PUBLIC WORKS DEPARTMENT

INVITATION FOR BIDS,
SPECIFICATIONS, AND CONTRACT DOCUMENTS

FOR

ENCLOSED FLARE STATION INSTALLATION PROJECT
AT THE CITY OF SANTA CRUZ RESOURCE RECOVERY FACILITY
CITY PROJECT NO. _____

SANTA CRUZ CITY COUNCIL
Fred Keeley, Mayor
Renee Golder, Vice Mayor
Sandy Brown
Sonja Brunner
Shebreh Kalantari-Johnson
Scott Newsome
Martine Watkins

Matt Huffaker, City Manager

Bonnie Bush, City Clerk Administrator

Anthony P. Condotti, City Attorney

Nathan Nguyen, Public Works Department Director

BID OPENING NOVEMBER 20, 2025 @ 2:00 PM PACIFIC STANDARD TIME

Closing time to receive bids
will be verified by the on-line clock maintained by the
US Naval Observatory, found at:
https://time.gov

NOTICE INVITING SEALED PROPOSALS OR BIDS

NOTICE IS HEREBY GIVEN that the City of Santa Cruz, California (the "City"), invites sealed Bids for the following "Project":

"ENCLOSED FLARE STATION INSTALLATION PROJECT AT THE CITY OF SANTA CRUZ RESOURCE RECOVERY FACILITY (INSERT PROJECT NUMBER)"

1. Date and Place of Opening Bids. Sealed bids for the construction of the Project will be received at the Public Works Department, 809 Center Street, Room 201, Santa Cruz, California 95060, until November 20, 2025, at 2PM local time in a sealed envelope plainly endorsed with the Project Name and Number, listed above. At that time, the Bids received will be publicly opened and read. Bids received after the date and time stated above will be rejected as nonresponsive.

2. Location of Project. The Project is to be performed at the following location: 605 Dimeo Ln, Santa Cruz, California 95060.

3. Description of Work. The Project to be performed consists of furnishing all labor, materials, tools, equipment, and transportation required to complete the Project, with a scope of work to generally include, but is not limited to, the following: General description of the work (the "Work"). For additional information, please contact the individual listed in Paragraph 17, below.

4. Time for Completion. The Project shall be completed in 90 working days. All time limits stated herein are of the essence

5. Bidding Documents. The "Bidding Documents" shall include this Notice Inviting Bids, the Bid Form including all attachments included herein, General Requirements, Technical Specifications (including all plans, drawings, and reports), Addenda, draft Agreement, the City's Standard Specifications (dated 2002), as amended[1], the State of California's Department of Transportation Standard Specifications (dated 2018), as amended, and all other documents identified herein.

6. Obtaining the Bidding Documents. Bidding Documents may be downloaded, without charge, from the following designated website: https://procurement.opengov.com/portal/santacruzca?status=all. Paper Bidding Documents may be examined and copies secured from the office of the Public Works Department, 809 Center Street, Room 201, Santa Cruz, California 95060.

   Prospective bidders are urged to register with the designated website as a Bidding Documents holder, even if Bidding Documents are obtained from a source other than the designated website or City in either electronic or paper format. The designated website will

[1] The City's Standard Specifications (dated 2002) are located via the City Website at: https://www.cityofsantacruz.com/home/showpublisheddocument?id=2467.

be updated periodically with Addenda, reports, and other information relevant to submitting a bid for the Project. All official notifications, Addenda, and other Bidding Documents will be offered only through the designated website. Neither City nor any City official, employee, or agent will be responsible for Bidding Documents, including Addenda, if any, obtained from sources other than the designated website or the City.

7. Submitted Bid. Each sealed Bid shall comply with the Bidding Documents and be submitted on the Bid Form, including all attachments. Contractor must clearly and legibly set forth all information requested in the manner and form indicated.

   By submitting a Bid, the Bidder represents that it has carefully examined and investigated the Project site and all Bidding Documents.

   Each Bid shall include a bid security in the form of a certified check, cashier's check, or bidder's bond made payable to the order of the City of Santa Cruz, California, for an amount not less than (10) percent of the amount of the Proposal. The bid security shall be given as a guarantee that the successful bidder will enter into the contract, and will be declared forfeited if the successful bidder refuses or fails to enter into said contract.

   All bidders shall submit with its Bid the included sworn statement of its financial responsibility, technical ability, and experience.

8. Addenda. All submitted Bids shall verify if the City has issued any addenda for this Project. It is the bidder's sole responsibility to ensure that all addenda requirements are included in the submitted Bid. All addenda shall be posted on the City's designated website.

9. Pre-Bid Conference. A mandatory pre-bid conference will be held at the Project address, listed in Section 2, above, on November 4, 2025, at 10:00 AM local time. All prospective bidders must sign in on the City-provided sign-in sheet at this conference to be eligible to bid for the Project.

10. Withdrawing Submitted Bid. A bidder may withdraw a submitted Bid at any time prior to the time of bid opening only by written request to the City. Unless otherwise required by law, no bidder may withdraw its Bid for a period of sixty (60) days after the bid opening.

11. Award of Contract. The City will award the Project to the lowest responsible and responsive bidder. The City reserves the right to reject any and all Bids, including but not limited to for any minor irregularities, or waive any informalities or minor defects in proposals received. The City may reject a Bid if it determines that any of the bid prices are materially unbalanced to the potential detriment of the City.

    Within ten (10) calendar days after receiving written notice that the contract has been awarded, the successful bidder shall return to the City the signed agreement, together with the completed Labor and Material Bond and Faithful Performance Bond each in an amount equal to one hundred percent (100%) of the contract price (issued by a corporate surety company

approved by the City Attorney), insurance certificates, and all other documents as required by the Bidding Documents.

12. Department of Industrial Relations Monitoring. This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations (DIR). Prevailing wages as published by the DIR are required for all workers, including those employed by subcontractors, for all non-federally funded projects.

    No contractor or subcontractor may be listed on a Bid or awarded the contract for the Project unless registered with the DIR pursuant to Labor Code section 1725.5 and 1771.1. Refer to the DIR website, http://www.dir.ca.gov, to register and to find the correct wage rates and answers to questions related to prevailing wage requirements.

13. Federal Monitoring. Section intentionally omitted.

14. Licenses. Bidders and their proposed subcontractors shall hold such licenses as may be required by the laws of the State of California for the performance of the Work. The Contractor is required to ensure that all subcontractors listed in the Bid Form and working on this Project hold valid licenses and certifications suitable for their trade. Bidder is required to provide with its Bid satisfactory proof of licensure to the City.

    Bidders bidding as the Prime Contractor shall possess a valid California Contractor's "Class A" license at the time of bid submittal, and all listed subcontractors shall hold valid licenses suitable for their trade at the time of bid submittal. Failure to possess required licenses at the time of bid submittal may render the bid non-responsive and shall act as a bar to award of the contract to the bidder and shall result in a forfeiture of the bid security.

    Bidder and all subcontractors shall maintain the required licenses throughout the entire Project until the City issues a Notice of Completion.

15. Retention. Progress payments are subject to 5% retention withholding until thirty-five (35) calendar days after recording the notice of completion. Pursuant to California Public Contract Code Section 22300, for monies earned by the General Contractor and withheld by the City to ensure the performance of the Contract. The General Contractor, may, at its option, choose to substitute securities meeting the requirements of California Public Contract Code Section 22300, or have the retained, earned monies deposited in an escrow account at a federal or state-chartered bank.

16. Business License. All Contractors and subcontractors working in the City must have a valid City of Santa Cruz business license at the time the contract is awarded, pursuant to Santa Cruz Municipal Code (SCMC) Chapter 5.04.

17. Good Faith Local Hiring and Apprenticeships. The General Contractor and all Subcontractors must make good faith efforts to hire qualified individuals who are residents of Santa Cruz County as required by SCMC Chapter 3.10, and to employ apprentices who are

enrolled and participate in a viable apprenticeship program approved by the California Division of Apprenticeship Standards.

18. Questions for City. All questions relative to this Project prior to the opening of Bids shall be in writing and received a minimum of five (5) working days prior to the above-stated Bid opening date and shall be directed to:

    City of Santa Cruz, Public Works Department
    809 Center Street, Room 201, Santa Cruz, California 95060
    Hoi Yu, P.E.
    Senior Professional Engineer
    Email: hyu@santacruzca.gov
    Tel.: 831-420-5427

This Advertisement is issued by the City of Santa Cruz, California.

Dated: September 25, 2025

_____
Kevin Crossley, P.E.
Assistant Public Works Director/City Engineer
Public Works Department
809 Center Street, Rm. 201
Santa Cruz, CA 95060

BID FORM
For
"ENCLOSED FLARE STATION INSTALLATION PROJECT AT THE CITY OF SANTA CRUZ RESOURCE RECOVERY FACILITY (INSERT PROJECT NUMBER)"

TO: The Council of the City of Santa Cruz

PROPOSAL OF:_____
Business Address: _____
_____
Business Telephone: _____

The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement, in the form specified in the Contract Documents, with the City of Santa Cruz ("City") 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 Bidding Documents.

The undersigned Bidder understands that any or all quantities of work shown herein are approximate only and are subject to increase or decrease, and offers to do the work whether the quantities are increased or decreased at the unit prices as stated in the following tabulation. The undersigned Bidder agrees to take in full payment for the work, including all applicable state and local taxes, the amount shown on the bid sheet.

Please note closing time to receive bids will be verified according to local telephone company time.

IT IS UNDERSTOOD THAT THIS BID IS BASED UPON COMPLETION OF THE WORK AS SPECIFIED IN THE SPECIAL PROVISIONS WITHIN 90 WORKING DAYS, AND THE PRICES INCLUDE ALL STATE, FEDERAL, AND OTHER TAXES APPLICABLE TO THE PROJECT.

The undersigned Bidder agrees to do any extra work, not covered by the above schedule of price, which may be ordered by the City, and to accept as full compensation therefore, such prices as may be agreed upon in writing by the City and the Contractor in accordance with the "Measurement and Payment" Section of the Standard Specifications.

If awarded the contract, the undersigned Bidder hereby agrees to submit the following documents to the City within ten (10) business days of the Notice of Award: a signed Agreement, executed bonds (including Faithful Performance Bond and Payment Bond), proper evidence of insurance, and any other forms or documents identified in the Bidding Documents and Notice of Award. The undersigned Bidder further agrees to begin work within ten (10) days after receiving the Notice to Proceed.

The undersigned Bidder has carefully examined the form of the Agreement, the Standard Specifications, the Plans and Special Provisions for the project hereinbefore described and referred to in the "Invitation to Bidders" inviting proposals for **the Project** and also the site of the work

and will provide all necessary machinery, tools apparatus and other means of construction, and do all the work and furnish all materials required by said Specifications and Plans and Special Provisions in the manner described therein.

No bid will be considered for less than all items of this schedule and one contract will be awarded for the entire Project.

The undersigned has carefully checked the bid prices, and all computations involved in the preparation of this bid, and understands that the City of Santa Cruz will not be responsible for any errors or omissions on the part of the undersigned in making up this bid.

This Bid is made with a full knowledge of the kind, quantities, and quality of the work and of materials, equipment, and plans required. This proposal is also made after a complete, careful, and independent examination and investigation of the site of the work, local conditions affecting the same, and materials to be encountered.

The undersigned Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date

The Bidder furthermore agrees that in case of its default in executing said Agreement with necessary bonds, the check or bond accompanying this Bid and money payable will become and remain the property of the City of Santa Cruz.

Enclosed is Bidder's bond, certified check, or cashier's check no. _____ of the _____ _____ Bank for $ _____ which is not less than 10 percent of the Bid submitted by the undersigned, payable to the City of Santa Cruz, California, and which is given as a guarantee that the undersigned will enter into the contract if awarded the work.

It is understood and agreed that the City may reject any or all proposals, or waive any informalities or minor defects in proposals received.

It is agreed that this bid may not be withdrawn over a period of sixty (60) days from the opening thereof.

Bidder submits the following complete and executed documents herewith to form a complete Bid:

1. Bid Form
2. Basis of Bid
3. Bid Bond (if used as security)
4. List of Subcontractors Form
5. DIR Compliance Affidavit
6. Contractor Reference Information

7. Non-Collusion Declaration
8. Bidder's Financial Qualification Form

Note: Bidders should not add any conditions or qualifying statement to this bid as otherwise the bid may be declared irregular as being not responsive to the Advertisement for Bids.

