint type.

2.21 FITTINGS

A. Mechanical joint fittings conforming to AWWA C153 shall be used on all buried fittings.

2.22 FLANGES

A. Flanges shall be solid back, Class 125 per AWWA C115. Flanges on pipe shall be either cast or threaded. Material shall be ductile iron.

B. Flanged pipe and fittings shall be shop fabricated not field fitted.

2.23 BOLTS AND NUTS FOR FLANGES

A. Bolts and nuts for Class 125 flanges located indoors, outdoors, aboveground, and in vaults and structures shall be carbon steel, ASTM 307, Grade B, hot dipped galvanized per ASTM F2329.

B. Bolts and nuts for buried or submerged Class 125 flanges shall be Type 304 stainless steel conforming to ASTM A193, Grade B8 for bolts and ASTM A194, Grade 8 for nuts.

C. Provide washers for each nut. Washers shall be of the same material as the nuts.

2.24 LUBRICANT FOR STAINLESS STEEL BOLTS AND NUTS

A. Lubricant shall be chloride free and shall be RAMCO TG-5G, Anti-Seize by RAMCO, Special Lubricants Corporation Husky™ Lube O'Seal or equal.

2.25 GASKETS FOR FLANGES

A. Gaskets shall be full face, 1/8-inch thick, cloth-inserted rubber, with a Shore "A" hardness of 75 to 85. Gaskets shall be suitable for a water pressure of 200 psi at a temperature of 180°F. Gaskets shall have "nominal" pipe size inside diameters not the inside diameters per ASME B16.21. Products: Garlock Style 19 or equal.

2.26 FLAP GATES

Flap gates shall be Waterman FRH-50 or equal. Provide with Class 125 flange drilling. Utilize an Ebba Iron Series 2100 restrained flange adaptor for connecting to discharge pipe.

PART 3 - EXECUTION

3.01 SERVICE CONDITIONS

Pump Data

Capacity (gpm)	**Pump Total Head (feet)**	**Minimum Pump Efficiency (%)**
1,400	17.5	
2,500*	12.5	65
3,200	6	
*Design point.		

Maximum pump speed	1,200 rpm
Motor horsepower (minimum)	15
Discharge nozzle size	10 inches
Manufacturers and models	Flygt Model NP3153 no substitution

3.02 FACTORY PERFORMANCE TESTING

A. Each pumping unit shall be subjected to a nonwitnessed laboratory performance test. Conduct tests in accordance with the ASME PTC 8.2 or ANSI/HI 1.6, using the actual job driver. The performance test shall be equivalent to Level "A" per ANSI/HI 1.6.

B. No motor overload above nameplate rating will be allowed at any flow up to 130% of the flow at the BEP.

3.03 PAINTING AND COATING

Coat submerged or immersed pumps and motors, other than stainless steel or brass, with a prime coat of Devoe Bar-Rust 233H, 8 mils; Tnemec 104-1211, 8 mils; and a finish coat of Devoe Bar-Rust 233H, 8 mils; Tnemec 104-ABO5, 8 mils; or equal. Apply the specified coatings at the place of manufacture.

A. Line volute and interior wetted surfaces and coat impeller with epoxy. Apply the manufacturer’s recommended number of coats to attain the specified minimum dry-film coating thickness. Products: Devoe Bar-Rust 233H, Tnemec 100, Scotchkote 323, Tnemec N140, Sherwin-Williams Tank Clad HS B62-80, Scotchkote 306, PPG AQUAPON® LT NSF Low Temperature Epoxy Coatings 95-172, Carboline Carboguard 891, PPG Amercoat 395FD or equal; 16 mils total. Color of topcoat: white. Each coat shall be different color than the one preceding it

3.04 INSTALLING PUMPING UNITS

A. Attach the flanged discharge elbow to the floor of the wet well using cast-in stainless steel anchor bolts. Install the guide rails per manufacturer's recommendations.

B. Install the guide rails per manufacturer's recommendations.

C. Provide and attach the stainless steel lift chain.

3.05 INSTALLATION OF STAINLESS STEEL BOLTS AND NUTS

A. Prior to assembly, coat threaded portions of stainless steel bolts and nuts with lubricant.

3.06 FIELD TESTING

A. Bump motor to ensure that motor has been connected for proper rotation.

B. Assure that in the automatic mode each pump responds to its water level signal.

C. Demonstrate that the pumping units, motors, and control system meet the following requirements:

1. The pumping units operate as specified without excessive noise, cavitation, vibration, and without overheating of the bearings.

2. Automatic and manual controls function in accordance with the specified requirements.

3. Drive equipment operates without being overloaded.

END OF SECTION