The undersigned declares under penalty of perjury that the information contained in this Bid and all accompanying documents are true and correct. **A notary acknowledgment is required**.

Dated: _____ Firm Name: _____

Official Address: _____ Phone: _____

Email Address: _____

By: _____ Title: _____

State Contractor's License No.: _____

DIR Registration No.: _____

Signature of Bidder: _____

Basis of Bid

Name of Bidder: _____
Project Name/Number: _____

Item No.	Item Description	Unit	Estimated Quantity	Unit Price ($)	Unit Price Extension ($)
1					
2					
3					
4					
5					
6					
7					
8					
9					
		SUBTOTAL			
		10% CONTINGENCY			
		TOTAL			

Total Basis of Bid Plus Contingency in Words: _____

_____

Bid Bond
(If Bond Posted as Security)

KNOW ALL PERSONS BY THESE PRESENT:

THAT WE, _____, AS PRINCIPAL, AND _____, AS SURETY, are held and firmly bound unto the City of Santa Cruz in the penal sum of 10 PERCENT OF THE TOTAL AMOUNT OF THE BID of the Principal above named, submitted by said Principal to the City of Santa Cruz for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made to the City of Santa Cruz to which said bid was submitted, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents. In no case shall the liability of the surety hereunder exceed the sum of $_____.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT, WHEREAS, the Principal has submitted the above-mentioned bid to the City of Santa Cruz, aforesaid, for certain construction specifically described as follows

For:

"ENCLOSED FLARE STATION INSTALLATION PROJECT
at the City of Santa Cruz Resource Recovery Facility, Project Number"

NOW, THEREFORE, if the aforesaid Principal is awarded the contract and, within the time and manner required under the specifications, after the prescribed forms are presented to him/her for signature enters into a written contract**, i**n the prescribed form, in accordance with the bid, and files the certificate of insurance and two bonds with the City, one to guarantee faithful performance, and the other to guarantee payment for labor and materials as required by law, then this obligation shall be null and void; otherwise, it shall be and remain in full force and virtue.

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this _____day of_____, 20 ___.

PRINCIPAL	SURETY
_____ (Seal)	_____ (Seal)
_____	_____
Signature	Signature
_____	_____
Title	Title
_____	_____
Address	Address

(Note: Signatures of those executing for the surety as an Attorney-in-Fact must include a Notary Acknowledgement.)

List of Subcontractors Form

Name of Bidder: _____

Project Name/Number: _____

Bidder will use Subcontractors for the Work: □ YES □ NO

For each subcontractor to whom the Bidder proposes to subcontract portions of the work in an amount in excess of one-half of one percent, Bidder shall indicate on this form each proposed subcontractor's legal/contracting entity name, business address and phone number, the Contractor's State Licensing Board license number, the public works contractor registration number issued pursuant to California Labor Code Section 1725.5, the dollar amount and proportion (in percent) of the Work of each Subcontractor (of any tier) to whom a portion of the Work will be awarded via one or more subcontracts, and the work to be performed by the subcontractor.

Subcontractor's Legal Name	Business Address and Phone Number	CSLB License Number	Public Works Contractor DIR Number	Subcontract Amount and Proportion of Total Bid Price	Work to Be Performed

(Attach additional sheets, if necessary)

DIR COMPLIANCE AFFIDAVIT

Name of Bidder: _____

Project Name/Number: _____

California Labor Code requires private contractors, and their subcontractors, to pay prevailing wages to their workers when working on a project funded by a public entity. Prevailing wages are due if the project costs more than $1,000, and involves the following construction work: new construction, alteration, demolition, installation, repair and maintenance. Contractors must also make an attempt to hire apprentices when the total project costs exceed $30,000.

Prior to commencement of the Contract, all Contractors and subcontractors are required to register, and maintain active registration throughout the duration of the contract with the California Department of Industrial Relations (DIR). For information regarding registration, please go to https://www.dir.ca.gov/Public-Works/PublicWorks.html.

- No contractor or subcontractor may be listed on a bid proposal for a public works project (effective March 1, 2015) unless registered with the DIR pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].
- No contractor or subcontractor may be awarded a contract for public work on a public works project (effective April 1, 2015) unless registered with the DIR pursuant to Labor Code section 1725.5.
- DIR registration is required each fiscal year (July 1 – June 30).

I, the Bidder, certify that:

I acknowledge that this project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. I am aware of the provisions of Senate Bill SB 854 and Labor Code sections 1725.5, 1771.1(a), 1774-1776, 1777.5, 1813, and 1815 which require Contractors to comply with all labor compliance requirements, including but not limited to, prevailing wage requirements, Public Works Contractor Registration Program, Electronic Certified Payroll Reporting, and other requirements described in the DIR website. I will comply with such provisions before commencing the performance of the work of this contract, and maintain compliance throughout the completion of said contract.

_____ _____

Signature Date

_____ _____

Print Name Title

Contractor Reference Information

Name of Bidder: _____
Project Name/Number: _____

Failure to provide this information may constitute grounds for rejection of the bid.

The Bidder has been engaged in the contracting business under State License No.(s) _____ for a period of years.

The following are five owners for whom the Bidder has constructed projects of similar scope to the Project. Such projects will have been completed within the past five years.

1. Name, Address, Phone No: _____
   _____
   Project Description: _____
   _____
   Date Completed: _____

2. Name, Address, Phone No: _____
   _____
   Project Description: _____
   _____
   Date Completed: _____

3. Name, Address, Phone No: _____
   _____
   Project Description: _____
   _____
   Date Completed: _____

4. Name, Address, Phone No: _____
   _____
   Project Description: _____
   _____
   Date Completed: _____

5. Name, Address, Phone No: _____
   _____
   Project Description: _____
   _____
   Date Completed: _____

Non-Collusion Declaration
(Pursuant to Section 7106 of the Public Contract Code)

Name of Bidder: _____
Project Name/Number: _____

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid.

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

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____, 20__, at _____[City], _____, [State].

_____
(Signature)

Bidder's Financial Qualification

Name of Bidder: _____
Project Name/Number: _____

Reference is hereby made to the following bank or banks as to the financial responsibility of the Bidder:

Name of Bank	Address/Phone Number/Contact Name & Title

Reference is hereby made to the following surety companies as to the financial responsibility and general reliability of the Bidder:

Company: _____

Address: _____

Company: _____

Address: _____

I certify that Bidder is financially and technically capable of performing and has the necessary experience to perform the work of the contract.

I declare under penalty of perjury that the foregoing is true and correct. This certificate is executed on _____[date], at _____[city], _____[state].

BIDDER

_____
Name: _____
Title: _____

AGREEMENT

THIS AGREEMENT, made and entered into this _____day of _____, 20___ ("Effective Date"), by and between the CITY OF SANTA CRUZ, a municipal corporation, hereinafter called "City," and _____, hereinafter called "Contractor;"

WITNESSETH, that the parties hereto do mutually agree as follows:

ARTICLE I

That for and in consideration of the covenants and agreements herein contained and the payments at the prices stated in the bid proposal attached hereto, and by this reference made a part hereof, the Contractor hereby covenants and agrees to furnish any and all required supervision, labor, equipment, material, services, and transportation, as set forth in the Contract Documents as hereinafter defined, and will bear any and all other expense necessary or incidental to the performance of certain work hereinafter specified, and to build, construct, reconstruct, pave or repave and complete improvements for:

"ENCLOSED FLARE STATION INSTALLATION PROJECT
at the City of Santa Cruz Resource Recovery Facility, Project Number"

(the "Project") in strict conformity and compliance with the Contract Documents, and to do everything required by this Agreement, and by said Contract Documents as hereinafter defined (the "Work").

ARTICLE II

It is expressly agreed and understood by each and every party to this Agreement that the following documents are hereby incorporated and made a part of this Agreement (hereinafter the "Contract Documents"):

1. All applicable Laws and Regulations
2. Duly issued Agreement modifications, and allowance authorization(s) signed by the City, in chronological order by effective date of each.
3. This Agreement, including:
    a. Exhibit A – Contractor's Bid Proposal, including all attachments
4. Labor and Material Bond (Payment Bond)
5. Performance Bond
6. Maintenance Bond
7. Insurance Certificates, including Contractor's Certificate Relating to Worker's Compensation
8. Good Faith Effort Statement for Local Hire
9. Local Hiring Statement

10. Invitation For Bids for ENCLOSED FLARE STATION INSTALLATION PROJECT at the City of Santa Cruz Resource Recovery Facility, Project Number, including the Project Specifications, drawings, and plans, all Exhibits, and all Addenda in the reverse order of date of issuance
11. General Conditions
12. Standard Specifications, including the City Specifications and all applicable State Specifications and/or Drawings

The parties to this Agreement do hereby expressly acknowledge that they have read, understand, and promise to comply with each and every provision of Contract Documents. There are no Contract Documents other than those indicated above. In the event inconsistencies, conflicts, or ambiguities between and among the Contract Documents are discovered, the parties shall attempt to resolve any ambiguity, conflict, or inconsistency informally, recognizing that the Contract Documents shall take precedence in the order in which they are listed above. Inclusion of an order of precedence herein does not in any way negate or reduce Contractor's obligation to report conflicts, discrepancies, apparent omissions, and similar matters to the City.

ARTICLE III

It is expressly agreed and understood by the Contractor that the "Standard Specifications" consists of the documents on file at the Public Works Department of the City of Santa Cruz, entitled:

1. City of Santa Cruz Department of Public Works, Department of Parks and Recreation, and Water Department 2002 Standard Specifications ("City Specifications");
2. Standard Specifications of the State of California, Department of Transportation, dated 2025 ("State Specifications"); and
3. State of California /Caltrans: California Manual on Uniform Traffic Control Devices (CA MUTCD) (2014 Revision 9).

Where conflicts arise between the City's Standard Specifications and the State Specifications, the City's Standard Specifications shall control and apply.

ARTICLE IV

Contractor shall conform to all laws and regulations of the United States and the State of California, as well as laws of Santa Cruz, as may be applicable to the Project. In addition, the City Council of the City of Santa Cruz endorses the MacBride Principles and the Peace Charter and encourages all companies doing business in Northern Ireland to abide by the MacBride Principles.

ARTICLE V

The City hereby contracts to pay said Contractor the prices provided for in the Bid Proposal in the manner, to the extent, and at the times set forth in the Contract Documents.

ARTICLE VI

It is agreed by the parties hereto that the acceptance of the Contractor's performance will be made only by an affirmative action of the City of Santa Cruz City Council in session, evidenced by resolution, and upon the filing by the Contractor of a Release of all Claims of every nature on account of work done under this Agreement, together with an affidavit that all claims have been fully paid. The acceptance by the Contractor of said final payment shall constitute a waiver of all claims against the City arising out of or in connection with this Agreement.

ARTICLE VII

To the fullest extent permitted by law, Contractor shall defend, indemnify, and hold harmless the City and its respective officials, officers, directors, partners, employees, and authorized agents ("Indemnitees") from and against any and all claims, suits, actions, judgments, demands, liabilities, losses, damages, expenses, including attorneys' fees and costs of litigation (collectively, "Losses"), arising from personal or bodily injuries, death, property damage, or otherwise in any way related to, connected with, or resulting from the obligations or performance of the Work under this Agreement by Contractor, subcontractors, and their respective officers, directors, employees, agents, or other third parties directly or indirectly employed by or under the authority or control of Contractor or subcontractors. This provision shall not be deemed to require the Contractor to indemnify or hold harmless an Indemnitee for any Loss proximately caused by the sole or active negligence or willful misconduct of the Indemnitee, as determined by a court or other adjudicatory body of competent jurisdiction.

Contractor acknowledges and agrees that Contractor's obligation to defend the City and the other Indemnitees arises at the time such Losses is tendered to Contractor by the Indemnitees and continues at all times until finally resolved, and/or decided by an adjudicatory body or a court of competent jurisdiction. This provision shall survive the termination of the Agreement or the completion of the Work.

This indemnification clause supersedes any other indemnification clauses contained in any other Contract Documents.

ARTICLE VIII

Article intentionally omitted.

ARTICLE IX
General Terms

1. Complete Agreement. This Agreement, along with the terms and conditions in the Contract Documents and any attachments, is the full and complete integration of the Parties' agreement with respect to the matters addressed herein, and that this Agreement supersedes any previous written or oral agreements between the Parties with respect to the matters addressed herein. Unless otherwise stated, to the extent there is any conflict between this Agreement and any other agreement (written or oral), the terms of this Agreement shall control.
2. Severability. The unenforceability, invalidity or illegality of any provision(s) of this Agreement shall not render the other provisions unenforceable, invalid or illegal.

3. Waiver. Waiver by any party of any portion of this Agreement shall not constitute a waiver of the same or any other portion hereof.

4. Governing Law. This Agreement shall be governed by and interpreted in accordance with California law.

5. Contract Interpretation. Each party acknowledges that it has reviewed this Agreement and that the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement.

6. Counterparts. The Parties may execute this Agreement in two or more counterparts, which shall, in the aggregate, be deemed an original but all of which, together, shall constitute one and the same instrument. A scanned, electronic, facsimile or other copy of a party's signature shall be accepted and valid as an original.

7. Warranty of Authority. The signatories to this Agreement warrant and represent that each is authorized to execute this Agreement and that their respective signatures serve to legally obligate their respective representatives, agents, successors and assigns to comply with the provisions of this Agreement.

Signature Page to Follow

IN WITNESS WHEREOF, this Agreement is executed by the City Manager of the City of Santa Cruz, under and pursuant to a resolution of the City Council authorizing such execution, and the Contractor has affixed his/her signature hereto the day and year first hereinabove written.

Approved as to Form by:

_____ Date: _____

Anthony P. Condotti, City Attorney

For (Contractor's Name):

Signature: _____ Date: _____

(Name, Title)

For CITY OF SANTA CRUZ, a municipal corporation

_____ Date: _____

Matt Huffaker, City Manager

LABOR AND MATERIAL BOND

WHEREAS, as the City Council of the City of Santa Cruz, a municipal corporation in the County of Santa Cruz, State of California (the "City"), has awarded to _____ _____ hereinafter designated as the "Principal", a contract for constructing the work or improvement described in the contract documents entitled: **ENCLOSED FLARE STATION INSTALLATION PROJECT at the City of Santa Cruz Resource Recovery Facility**, adopted by the City Council of the City_____ , 20___ and

WHEREAS, said Principal is required under the terms of said contract to furnish a Labor and Material Bond, the surety of this bond will pay the same to the extent hereinafter set forth; and

WHEREAS, the said Principal is about to enter into the annexed contract with the City to complete the work or improvement referred to above for the City, all as more particularly and in detail shown upon the Contract Documents filed in the Office of the City Clerk of the City:

NOW, THEREFORE, we, the Principal, and _____, a corporation organized and existing under and by virtue of the laws of the State of _____ as "Surety", are held and firmly bound unto the City of Santa Cruz in the sum of _____ _____ dollars ($_____), such sum being not less than one hundred percent (100%) of the estimated contract cost of the work, lawful money of the United States of America, to be paid to the City of Santa Cruz, for payment of which sum, well and truly to be made, we hereby bind ourselves, our heirs, administrators, executors, successors and assign jointly and severally.

THE CONDITION OF THIS OBLIGATION IS SUCH, that if said Principal or its heirs, executors, administrators, successors or assigns, shall fail to pay for any materials, provisions, vendor supplies, or equipment as provided in the contract documents, upon, for, or about the performance of the work contracted to be done, or for any work or waiver thereon of any kind, or for amounts due under the Unemployment Insurance Code with respect to work or labor performed by any such claimant, or fails to pay any of the persons authorized under Civil Code Section 9100 to assert a claim against a payment bond, or fails to pay for any amounts required to be deducted, withheld, and paid over to the Franchise Tax Board for the wages of employees of the Principal or his/her subcontractor pursuant to Section 18806 of the Revenue and Taxation Code, or fails to pay for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the principal and all subcontractors with respect to such work and labor that the surety or sureties will pay for the same, in an amount not exceeding the sum specified in this bond, and also, in case suit is brought upon the bond, will pay, in addition to the face amount hereof, a reasonable attorney's fee, to be fixed by the Court.

The condition of this obligation is such that its terms inure to the benefit of any of the persons and entities authorized in Civil Code Section 9100 to assert a claim against a payment bond so as to give a right of action to such persons or entities or their assigns in any suit brought upon or action to enforce liability on the bond.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder shall

in any manner affect its obligation upon this bond, and it does hereby explicitly waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder, and further explicitly hereby waives its rights under Civil Code Section 2819.

IN WITNESS WHEREOF, the above parties have executed this instrument under their seals this _____ day of _____, 20____, and duly signed by its undersigned representative, pursuant to the authority of its governing body.

PRINCIPAL:

Firm name: _____

Printed name: _____

Signature: _____ Date: _____

Title: _____

SURETY:

Firm name: _____

Printed name: _____

Signature: _____ Date: _____

Title: _____

I hereby approve the form of the within bond.

_____ _____

City Attorney Date

(Note: Signatures of those executing for the surety as an Attorney-in-Fact must include a Notary Acknowledgement.)

FAITHFUL PERFORMANCE BOND

WHEREAS, the City Council of the City of Santa Cruz, a municipal corporation in the County of Santa Cruz, State of California (the "City"), and _____ _____ hereinafter designated as "Principal" have entered into an agreement whereby Principal agrees to install and complete the work or improvement described in the contract documents entitled: **ENCLOSED FLARE STATION INSTALLATION PROJECT at the City of Santa Cruz Resource Recovery Facility**, adopted by the City Council of the City on ___ _____, 20__; and

WHEREAS, said Principal is about to enter into the annexed agreement with the City as is required to furnish security for the faithful performance of said Agreement.

NOW, THEREFORE, we, the Principal, and _____, a corporation organized and existing under and by virtue of the laws of the State of _____, as "Surety", are held and firmly bound unto the City, in the sum of _____ _____ ($_____), such sum being not less than one hundred percent (100%) of the estimated contract cost of the work, lawful money of the United States of America, to be paid to the City, for payment of which sum, well and truly to be paid, we hereby jointly and severally bind ourselves, our heirs, administrators, executors, successors and assigns, by these presents;

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the above bound Principal, its heirs, executors, administrators, successors, or assigns will in all things abide by and well and truly keep and perform the covenants, conditions and provisions in the said agreement and any alteration thereof made as therein provided, on his or her part, to be kept and performed at the time and in the manner therein specified, and in all respects according to the true intent and meaning, and will indemnify and save harmless the City, its officers and agents, and employees, as therein stipulated, then this obligation will become null and void, otherwise it will be and remain in full force and effect.

As a part of the obligation secured hereby and in addition to the face amount specified therefore, there will be included costs and reasonable expenses and fees, including reasonable attorneys' fees, incurred by the City.

As a condition precedent to the satisfactory completion of the said contract, an obligation in the amount of _____ ($_____), being not less than ten percent (10%) of the estimated contract cost, will remain in force for a period of one (1) year after the official acceptance of said work, during which time if the Principal, its heirs, executors, administrators, successors or assigns will fail to make full, complete and satisfactory repairs and replacements or totally protect the City of Santa Cruz from loss or damage made evident during said period of one (1) year from the date of official acceptance of said work and resulting from or caused by defective materials or faulty workmanship in the prosecution of the work done, the above obligation in the sum of ($ __ _____), will remain in full force and effect, otherwise the obligation will be discharged. However, notwithstanding any other provisions of this paragraph, the obligation for the surety hereunder will continue so long as any obligation of the Principal remains.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder or the specifications will in any manner affect this obligation upon this bond, and it does hereby explicitly waive notice of any such changes, extensions of time, alterations, or additions to the terms of the contract or to the work to be performed thereunder, or to the specifications, and it further explicitly hereby waives its rights under California Civil Code § 2819.

IN WITNESS WHEREOF, the parties have executed this instrument under their seals this _____ day of _____, 20___, and duly signed by its undersigned representative, pursuant to the authority of its governing body.

PRINCIPAL:

Firm name: _____

Printed name: _____

Signature: _____ Date: _____

Title: _____

SURETY:

Firm name: _____

Printed name: _____

Signature: _____ Date: _____

Title: _____

I hereby approve the form of the within bond.

_____ _____

City Attorney Date

(Note: Signatures of those executing for the surety as an Attorney-in-Fact must include a Notary Acknowledgement.)

MAINTENANCE BOND

WHEREAS, the City of Santa Cruz, a municipal corporation, in the County of Santa Cruz, State of California (the "City"), has awarded to _____, hereinafter designated as the "Principal," a contract for constructing the work or improvement described in the contract documents entitled:

"ENCLOSED FLARE STATION INSTALLATION PROJECT
at the City of Santa Cruz Resource Recovery Facility, Project Number"

adopted by the City Council of the City on the __ day of _____, 20__, and,

WHEREAS, said Principal is about to enter into the annexed contract with the City.

NOW, THEREFORE, we, the Principal, and _____, a corporation organized and existing under and by virtue of the laws of the State of California, as "Surety", are held and firmly bound unto the City, in the sum of _____dollars ($_____) being not less than ten percent (10%) of the estimated contract costs of the work, to be paid to the City, for the payment of which sum, well and truly to be paid, we hereby jointly and severally bind ourselves, our heirs, administrators, executors, successors and assigns;

NOW, THEREFORE THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal, his/her heirs, executors, administrators, successors, or assigns shall in all things abide by and well and truly keep and perform the covenants, conditions and agreements in the said contract and any alteration thereof made as herein provided, on his/her or their part, to be kept and performed at the time and in the manner therein specified, and in all respects according to the true intent and meaning, and shall indemnify and save harmless the City, its officers and agents as therein stipulated, that this obligation shall be discharged, otherwise it shall be and remain in full force and effect.

As a condition precedent to the satisfactory completion of the said contract, the above obligation in the amount of dollars _____ dollars ($_____), being not less than ten percent (10%) of the estimated contract cost, shall remain in force for a period of one (1) year after the completion and acceptance of the said work, during which time if the Principal, his/her or its heirs, executors, administrators, successors or assigns shall fail to make full, complete and satisfactory repairs and replacements or totally protect the City of Santa Cruz from loss or damage made evident during said period of one (1) year from the date of official acceptance of said work and resulting from or caused by defective materials or faulty workmanship in the prosecution of the work done, the above obligation in the sum of _____ dollars ($_____), shall remain in full force and effect, otherwise the obligation shall be discharged. However, notwithstanding any other provisions of this paragraph, the obligation of the surety hereunder shall continue so long as any obligation of the Principal remains.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder or the Contract Documents shall in any way effect its obligation on this bond, and it does hereby waive

notice of any such changes, extensions of time, alterations, or additions to the terms of the contract or to the work or to the specifications, and the surety does hereby waive its rights under California Civil Code Section 2819.

IN WITNESS WHEREOF, the above parties have executed this instrument under their seals this _____ day of _____, 20____, and duly signed by its undersigned representative, pursuant to the authority of its governing body.

PRINCIPAL:

Firm name: _____

Printed name: _____

Signature: _____ Date: _____

Title: _____

SURETY:

Firm name: _____

Printed name: _____

Signature: _____ Date: _____

Title: _____

I hereby approve the form of the within bond.

_____ _____

City Attorney Date

(Note: Signatures of those executing for the surety as an Attorney-in-Fact must include a Notary Acknowledgement.)

Contractor's Certificate Relating to Worker's Compensation

I, THE UNDERSIGNED, HEREBY CERTIFY that at all times during the performance of any work under contract with the City of Santa Cruz (check one of the following) for the

ENCLOSED FLARE STATION INSTALLATION PROJECT
at the City of Santa Cruz Resource Recovery Facility:

□ I have and will maintain in full force and effect Workers' Compensation Insurance, as required by Section 3700 of the Labor Code, for the performance of the Work. My Workers' Compensation insurance carrier and policy number are:

Insurance Carrier: _____
Policy Number: _____

□ I have and will maintain in full force and effect and have attached hereto a Certificate of Consent to Self-Insure issued by the Director of Industrial Relations, as provided for by Section 3700 of the Labor Code, for the performance of the Work.

I declare under penalty of perjury that the foregoing is true and correct and executed on _____ _____, 20__ at _____, California.

CONTRACTOR

_____
Name: _____
Title: _____

Good Faith Effort Statement for Local Hire

In conformance with Chapter 3.10 of the Municipal Code, each Contractor and subcontractor shall complete and submit this Statement following Award of Contract and prior to issuance of the Notice to Proceed.

Project Title: _____
Name and Title of Person Completing Statement: _____
Name of Contractor or Subcontractor: _____
Date Statement Completed: _____
Address: _____

Contractor (or Subcontractor) estimates that fifty percent (50%) or more of its workforce for this project meets the local hire requirements of this contract: ☐ Yes ☐ No*

*If no, complete the following table:

Name & Address of Local Recruitment Source			
Date of Recruitment Contact			
Person Contacted & Phone #			
Trade & Classification			
# of Hire Referrals Requested			
# of Local Hire(s) Made as Result of Contact			
Name & Address of Local Hire(s), as a Result of Contact			

(Additional Sheets May Be Attached As Needed)

Local Hiring

Prevailing wage statements shall be deemed acceptable documentation to accurately record hiring information required to comply with Chapter 3.10 of the Municipal Code pertaining to Local Hiring. However, the following information shall accompany the prevailing wage statements:

For pay period ending _____

I. For each employee, complete residency compliance by marking the appropriate box.

Employee	a. Resident of the County of Santa Cruz for at least one year preceding date of Award of Contract, or	b. A member of a Building Trade Journeyman, or Building Trade Apprentice program whose organization has jurisdiction over all or part of Santa Cruz County.
1	Yes ☐ No ☐	Yes ☐ No ☐
2	Yes ☐ No ☐	Yes ☐ No ☐
3	Yes ☐ No ☐	Yes ☐ No ☐
4	Yes ☐ No ☐	Yes ☐ No ☐
5	Yes ☐ No ☐	Yes ☐ No ☐
6	Yes ☐ No ☐	Yes ☐ No ☐
7	Yes ☐ No ☐	Yes ☐ No ☐
Apprentice		
	Yes ☐ No ☐	Yes ☐ No ☐

DUPLICATE AS NECESSARY

II. Calculate total weekly project local hiring percentage based on personnel and hours reported on prevailing wage statement: _____%

III. Calculate cumulative total project local hiring percentage based on personnel and hours reported on prevailing wage statement: _____%

GENERAL CONDITIONS

1. Failure to Execute Contract

Failure of the lowest responsible and responsive bidder to execute the Contract and provide all acceptable bonds and documents as required by the Contract Documents as provided herein within ten (10) calendar days after such bidder has received the Contract for execution shall be just cause for the annulment of the award and the forfeiture of the bid security. This period of time shall be subject to extension for such further period as may be agreed upon in writing between the City and Bidder concerned.

2. Contractor's Insurance

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

A. CERTIFICATE REQUIREMENTS

The City will be issued a Certificate of Insurance (a Memorandum of Understanding will not be accepted) with the following minimum requirements:

- Certificate(s) will show current policy number(s) and effective dates,
- Coverage and policy limits will meet, or exceed, requirements below,
- The Certificate Holder will be City of Santa Cruz, Risk Management, 333 Front Street., Suite 200, Santa Cruz, CA 95060,
- Certificate will be signed by an authorized representative,
- An endorsement will be provided to show the City, its officers, officials, employees, agents, and volunteers as additional insureds.

B. MINIMUM SCOPE AND LIMITS OF INSURANCE

Consultant acknowledges that the insurance coverage and policy limits set forth in this section constitute the minimum amount of coverage required. The City will be entitled to coverage for the highest limits maintained by Consultant. Coverage will be at least as broad as:

- COMMERCIAL GENERAL LIABILITY (CGL): $2,000,000 PER OCCURRENCE; $2,000,000 AGGREGATE
  Proof of coverage for $2 Million per occurrence including products and completed operations, property damage, bodily injury, personal and advertising injury will be provided on Insurance Services Office (ISO) Form CG 00 01 covering CGL. If a general aggregate limit applies, either the general aggregate limit will apply separately to this project/location or the general aggregate limit will be at least twice the required occurrence limit.
- AUTOMOBILE LIABILITY:
  Proof of coverage for $1,000,000 provided on ISO Form Number CA 00 01 covering any

auto (Code 1), or if Consultant has no owned autos, hired, (Code 8) and non-owned autos (Code 9), per accident for bodily injury and property damage.

- WORKERS' COMPENSATION AS REQUIRED BY THE STATE OF CALIFORNIA, WITH STATUTORY LIMITS, AND EMPLOYER'S LIABILITY INSURANCE: $1,000,000 per accident for bodily injury or disease.
  The Worker's Compensation policy must be **endorsed** with a waiver of subrogation in favor of the City for all work performed by the Consultant and its employees.

  (Not required if Consultant provides written verification it has no employees) - If Contractor has no employees, Contractor shall complete and sign a Workers' Compensation Exemption Declaration and Release of Liability

- CONTRACTORS POLLUTION LIABILITY and/or ASBESTOS POLLUTION LIABILITY (CPL) (if project involves environmental hazards) with limits no less than $2,000,000 per occurrence or claim, and $4,000,000 policy aggregate.

  1. If the services involve lead-based paint or asbestos identification / remediation, the Pollution Liability shall not contain lead-based paint or asbestos exclusions. If the services involve mold identification / remediation, the Pollution Liability shall not contain a mold exclusion and the definition of "Pollution" shall include microbial matter including mold.

  2. The Automobile Liability policy shall be **endorsed** to include **Transportation Pollution Liability** insurance, covering hazardous materials to be transported by Contractor pursuant to the Agreement. This coverage may also be provided on the Contractors Pollution Liability policy.

- BUILDER'S RISK (Course of Construction) insurance utilizing an "All Risk" (Special Perils) coverage form, with limits equal to the completed value of the project and no coinsurance penalty provisions.

  Builder's Risk (Course of Construction) Insurance

  Contractor may submit evidence of Builder's Risk insurance in the form of Course of Construction coverage. Such coverage shall **name the City as a loss payee** as their interest may appear.

  If the project does not involve new or major reconstruction, at the option of the City, an Installation Floater may be acceptable. For such projects, a Property Installation Floater shall be obtained that provides for the improvement, remodel, modification, alteration, conversion or adjustment to existing buildings, structures, processes, machinery and equipment. The Property Installation Floater shall provide property damage coverage for any building, structure, machinery or equipment damaged, impaired, broken, or destroyed during the performance of the Work, including during transit, installation, and testing at the City's site.

C. OTHER INSURANCE PROVISIONS

If Consultant maintains broader coverage and/or higher limits than the minimums shown above, the City of Santa Cruz requires and shall be entitled to the broader coverage and/or higher limits maintained by Consultant. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City of Santa

Cruz.

The insurance policies are to comply with the following provisions:

- ADDITIONAL INSURED STATUS
  The City, its officers, officials, employees, agents, and volunteers are to be covered as additional insureds on the CGL, [Contractors Pollution Liability,] and automobile insurance (if transporting hazardous materials policy(ies) with respect to liability arising out of work or operations performed by or on behalf of Consultant including materials, parts, or equipment furnished in connection with such work or operations. General liability coverage will be provided in the form of an **endorsement** to Consultant's insurance at least as broad as ISO Form CG 20 10 11 85, or if not available, through the addition of **both** CG 20 10 CG 20 26, CG 20 33, or CG 20 38; **and** CG 20 37 (if a later edition is used).

- PRIMARY COVERAGE
  For any claims related to this Agreement, Consultant's insurance coverage will be **primary** insurance as respects the City, its officers, officials, employees, agents, and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, employees, agents, or volunteers will be excess of Consultant's insurance and will not contribute with it.

- NOTICE OF CANCELLATION
  Each insurance policy required above shall state that the coverage shall not be canceled, except with notice to the City.

- WAIVER OF SUBROGATION
  Consultant hereby grants to the City a waiver of any right to subrogation which any insurer of said Consultant may acquire against the City by virtue of the payment of any loss, including attorney's fees under such insurance. Consultant agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation, but this provision applies regardless of whether or not the City has received a waiver of subrogation endorsement from the insurer.

- EXCESS LIABILITY/UMBRELLA INSURANCE POLICIES
  The excess/liability policies will provide similar coverage as the primary CGL policy with no new exclusions - Excess liability insurance must **follow form** the terms, conditions, definitions, and exclusions of the underlying CGL insurance. The excess/umbrella policy must also be written on a primary and noncontributory basis for an additional insured, and that it will apply before any other insurance that is available to such additional insured which covers that person or organization as a named insured, and we will not share with that other insurance.

  The policy regarding Limits of Insurance regarding Aggregates must provide that the aggregate limits if applicable shall apply in the same manner as the aggregate limits shown in the Schedule of the Underlying Insurance.

- SELF-INSURED RETENTIONS
  Self-insured retentions must be declared to and approved by the City. City may require Consultant to purchase coverage with a lower retention or provide proof of ability to pay losses and related expenses. The policy language shall provide, or be endorsed to provide,

that the self-insured retention may be satisfied by either the named insured or City.

- ACCEPTABILITY OF INSURERS
  Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A: VII, unless otherwise acceptable to the City.

- CLAIMS MADE POLICIES
  If any of the required policies provide coverage on a claims-made basis:

  1. The Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work.
  2. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of the contract of work.
  3. If coverage is canceled or non-renewed, and not *replaced with another claims-made policy form with a Retroactive Dat*e prior to the contract effective date, the Consultant must purchase "extended reporting" coverage for a minimum of *five (5)* years after completion of contract work.

- VERIFICATION OF COVERAGE
  Consultant will furnish the City with original Certificates of Insurance including all required amendatory endorsements (or copies of the applicable policy language effecting coverage required by this clause) and a copy of the Declarations and Endorsement Page of the CGL,CPL, and automobile Policy(ies) listing all policy endorsements to be approved by the City before work commences. However, failure to obtain the required documents prior to the work beginning will not waive the Consultant's obligation to provide them. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

D. SUBCONTRACTORS
Consultant shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, and Contractor shall ensure that City is an additional insured on insurance required from subcontractors.

E. SPECIAL RISKS/CIRCUMSTANCES
City reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other special circumstances and provide notice to Consultant.

3. Claims

A. Definition of "Claim".

All provisions of California Public Contract Code Section 9204 are incorporated into and form an integral part of the Contract Documents for this Project. The City and Contractor shall comply with California Public Contract Code Section 9204 when applicable.

As used herein, the term "Claim" means a separate written demand or assertion by Contractor sent by registered mail or certified mail, with return receipt requested, for one or more of the following arising out of or related to the Contract Documents or the performance of the Work: (A) a time extension, including, without limitation, for relief from damages or penalties for delay assessed by the City under the Contract; (B) payment by the City of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the Contract and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled; (C) payment of an amount that is disputed by the City, as defined in Public Contract Code Section 9204(c).

A Claim does not include, and the procedures for processing of Contractor Claims do not apply to the following:

(i) Claims respecting penalties for forfeitures prescribed by statute or regulation which a government agency is specifically authorized to administer, settle, or determine (other than penalties for delay assessed by the City under the Contract).
(ii) Claims respecting personal injury, death, reimbursement, or other compensation arising out of or resulting from liability for personal injury or death.
(iii) False claims liability under California Government Code Section 12650, et seq.
(iv) Defects in the Work first discovered by City after final payment by City to Contractor.
(v) Claims respecting stop notices.
(vi) The right of City to specific performance or injunctive relief to compel performance of any provision of the Contract Documents or for other City claims against the Contractor.

B. Time Period for Submission of Claim.

If a Claim involves an adjustment to the Contract Sum or to the Contract Time due to Extra Work, then the Claim arises upon issuance of a decision denying, in whole or in part, Contractor's Change Order Request. All other Claims arise when Contractor discovers, or should have discovered, the circumstances giving rise to the Claim (even if Contractor has not yet been damaged or delayed).

A Claim that does not involve an adjustment to the Contract Sum or Contract Time for Extra Work may be asserted if, and only if, Contractor gives written notice of intent to file the Claim to the City within five (5) calendar days of the date the Claim arises. A written notice of intent to file a Claim shall be valid if, and only if, it identifies the event or condition giving rise to the Claim, states its probable effect, if any, with respect to Contractor's entitlement to an adjustment of the Contract Sum or Contract Time, and complies with the requirements of Section 3(C), below.

All Claims and supporting documentation and certifications must be filed as soon as possible, but no later than thirty (30) calendar days after the Claim arises. No Claims shall be filed after the final payment has been issued unless otherwise permitted by law.

C. Reasonable Documentation.

The Claim must include the following:

(i) A statement that it is a Claim and a request for a decision on the Claim;

(ii) A detailed factual narrative of events fully describing the nature and circumstances giving rise to the Claim, including but not limited to, necessary dates, locations, and items of Work effected and reasonable documentation to support the Claim;

(iii) A certification, executed by each Subcontractor claiming not less than 5% of the total monetary amount sought by the Claim, that the Subcontractor's portion of the Claim is filed in good faith.

(iv) If the Claim involves an adjustment to the Contract Sum or Contract Time for Extra Work, a statement demonstrating that a Change Order Request was submitted in a timely manner as required by the Contract Documents. If the Claim does not involve an adjustment to the Contract Sum or Contract Time for Extra Work, a statement demonstrating that a notice of intent to file the Claim was submitted in a timely manner as required by the Contract Documents.

(v) A detailed justification for any remedy or relief sought by the Claim, including, without limitation:

a. A detailed cost breakdown in the form required for submittal of Change Order Requests, including an estimate of the costs incurred or to be incurred. To the extent costs have been incurred when the Claim is submitted, the Claim must include actual cost records (including, without limitation, payroll records, material and rental invoices, and the like) demonstrating that costs claimed have actually been incurred. To the extent costs have not yet been incurred at the time of Claim submittal, actual cost records must be submitted on a current basis not less than once a month during any periods costs are incurred.

b. Copies of actual job cost records demonstrating that the costs have been incurred.

c. If the Claim is based on an error, omission, conflict, or ambiguity in the Contract Documents: (1) a sworn statement by Contractor and any Subcontractors or Sub-subcontractors involved in the Claim, to the effect that the error, omission, conflict, or ambiguity was not discovered prior to submission of the Bid, or (2) if not discovered, a statement demonstrating that the error, omission, conflict, or ambiguity could not have been discovered by Contractor, its Subcontractors or Sub-subcontractors in exercise of the degree of care required of them under the Contract Documents for review of the Bid Documents prior to submission of the Bid.

(vi) If the Claim involves a request for adjustment of the Contract Time, written documentation demonstrating that Contractor has complied with the requirements of the Contract Documents pertaining to proving the right to an extension of time and demonstrating that Contractor is entitled to an extension of time under the Contract Documents.

(vii) A written certification signed by a responsible managing officer of Contractor's organization, who has the authority to sign subcontracts and purchase orders on behalf of Contractor and who has personally investigated and confirmed the truth and accuracy of the matters set forth in such certification, in the following form:

"I hereby certify under penalty of perjury under the laws of the State of California that I am a managing officer of (Contractor's name) and that I have reviewed the Claim presented herewith on Contractor's behalf and/or on behalf of (Subcontractor's/Sub-subcontractor's name(s)) and that the following statements are true and correct.

a. The facts alleged in or that form the basis for the Claim are true and accurate.
b. The Claim is submitted in good faith.
c. The Change Order Request was timely submitted, as required by the Contract Documents.
d. Contractor does not know of any facts or circumstances, not alleged in the Claim, that by reason of their not being alleged render any fact or statement alleged in the Claim materially misleading.
e. Contractor has, with respect to any request for money or damages alleged in or that forms the basis for the Claim, reviewed the job cost records (including those maintained by Contractor and by any Subcontractor or Sub-subcontractor, of any Tier, that is asserting all or any portion of the Claim) and confirmed with reasonable certainty that the Losses or damages suffered by Contractor and/or such Subcontractor or Sub-subcontractor were in fact suffered in the amounts and for the reasons alleged in the Claim.
f. Contractor has, with respect to any request for extension of time or claim of Delay, disruption, hindrance or interference alleged in or that forms the basis for the Claim, reviewed the job schedules (including those maintained by Contractor and by any Subcontractor or Sub-subcontractor, of any Tier, that is asserting all or any portion of the Claim) and confirmed on an event-by-event basis that the delays or disruption suffered by Contractor and /or such Subcontractor or Sub-subcontractor were in fact experienced for the durations, in the manner, and with the consequent effects on the time and/or sequence of performance of the Work, as alleged in the Claim; and.
g. Contractor has not received payment from City for, nor has Contractor previously released City from, any portion of the Claim.

Signature: _____
Name: _____
Title: _____
Company: _____
Date: _____

D. Assertion of Claims.

(i) Notwithstanding the making of any Claim or the existence of any dispute regarding any Claim, unless otherwise directed by City, Contractor shall not delay, slow, or stop performance of the Work, but shall diligently proceed with performance in accordance with the Contract Documents and City will continue to make payments as required by the Contract Documents.

(ii) All Claims and supporting documentation must be sent to the City by registered mail or certified mail with return receipt requested.

(iii) Strict compliance with these requirements is conditions precedent to Contractor's right to an informal conference to meet and confer to resolve a Claim, mediate a Claim, or

arbitrate or litigate a Claim. The failure of Contractor to strictly comply with the requirements of this Section constitutes a failure by Contractor to exhaust its administrative remedies with the City, thereby denying any court or arbitration panel of jurisdiction to adjudicate the Claim.

(iv) There shall be no waiver of any of the rights set forth in California Public Contract Code Section 9204; provided, however, that (i) upon receipt of a Claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (ii) the City may prescribe reasonable Change Order, Claim, and Dispute Resolution Procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise the timeframes and procedures set forth in Public Contract Code Section 9204.

(v) The City's right to commence the Contract dispute resolution process shall arise at any time following the City's actual discovery of the circumstances giving rise to the dispute. Nothing herein shall preclude the City from asserting disputes in response to a Claim asserted by Contractor.

E. Decision of City on Claims.

(i) Pursuant to Public Contracting Code section 9204(d), upon receipt of a Claim, the City shall conduct a reasonable review of the claim and, within 45 days, shall provide the Contractor a written statement identifying what portion of the Claim is disputed and what portion is undisputed. Upon receipt of the Claim, the Owner's Representative, City, and Contractor may, by mutual agreement, extend the time period provided in this Section. If City determines that additional supporting data are necessary to fully evaluate a Claim, City will request such additional supporting data in writing. Such data shall be furnished by Contractor to City no later than 10 days after the date of such request. Any payment due to Contractor by City on an undisputed portion of the Claim shall be processed and made within 60 days after the written statement is issued.

(ii) If the City needs approval from its governing body to provide the Contractor with a written statement identifying the disputed portion and the undisputed portion of the Claim, and the governing body does not meet within the forty-five (45) days or within the mutually agreed to extension of time following receipt of a Claim sent by registered mail or certified mail, return receipt requested, the City shall have up to three (3) days following the next duly publicly noticed meeting of the governing body after the forty-five (45) day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.

(iii)Failure by the City to respond to a Claim from Contractor within the time periods described in this Section 3 and California Public Contract Code Section 9204 or to otherwise meet the time requirements shall result in the Claim being deemed rejected in its entirety. A Claim that is denied by reason of the City's failure to have responded to a Claim, or its failure to otherwise meet the time requirements of this Article 4.2 and California Public

Contract Code Section 9204, shall not constitute an adverse finding with regard to the merits of the Claim or the responsibility or qualifications of the Contractor.

(iv) Any payment due on an undisputed portion of the Claim shall be processed and made within 60 days after the City issues its written statement.

(v) Amounts not paid in a timely manner as required by this Section shall bear interest at 7 percent per annum, pursuant to Public Contracting Code section 9204(d)(4).

(vi) If a subcontractor or a lower tier subcontractor lacks standing to assert a Claim against the City because privity of contract does not exist, the Contractor may present to the City a Claim on behalf of a subcontractor or a lower tier subcontractor. A subcontractor may request in writing, either on its own behalf or on behalf of a lower tier subcontractor, that the Contractor present a Claim for work which has been performed by the subcontractor or lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting the Claim be presented to the City shall furnish reasonable documentation supporting the Claim. Within 45 days of receipt of this written request, the Contractor shall notify the subcontractor in writing as to whether the Contractor presented the Claim to the City and, if the Contractor did not present the Claim, provide the subcontractor with a statement of the reasons for not having done so.

F. Meet and Confer Conference.

If the Contractor disputes the City's written response, or if the City fails to respond to a Claim issued pursuant to Section 3(E) within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issue in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the City shall schedule a meet and confer conference within 30 days for settlement of the dispute.

G. Mediation.

(i) Within ten (10) business days following the conclusion of the meet and confer conference, specified in Section 3(F), if the Claim or any portion of the Claim remains in dispute, the City shall provide the Contractor a written statement identifying the portion of the Claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after the City issues its written statement. Any disputed portion of the Claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the City and the Contractor sharing the associated costs equally. The City and the Contractor shall mutually agree to a mediator within ten (10) business days after the disputed portion of the Claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures outside this section.

(ii) For purposes of this Section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation, or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

(iii) Unless otherwise agreed to by the City and the Contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Public Contract Code Section 20104.4 to mediate after litigation has been commenced.

H. Arbitration and Litigation.

(i) In the event mediation does not resolve the parties' dispute, the parties shall comply with the Arbitration provisions set forth in Public Contract Code Sections 10240 – 1024.13.

(ii) Unless the City and Contractor otherwise agree in writing, the arbitration decision shall be binding upon the parties, made under and in accordance with the laws of the State of California, supported by substantial evidence, and in writing. If the total of all Claims or cross Claims submitted to arbitration is in excess of $50,000, the award shall contain the basis for the decision, findings of fact, and conclusions of law. Any arbitration award shall be subject to confirmation, vacation, or correction under the procedures and on the grounds specified in the California Code of Civil Procedure including without limitation Section 1296. The expenses and fees of the arbitrators and the administrative fees of the AAA shall be divided among the parties equally. Each party shall pay its own counsel fees, witness fees, and other expenses incurred for its own benefit.

(iii) The City may, but is not required, to assert as a counterclaim any matter arising out of the claims asserted by Contractor in the arbitration. City's failure to assert any such counterclaim in an arbitration shall be without prejudice to the City's right to assert the counterclaim in litigation or other proceeding.

(iv) Any litigation shall be filed in the Superior Court of the State of California for the County of Santa Cruz.

I. Waiver.

A waiver of or failure by the City to enforce any requirement in this Section 3 in connection with any Claim shall not constitute a waiver of and shall not preclude the City from enforcing such requirements in connection with any other Claims.

The Contractor agrees and understands that no oral approval, either express or implied, of any Claim shall be binding upon the City unless and until such approval is ratified by execution of a written Change Order.

4. Time of Completion

Attention is directed to the provisions in Section 8 (Commencement of Work, Time of Completion and Liquidated Damages) of the Standard Specifications and these General Conditions.

The Contractor shall promptly start the work and diligently prosecute the work to completion before the expiration of 90 **working days** after the date of the Notice to Proceed.

Full compensation for any additional costs occasioned by compliance with the provisions in this section shall be considered as included in the prices paid for the various contract items of work and no additional compensation will be allowed therefore.

5. Failure to Complete the Work on Time (Liquidated Damages)

All time limits stated in the Contract Documents are of the essence. If the work is not completed by Contractor in the time specified in the Contract Documents, or within any period of extension authorized in writing by the City, it is understood that City will suffer damage; and it being impracticable and infeasible to determine the amount of actual damage, it is agreed that Contractor will pay the City, as fixed and liquidated damages, and not as a penalty, the sum of Three Thousand Dollars ($3,000) for each calendar day of delay until the work is completed and accepted, and Contractor and his/her surety will be liable for the amount thereof; provided, however, that Contractor shall not be charged liquidated damages because of any delays in the completion of the work due to unforeseeable causes beyond the control and without the fault or negligence of Contractor.

Contractor shall, within ten (10) days from the beginning of any such delay, notify City in writing of the cause of the delay; whereupon City shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in its judgment, the findings of fact justify such an extension. City's finding of fact thereon shall be final and conclusive on the parties hereto.

6. Existing Facilities

Prospective bidders shall visit the work site and determine for themselves the existing conditions at the Project site, including location of utilities. The Contractor shall take precaution so as to avoid damaging existing public facilities and private improvements.

In accordance with California Government Code Section 4215, the City assumes the responsibility for the timely removal, relocation, or protection of existing main or trunk line utility facilities located on the Project site if such utilities are not identified in the plans and specifications made a part of the invitation for bids. The City will compensate the Contractor for the costs of locating, repairing damage not due to the Contractor's failure to exercise reasonable care, and removing or relocating existing main or trunk line utility facilities located at the Project site and not identified with reasonable accuracy in plans and specifications made a part of the invitation for bids. The City will also compensate the Contractor for the cost of equipment on the Project necessarily idled during such work. The Contractor will not be assessed liquidated damages for delay in completion of the project, when such delay was caused by the City's or utility owner's failure to provide for removal or relocation of such main or trunk line utility facilities.

Nothing in this provision or the Contract Documents will be deemed to require the City to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Work site can be inferred from the presence of other visible facilities, such as buildings, meter, and junction boxes, on or adjacent to the Project site; provided, however, that nothing in this provision or the Contract Documents shall relieve the City from identifying main or trunk lines in the plans and specifications made a part of the invitation for bids.

Nothing in this provision or the Contract Documents will preclude the City from pursuing any appropriate remedy against the utility for delays which are the responsibility of the utility.

Nothing in this provision or the Contract Documents will be construed to relieve the utility from any obligation as required either by law or by contract to pay the cost of removal or relocation of existing utility facilities.

If the Contractor while performing the Work discovers utility facilities not identified by the City in the plans and specifications made a part of the invitation for bids, the Contractor must immediately notify the City and utility in writing.

Either the City or the utility, whichever owns existing main or trunk line utility facilities located on the Work site, shall have sole discretion to effect repairs or relocation work or to permit the Contractor to perform such repairs or relocation work at a reasonable price

The Contractor will be required to work around public utility facilities that are to remain in place within the construction area or that are to be relocated and relocation operations have not been completed, and (s)he will be held liable to the owners of such facilities for any damage or interference with service resulting from his/her operations.

The exact locations of underground facilities and improvements within the construction area shall be ascertained by the Contractor before using equipment that may damage or interfere with service resulting from his/her operations. It shall be the Contractor's responsibility to notify public utilities that (s)he is working in the vicinity of their facilities.

Other forces may be engaged in moving or reconstructing utility facilities or maintaining service of utility facilities, and the Contractor shall cooperate with such forces and conduct his/her operation in such a manner as to avoid unnecessary delay or hindrance to the work being performed by such other forces.

The City owns, operates, and maintains its own water distribution and sewer collection systems and will cooperate with the Contractor insofar as it is reasonable and practicable. Water, as required for City projects, may be obtained at City-owned fire hydrants provided that application is made to the Water Department and permission obtained with provision for payment.

Full compensation for conforming to the requirements of this article, not otherwise provided for, shall be considered as included in the prices paid for the various contract items of work and no additional allowance will be made therefor.

All underground utilities including but not limited to water service, sewer laterals, electrical service, and gas service broken or disturbed by the Contractor's crew will be replaced or repaired by the Contractor or Utility Company at the Contractor's expense.

The Contractor shall consult with utilities and notify them of any relocation or protection in sufficient time to allow the utilities to perform the work in a complete and orderly manner.

7. Water Pollution Control Program (WPCP) and/or Storm Water Pollution Prevention Program (SWPPP)

Water pollution control work and storm water pollution prevention work shall conform to Chapter 4 of the Best Management Practices Manual for the City's Storm Water Management Program available on the City of Santa Cruz website at: http://www.cityofsantacruz.com/government/city-departments/public-works/stormwater/best-management-practices.

The Contractor shall take all necessary precautions to prevent any leakage or sewage spills of any kind onto adjacent property, public or private roadway, drainage systems, and waterways. The Contractor shall be liable for any and all clean-up costs or any fines that may be levied including those by the Regional Water Quality Control Board (RWCQB) against the City, in the event that such leakage or spill occurs. The Contractor shall also be responsible for reporting any and all spill to the appropriate regulatory agencies, including the RWCQB and the Santa Cruz-County Health Department.

Full compensation for conforming to the requirements of **"WATER POLLUTION CONTROL"** including furnishing all labor, materials, equipment, tools, and incidentals shall be included in the various bid item prices and no additional compensation will be allowed.

8. Maintenance and Clean-Up

Throughout the construction period, the Contractor shall keep the Project site in a neat and clean condition, shall dispose of any surplus materials in an approved manner off the site, and maintain proper housekeeping practices to the satisfaction of the Engineer.

When any material is to be disposed of outside of the easement or street or highway right-of-way, the Contractor shall first obtain written permission from the owner on whose property the disposal is to be made. Disposal must conform to grading ordinance of the jurisdiction in which the Work is performed. Location of disposal sites shall be submitted to the Engineer for review and subject to his/her approval.

Upon completion of the Work, and prior to requesting final inspection, the Contractor shall thoroughly clean the site of the Work of all rubbish, excess materials, falsework, temporary

structures, and equipment, and all portions of the Work shall be left in a neat and orderly condition. The final inspection, acceptance, and final payment will not be made until this has been accomplished.

9. State of California Department of Transportation Standard Specifications

All Work under the Contract shall conform to the applicable requirements of the most recent published State of California Department of Transportation Standard Specifications. Said State Specifications are to be considered an integral part of the specifications for all purposes related to this Contract.

Definitions of terms not defined in City Standard Specifications shall be as defined in the 2024 State Standard Specifications, available at:
https://dot.ca.gov/-/media/dot-media/programs/design/documents/2024_stdspecs-a11y.pdf

10. Notification of Project Commencement

The Contractor shall notify the City Engineer at least five (5) business days prior to mobilizing to the Project site.

11. Project Schedule

The Contractor shall prepare a project schedule and submit it to the Engineer for his/her review and approval five (5) days prior to the beginning of the Work. Work shall be conducted between the hours of **8 AM and 5 PM**, Monday to Friday, except with the permission of the Director, except in case of any emergency.

12. Progress and Final Payment

Progress and final payments will be made in accordance with Section 9 of the Standard Specifications, except as herein modified.

Payments are made every two weeks by the City Finance Department. The Contractor may receive partial payments only once for any month. A listing of payment cut-off dates is available upon request.

13. Extra Work

Extra work shall conform to the provisions in Section 9 of the California Standard Specifications and to these General Provisions.

Any alleged extra work or delays shall be given in writing within 24 hours of any occurrence to the Project Engineer or Inspector. The Contractor shall submit to the Project Engineer or Inspector an extra work report for each day the extra work is performed. The report shall be submitted prior to the start of work the following day. The report shall include: (1) a description of the extra work; (2) the quantity, classification, and working hours of the extra work labor force; (3) the type of

equipment, code number, and hours of operation of the equipment towards extra work; and (4) the quantity and type of materials used for extra work.

14. Local Hiring Compliance Forms

The Contractor, and all subcontractors, must comply with the local hiring provisions of Chapter 3.10 of the Municipal Code of the City of Santa Cruz, which is incorporated into these Contract Documents by reference. Chapter 3.10 specifically requires City Contractors and subcontractors to make good faith efforts to hire qualified individuals who are local residents, as workers on City public works projects of estimated value of greater than the formal bid limit, unless prohibited by State or Federal laws or regulations.

The Contractor and all listed subcontractors must complete and submit to the City, after the Award of Contract and prior to the issuance of the Notice to Proceed, the form entitled, "Good Faith Effort Statement for Local Hire," as contained in the Contract Documents.

The Contractor must also complete and submit to the City, on a weekly basis, documentation of local hiring. The certified payroll documents required by the Department of Industrial Relations will be deemed acceptable documentation if the certified payroll documents are accompanied by the form included in the Contract Documents or if certified payroll documents are modified to include the information therein.

15. Apprentice Hiring Records and Compliance Forms

City apprentice requirements do not apply to projects less than one hundred thousand dollars ($100,000) in value.

The Contractor, and all subcontractors, must comply with the apprentice hiring provisions of Chapter 3.10 of the Municipal Code of the City of Santa Cruz, which is incorporated into these Contract Documents by reference. Chapter 3.10 specifically requires each City Contractor or subcontractor to make a good faith effort to hire an apprentice on the Project who is enrolled in a viable apprentice program. Viable apprenticeship programs are listed on the Division of Apprenticeship Standards (DAS) web site (select Santa Cruz County): http://www.dir.ca.gov/databases/das/pwaddrstart.asp. The apprenticeship requirement will apply for each apprenticeable craft in which the Contractor employs workers in performing any of the work under the Contract. Attention is also directed to State Labor Code Sections 1777.5 and 1777.6 and California Apprenticeship Council regulations concerning the employment of apprentices by the Contractor or subcontractor.

Chapter 3.10 further requires the maintenance of documents demonstrating that the Contractor has requested an apprentice from a minimum of two viable apprenticeship programs after the Contractor is awarded the Contract and prior to commencing work. Failure to comply with any of the provisions of Chapter 3.10, including the maintenance of the records, will be deemed a breach of the Contract or subcontract and may result in the Contractor or subcontractor being declared "non-responsible" by the City and ineligible for the award of future City contracts. In addition,

State Labor Code 1777.5 provides for penalties of up to one hundred dollars ($100) a day for non-compliance.

If the Contractor is exempted from the apprentice requirement according to the exemptions described in State Labor Code 1777.5, the Contractor must notify the City in writing of their exemption prior to commencing work and explain the exemption in detail.

Unless exempted, the Contactor will, prior to commencing Work, submit to the City and the appropriate apprenticeship program, a DAS Form 140. The Contractor will submit a copy of the Request for Dispatch of Apprentice Form to the City as evidence that an apprentice was requested. A Request for Dispatch of Apprentice Form is provided in Section 4 of these Special Provisions. The request for an apprentice will be made at least two (2) working days before the date on which one or more apprentices are required. These forms are available from the DAS web site (http://www.dir.ca.gov/das/PublicWorksForms.htm).

16. Trenching Requirements

Section intentionally omitted.

17. Third Party Claims

Both parties shall timely notify the other of the receipt of any third-party claim relating to the Contract or Project. The City shall be entitled to recover its reasonable costs incurred in providing such notice.

18. Force Majeure

Neither party hereto shall be considered in default in the performance of its obligation hereunder to the extent that the performance of any such obligation is prevented or delayed by an act of God, natural disaster, pandemic, acts of terrorism, war, or other peril, which is beyond the reasonable control of the affected party and without the negligence of the respective Parties. Each party hereto shall give notice promptly to the other of the nature and extent of any Force Majeure claimed to delay, hinder, or prevent performance of the services under this Agreement. Each Party will, however, make all reasonable efforts to remove or eliminate such a cause of delay or default and will, upon the cessation of the cause, diligently pursue performance of its obligations in this Contract.

19. Contractor Not an Agent

Except as City may specify in writing, Contractor shall have no authority, express or implied, to act on behalf of City in any capacity whatsoever as an agent. Contractor shall have no authority, express or implied, pursuant to this Contract to bind City to any obligation whatsoever.

20. Conflicts of Interest

Contractor owes City a duty of undivided loyalty in performing the Work and services under this Contract. Contractor covenants (on behalf of Contractor and its employees, agents, representatives, and subcontractors) that there is no direct or indirect interest, financial or otherwise, which would conflict in any manner or degree with the performance of services required under this Contract. Contractor acknowledges and agrees to comply with applicable provisions of conflict of interest law and regulations, including the Political Reform Act, Section 1090 of the Government Code, and the City's conflict of interest code. Contractor will immediately advise City if Contractor learns of a conflicting financial interest of Contractor during the term of this Contract.

21. City Property

Unless otherwise provided herein, Contractor agrees that all copyrights which arise from creation of Project-related documents and materials pursuant to this Agreement shall be vested in the City and Contractor waives and relinquishes all claims to copyright or other intellectual property rights in favor of City. Any work product related to this Contract shall be confidential, not to be used by the Contractor on other projects or disclosed to any third party, except by agreement in writing by the City, or except as otherwise provided herein.

22. Equal Employment Opportunity/Non-Discrimination Policies

City's policies promote a working environment free from abusive conduct, discrimination, harassment, and retaliation; and require equal opportunity in employment for all regardless of race, religious creed (including religious dress and grooming practices), color, national origin (including language use restrictions), ancestry, religion, disability (mental and physical), medical condition, sex, gender (including gender identity and gender expression), physical characteristics, marital status, age, sexual orientation, genetic information (including family health history and genetic test results), organizational affiliation, and military or veteran status, or any other consideration made unlawful by local, State or Federal law. Contractor must comply with all applicable Federal and State and local equal employment opportunity laws and regulations, and Contractor is responsible for ensuring that effective policies and procedures concerning the prevention of abusive conduct, discrimination, harassment, and retaliation exist in Contractor's business organization. The City's current Equal Employment Opportunity and Non-Discrimination policies to which this Section applies may be viewed at http://www.codepublishing.com/CA/SantaCruz/?SantaCruz09/SantaCruz0983.html and http://www.cityofsantacruz.com/home/showdocument?id=59192.

23. Termination

A. City May Terminate for Cause

The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

- 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);

- Failure of Contractor to perform or otherwise comply with a term of the Contract Documents;
- Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or Contractor's repeated disregard of the authority of City or Engineer.

If one or more of the events identified above occurs, then after giving Contractor (and any surety) at least fourteen (14) calendar days' written notice of City's intent to terminate the Contract, City may proceed to:

- declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
- enforce the rights available to City under any applicable performance bond.

Subject to the terms and operation of any applicable performance bond, if City has terminated the Contract for cause, City may exclude Contractor from the Site, take possession of the Work and all materials and equipment stored at the Site for which City has paid Contractor, including materials and equipment stored elsewhere, and complete the Work as City may deem expedient.

City may proceed with termination of the Contract under this Section, unless Contractor within seven (7) days of the date of the notice of intent to terminate begins to correct Contractor's failure to perform and proceeds diligently to cure such failure.

If the contract is terminated as provided herein, Contractor shall not be entitled to receive any further payment. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by City, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to City within thirty (30) calendar days of City's invoice to Contractor. Such claims, costs, losses, and damages incurred by City will be reviewed as to reasonableness. When exercising any rights or remedies under this paragraph, City shall not be required to obtain the lowest price for the Work performed.

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

B. City May Terminate for Convenience

Upon fourteen (14) calendar days' written notice to Contractor, the City may, without cause and without prejudice to any other right or remedy of City, terminate the Contract. In such case, Contractor shall submit a claim for payment including required certifications as required in the Contract Documents within six (6) months of the effective date of termination. Subject to verification to City's satisfaction, Contractor will be eligible to be paid for (without duplication of any items):

- completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination;
- 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; and
- other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

City shall not be liable for costs incurred by Contractor, or any Subcontractor or supplier, after receipt of a notice of termination.

City shall deduct from Contractor any advance payments made to Contractor related to the terminated portion of the Contract Documents, any claim which City may have against Contractor in connection with the Contract Documents, and any other applicable costs.

C. Contractor May Stop Work or Terminate

If, through no act or fault of Contractor, or Subcontractor, or any employee or agent of Contractor or any Subcontractor, (1) the Work is suspended for more than 180 consecutive days by City or under an order of court or other public authority, or (2) the City fails to act on an application for payment within 30 days after it is submitted by Contractor, or (3) City fails for sixty (60) calendar days to pay Contractor any undisputed sum finally determined to be due, then Contractor may, upon thirty (30) days' written notice to City, and provided City does not remedy such suspension or failure to cure within fourteen (14) days of the default, terminate the contract and recover payment for Work actually performed.

In lieu of terminating the Contract and without prejudice to any other right or remedy, if City has failed to act on an application for payment by Contractor within thirty (30) days after it is submitted, or City has failed for sixty (60) days to pay Contractor any undisputed sum finally determined to be due, Contractor may, fourteen (14) days after written notice to City, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal 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.

[End of Section]

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

FOR THE

FLARE STATION IMPROVEMENTS CONSTRUCTION

AT THE CITY OF SANTA CRUZ RESOURCE RECOVERY FACILITY

CITY OF SANTA CRUZ

CITY OF SANTA CRUZ PUBLIC WORKS DEPARTMENT

Prepared under the Supervision of:

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Paul Stout, P.E.

Hoi Yu, P.E.

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GENERAL TERMS AND CONDITIONS

PART 1 – GENERAL

1.01 INTRODUCTION

A. The project is located at the City of Santa Cruz Resource Recovery Facility. The Contractor shall become thoroughly familiar with the Health and Safety Provisions of this Contract for precautionary measures to be followed during construction.

Definition of Terms

Division: ..... City of Santa Cruz Public Works Department (City).

Contract Operator:..... City Contract Operator.

Engineer:..... All references to Engineer shall mean the City acting either directly or through properly authorized representatives acting within the scope of the particular duties delegated to them. For this project, Engineering/Design support will be performed by Tetra Tech, 21700 Copley Drive, Suite 200, Diamond Bar, CA 91765.

Contractor:..... The person, persons, firm, partnership, corporation or combination thereof, who have entered into a contract with the City to perform work pursuant to the Contract requirements.

Construction Manager (CM):..... The firm under contract to perform Construction Management for the project. The CM firm is yet to be determined.

Construction Quality Assurance (CQA) Firm: ..... The firm under contract to perform Construction Quality Assurance monitoring and reporting for the project. The CQA firm is yet to be determined.

These Technical Specifications include the General Terms and Conditions, Construction Support Tasks, and the Special Conditions for the Flare Station Improvements Construction at the City of Santa Cruz Resource Recovery Facility.

1.02 DESCRIPTION OF WORK

The project consists of construction improvements to install a permanent flare station and all other appurtenant equipment as shown in the Construction Drawings as specified herein, as well as the installation of a new low nitrous oxide (NOx) flare stack and blower skid along with the start-up process.

1.03 CONTRACT DOCUMENTS

The contract documents consist of the Advertisement for Bids, Bidder's Proposal, Bid Documents, Technical Specifications and Plans or Drawings as defined below.

A. ADVERTISEMENT FOR BIDS

The Advertisement for Bids first publication date is included in the specifications cover.

B. BIDDER'S PROPOSAL

Bid submittal requirements and specifics are included in the specifications cover.

C. BID DOCUMENTS

Bid Documents entitled "Flare Station Improvements Construction at the City of Santa Cruz Resource Recovery Facility".

D. TECHNICAL SPECIFICATIONS

Technical Specifications shall include the General Terms and Conditions, Construction Support Tasks, Special Conditions, and referenced Specifications as listed in Section 1.04.

E. PLANS OR DRAWINGS

The Plans for this project are the "Flare Station Improvements at the City of Santa Cruz Resource Recovery Facility", dated September 8, 2025 prepared by Tetra Tech specifically prepared for this project and referenced Standard Plans.

1.04 REFERENCE SPECIFICATIONS

A. STANDARD SPECIFICATIONS

The standard specifications shall be considered as the 2024 edition of the "Standard Specifications for Public Works Construction" (SSPWC) of the American Public Works Association, and all subsequent amendments, supplements, and additions.

B. ASTM SPECIFICATIONS

The ASTM specifications shall be considered as the latest revised specifications or tentative specifications of American Society of Testing Materials as specified in either the Special Conditions, General Provisions or Standard Specifications.

C. STANDARD DRAWINGS

Unless otherwise noted on the project plans, the Standard Drawings shall be the most recent standard drawings referenced.

1.05 RESERVED

1.06 ABBREVIATIONS AND REFERENCES

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearings Manufacturer's Association
AGA	American Gas Association
AISC	American Institute of Steel Constructors
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
AWS	American Welding Society
AWWA	American Water Works Association
BMP	Best Management Practice
BTU	British Thermal Unit
CASQA	Construction Stormwater Quality Association
CASMP	Construction Activities Storm Water Management Plan
CDFW	California Department of Fish and Wildlife
CGA	Compressed Gas Association
CI	Cast Iron
CPM	Critical Path Method
CSA	Canadian Standards Association
CSP	Corrugated Steel Pipe
CQA	Construction Quality Assurance
CQC	Construction Quality Control
DOTSS	Dept. of Transportation (Cal Trans) Standard Specifications, 2014 Edition Rev. 9
FM	Factory Mutual Research Corporation
FRP	Fiberglass Reinforced Plastic
HDPE	High Density Polyethylene
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers

IPS	Iron Pipe Size
LFG	Landfill Gas
MBARD	Monterey Bay Air Resources District
NBS	National Bureau of Standards
NEC	National Electrical Code
NECA	National Electrical and Communications Association
NEMA	National Electrical Manufacturers' Association
NFPA	National Fire Protection Association
NLGI	National Lubricating Grease Institute
NPDES	National Pollutant Discharge Elimination System
NONA	Notice of Non-Applicability
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
P&ID	Piping and Instrumentation Diagram
PG&E	Pacific Gas and Electric
PLC	Programmable Logic Standard
PSIG	Pounds Per Square Inch Gage
PVC	Polyvinyl Chloride
ROW	Right of Way
SAE	Society of Automotive Engineers
SCRRF	Santa Cruz Resource Recovery Facility
SSPWC	Standard Specifications for Public Works Construction, 2003 Edition
SS, SST	Stainless Steel, Stainless Steel Tubing
UBC	Uniform Building Code
UL	Underwriters' Laboratories, Inc.
USASI	USA Standards Institute

1.07 WORK BY OTHERS

A. The Contractor is advised that work by others may be in progress adjacent to, or at the site, during the Contract time. Cooperation during mobilization, storage, access, and other construction activities between the parties, and access by the City, is required.

B. The Contractor shall coordinate and interface his work with all other work on or adjacent to the site.

C The Contractor shall give the work the necessary constant attention to facilitate the progress thereof and shall cooperate with the disposal site Owner, and other Contractors.

1.08 WORK HOURS

A. Unless otherwise approved by the Owner, construction activities and material deliveries to the disposal site shall be limited to the hours of 8:00 a.m. to 5:00 p.m. Monday through Friday.

1.09 WORKING DAYS

A. The Contractor may perform work Monday through Friday. No working operations will be conducted beyond those periods unless otherwise approved in writing by the City.

1.10 TIME OF COMPLETION/LIQUIDATED DAMAGES; EXTENSION OF TIME

A. The Contractor agrees to complete all work within 90 working days, commencing upon issuance of a NOTICE TO PROCEED by the City. In accordance with Government Code Section 53069.85, Contractor agrees to forfeit and pay to the City the sum of Three Thousand Dollars ($3,000) per day for each calendar day that completion of the project is delayed beyond the specified 90 working days.

B. Such sums shall be deducted from any payments due to or to become due to the Contractor. If delays are caused by unforeseen events beyond the control of both the Contractor and the City, or by delays within the control of the City, such delays will entitle the Contractor to an extension of time, but Contractor shall not be entitled to damages or additional payment due to such delays.

C. If Contractor believes that the progress of the work has been adversely affected by abnormal inclement weather, Contractor shall submit a written request for extension of time to the CM.

D. It is understood that requests for time extensions related to delays for inclement weather will only be considered when the days in question impact a critical path element of the project. Further, a time extension will only be granted when the Contractor is prevented from working on a critical path item during the first five (5) hours of the day with at least sixty (60) percent of the normal work force for that item.

E. Additionally, Contractor agrees to forfeit and pay to the City any penalties and/or fines assessed by the various regulatory agencies having jurisdiction over the landfill for violations associated with a failure to complete the project within the specified 90 working days.

F. Such sum shall be deducted from any payments due to or to become due to Contractor. If delays are caused by unforeseen events beyond the control of both Contractor and the City, or by delays within the control of the City, such delays will entitle Contractor to an extension of time, but Contractor shall not be entitled to damages or additional payment due to such delays.

1.11 RESPONSIBLE REPRESENTATIVE

A. The Contractor shall furnish to the City, in writing, the name of the representative who shall have complete authority to act for this project, including, but not

limited to, implementation and enforcement of the site safety plan, the maintenance of barricades, signs, lights, fencing, erosion and dust control. The Contractor shall also furnish to the City, a telephone number where the Contractor or their representative may be contacted 24 hours a day. The representative shall be present at the job site during all working hours.

1.12 CONTROL OF WORK

A. The City will provide control point information for Contractor's use. All other construction layout and staking shall be the responsibility of the Contractor.

1.13 DESIGNATED CONTRACTOR ENTRANCE

A. The City will determine entrance location(s) for use by the Contractor during the construction kick-off meeting. The Contractor will be limited to using only designated entrance location(s).

1.14 CONTRACTOR KEY AND LOCKS

A. The Contractor shall be responsible for securing and locking all construction entrances and the proposed location of the new Flare Station during non-working hours. The Contractor shall also ensure that entry to the site is controlled during working hours. The Contractor shall provide locks that will be added to the chain/lock loop at the construction entrances for the duration of the project. The Contractor shall remove their locks at the completion of the project.

1.15 PARKING

A. Contractor's and subcontractor's personnel will only be allowed to park in areas as designated by the City. The parking area/areas will be designated by the City prior to the start of the project. Any area disturbed by the Contractor will be restored to its original conditions as approved by the City. The Contractor is responsible for any costs required to repair and/or restore the designated parking area/areas and shall be included in the bid schedule unit costs. The City will not authorize a separate unit cost.

1.16 SMOKING POLICY

A. Smoking is not allowed at the City of Santa Cruz Resource Recovery Facility. The smoking prohibition will be strictly enforced on this project due to the explosive nature of landfill gas.

1.17 SPECIAL CLEAN-UP

A. Any trash generated on the project site by the Contractor, or their employees, will be cleaned up daily by the Contractor for disposal. It shall be the Contractors responsibility to make the arrangements necessary to provide trash disposal containers and service as

required. Mud and dirt tracked off-site by the Contractor, their equipment, or their employees will be cleaned up daily and properly disposed of by the Contractor.

1.18 LIMITING PUBLIC ACCESS

A. All necessary safety precautions including barricades and/or traffic cones will be used to prevent the public from entering the working area and the landfill. This is an operating disposal site and access by the public is not authorized. The Contractor is reminded that the disposal site contains explosive and potentially hazardous gases.

1.19 BIOHAZARDS

A. The Contractor may encounter waste during construction of the System. Waste may contain biohazards such as medical waste or dead animals. The Contractor's Health and Safety Plan, as required in Subsection 01 35 00, shall address the potential for contact with biohazards and the specific measures to be taken to protect the Contractor's workers, facility staff, and the public.

1.20 SUPERINTENDENT AND FOREMAN PAGERS/CELLULAR PHONES

A. The Contractor's superintendent and Foreman shall be equipped with a cellular telephone through which the City, Engineer, or CQA representative can reach the Superintendent and Foreman 24 hours a day.

1.21 MATERIALS DELIVERY

A. The Contractor is to have all materials delivered to the work site and/or staging area. The City, Engineer, or CQA representative will not accept delivery of materials.

1.22 TIMELINESS OR CORRECTION OF ITEMS AFFECTING THE OPERATION OF THE SITE

A. The Contractor will not interfere with the continued proper operation of the City of Santa Cruz Resource Recovery Facility. The Contractor shall correct any interference with site operation immediately upon notification from the Engineer or the City.

1.23 EMERGENCIES

A. The Contractor will provide the Engineer and the City with the phone numbers of at least two individuals who may be contacted in an emergency on a 24-hour, 7-day per week basis, including holidays. To prepare for emergencies, the Contractor will ensure that their employees know the location of appropriate fire and first aid equipment and emergency phone numbers. In the event of an emergency, such as damage or rupture of an existing gas pipeline, the Contractor shall immediately notify the City and the Engineer. Should such an emergency occur after hours, the Contractor shall notify the City. This is in addition to the Contractor taking any appropriate immediate emergency response to correct the problem.

1.24 GENERAL SAFETY AND HAZWOPER CERTIFICATION

A. The Contractor shall be responsible for maintaining safety on the project site in accordance with the provisions of the contract and including OSHA and NFPA regulations. In addition, the Contractor shall supply all necessary safety equipment for their employees and any site visitors. Tailgate safety meetings shall be performed a minimum of once per week for all site personnel. The Contractor shall provide the CM with a summary of the items discussed at the weekly tailgate meetings and a sign-in sheet of those attending the weekly meetings.

B. All employees of the Contractor or Subcontractor working on the site shall be HAZWOPER trained and certified. The Contractor shall provide copies of each employee's initial and recurrent training certificates prior to mobilization to the site.

1.25 ENVIRONMENTAL MITIGATION MEASURES

A. Cultural Resources

In the event cultural or palaeontologic resources are uncovered during the course of the project, ground-disturbing activities in the vicinity of the find shall be redirected until the nature and extent of the find can be evaluated by a qualified archaeologist or paleontologist as determined by the City. Any such resource uncovered during the course of the project related to grading or construction shall be recorded and/or removed per applicable City and/or State regulations.

1.26 SANITARY FACILITIES

A. The Contractor shall provide adequate chemical toilet facilities for personnel. The number of facilities shall be as required by Federal and State Safety and Occupational Standards. Chemical toilets shall be kept in a sanitary condition. The Contractor shall remove chemical toilets upon completion of the work and disinfect the premises.

1.27 STORM DAMAGE

A. The Contractor shall be responsible for the repair of any storm damage to the work prior to the Final Inspection by the Engineer and the City. Storm damage of stockpiled materials is also the responsibility of the Contractor. Prompt repair of any storm damage shall be the responsibility of the Contractor, at no cost to the City.

1.28 EQUIPMENT FUELING AND MAINTENANCE

A. The Contractor shall fuel and maintain equipment in designated areas of the site as directed by the City. Any fuel spills will be immediately cleaned up, and the contaminated soil removed from the site by the Contractor at the Contractor's expense. Any temporary fuel storage tank necessary to fuel the Contractor's equipment will be placed within a secondary containment berm, structure, or secondary containment tank. The bermed area shall be lined with a material suitable to prevent contamination of the site and underlying soil. The Contractor shall be responsible to obtain any required permits for fuel storage/dispensing facilities that may be required.

1.29 PROJECT DOCUMENT CHANGE CONTROL

A. A structured process for controlling project Plan and Specification changes will be implemented by the Engineer. "Controlled" copies of the Plans and Specifications will be issued to the Contractor and the City. These "controlled" copies will be updated with any project changes, revisions, or addenda. The Engineer will not be responsible for providing changes, revisions, or addendums to the Plans and Specifications, other than these "controlled" copies.

1.30 SITE HEALTH AND SAFETY PLAN

A. The Contractor shall provide a site-specific Health and Safety Plan with the signed Contract documents for review and approval by the City that meets the minimum of all the requirements of Federal and State regulations through the construction activities. The Contractor shall allow a period of two weeks for the Engineer's review time. The Site Health and Safety Plan shall be reviewed and signed by a Certified Industrial Hygienist. The Contractor shall include the elements of the Health and Safety provisions described in Appendix B of these Specifications.

B. The Contractor shall determine the extent to which these requirements are applicable to their work and subcontractors work for this project. It is the responsibility of the Contractor to ensure compliance with all relevant health and safety regulations. The Contractor shall determine the level of protection to be utilized for their workers and for subcontractors during the project.

C. The Contractor shall be responsible for providing all items necessary for health and safety, including dust control, and personal protective equipment, in accordance with applicable Federal and State requirements. The City reserves the right to instruct removal of any of the Contractor's employees or subcontractors that are not meeting the requirements of the law or the Site Health and Safety Plan. During the entire project, the Contractor shall maintain at least one copy of the Health & Safety Plan at the site.

1.31 SAFETY RECORD

A. The Contractor shall provide a Safety Record with the Contract documents. The Safety Record shall be the OSHA 200 log for the past three calendar years (2024, 2023, and 2022) and for any incidents in 2025.

1.32 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested. See Section 8.3 of the General Conditions for more information.

1. Phone/pager numbers of Contractor's Superintendent
2. Emergency Contact List
3. Site Health and Safety Plan
4. HAZWOPER Certificates
5. OSHA 200 Log

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – PAYMENT (NOT USED)

END OF SUBSECTION 00 72 00

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 11 00
SUMMARY OF WORK

PART 1 – GENERAL

1.01 QUALITY CONTROL

A. All materials and equipment shall be new. All material and equipment shall be of the specified quality and equal to the samples found to be acceptable by the Engineer and the City, if samples have been submitted. The work shall be done and completed in a thorough, workmanlike manner, notwithstanding any omission in the Contract Documents.

B. Materials and equipment to be supplied under this Contract will be tested and inspected at the work site.

C. Inspectors employed by the City shall be authorized to inspect all work done and materials and equipment furnished. Such inspection may extend to all or any part of the work, and to the preparation, fabrication, or manufacturing of materials and equipment to be used. The Inspector will not alter or waive the provisions of the Contract Documents.

D. The Contractor shall at all times maintain proper facilities and provide safe access to all parts of the work, to the shops wherein the work is in preparation, and to all warehouses and storage yards wherein materials and equipment are stored, for purposes of inspection by the City.

E. The Contractor shall furnish the City with every reasonable facility for ascertaining if the work as performed is in accordance with the requirements and intent of the Specifications, Construction Drawings, and Contract. Should any work be covered before acceptance, inspection, or consent of the City, it must, if required by the City, be uncovered for examination at the Contractor's expense.

1.02 WARRANTY OF WORK

A. All equipment, materials, and articles incorporated in the work covered by this Contract shall be new and subject to review and acceptance by the City unless otherwise specifically provided for in the Specifications.

B. Where equipment, materials, or articles are referred to in the Specifications or Drawings as "or equivalent", "equal to", or "or approved equal", the Engineer shall decide the question of equality.

C. The Contractor shall guarantee the work against defective materials or workmanship for a minimum period of one (1) year from the date of its final acceptance under this Contract, except where longer warranty periods are specifically stated by the manufacturer of individual components.

D. It is the Contractor's ultimate responsibility to deliver, at the time of final acceptance, a complete project that complies with these Specifications and Drawings. All items shall be 100 percent complete and ready to operate.

E. During the warranty period, should the Contractor fail to remedy defective material or workmanship, or to make replacements within five (5) days (except long lead items) after written notice by the City, it is agreed that the City may make such repairs and replacements at 1.5 times the actual cost of the required labor, and materials shall be chargeable to and payable by the Contractor.

F. In the event it is necessary for the City to file suit to enforce any liability of the Contractor pursuant to this article, Control of Work, the City shall be entitled to recover from the Contractor, in addition to all other amounts found due and owing, costs of suit and reasonable expenses and fees, including reasonable attorneys' fees incurred by the City in successfully enforcing the Contractor's obligations, all to be taxed as costs and included in any judgment rendered.

G. The warranty provided herein shall not be in lieu of, but shall be in addition to any warranties or other obligations otherwise imposed by law. The remedies provided herein shall not be exclusive and the City shall be entitled to all remedies provided by law.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – PAYMENT (NOT USED)

END OF SUBSECTION 01 11 00

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 29 00
BASIS OF PAYMENT

PART 1 – GENERAL

1.01 INTRODUCTION

This section includes the items of work and the basis of payment for these tasks. The Contractor shall bid Items 1 through 32 below separately and provide a total sum for all work items. The Contractor is responsible for supplying all materials, equipment, and labor necessary for the complete construction and installation of all work as described in these specifications and as shown on the Construction Drawings. Payment for each work item will be made on either a unit price (EA), lump sum (LS), or linear foot (LF) basis, and only after that portion of the project has been completed.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – PAYMENT

4.01 MOBILIZATION/DEMOBILIZATION

This task includes any and all temporary facilities and utilities, safety plans, and construction equipment required for this project. Payment for this work will be made on an LS basis. Twenty-five (25) percent of the lump sum price bid will be paid with the first payment request following satisfactory evidence of mobilization of sufficient labor, equipment and material to adequately progress the work of this contract. Twenty-five (25) percent of the lump sum price bid will be paid with the payment request subsequent to the payment request in which the initial payment for this item is made. Fifty (50) percent of the LS price bid will be paid with the Final Payment request. The price bid in the proposal for this item shall not exceed ten (10) percent of the total project amount.

4.02 SURVEY (PRE AND POST CONSTRUCTION)

Supply all material, equipment, and labor necessary to perform surveying tasks, including initial layout survey for piping, flare station grading and earthwork, and as-built survey of piping. Payment for this work will be on an LS basis.

4.03 SYSTEM START-UP, TESTING, COMMISSIONING, AND TROUBLESHOOTING

Supply all material, equipment, and labor necessary for start-up, testing, and commissioning of the system. The Contractor shall coordinate with the Engineer on the start-up and testing dates. The Contractor shall perform start-up, testing, commissioning, and troubleshooting of the system as coordinated with flare manufacturer and Engineer. Any components found to be non-operational during commissioning and start-up will be repaired or replaced at the Contractor's expense. Payment for this work will be made on an LS basis.

4.04 SITE GRADING AND OVEREXCAVATION

Supply all materials, equipment, and labor for the earthwork and grading of the flare station area. Excavation includes removal, relocation, or disposal of any soil, rocks, or trees in the approximate area as shown on the Construction Drawings. Payment for this work will be made on an LS basis.

4.05 REPLACEMENT OF GRAVEL

Supply all materials, equipment, and labor for the replacement of all disturbed gravel in the construction area. Payment for this work will be made on an LS basis.

4.06 6-FOOT-HIGH CHAIN LINK FENCE AND MANUAL DOUBLE SWING GATE – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of chain link fencing per Detail 1 on Sheet S-103. Chain link fence shall conform to Caltrans Standard Plans A85 and A85A as well as requirements in Section 206-6 of SSPWC. Payment for this work will be made on an LS basis.

4.07 6-FOOT-HIGH CHAIN LINK FENCE FOOTINGS – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the chain link fence footings per the Construction Drawings. Payment for this work will be on an EA basis.

4.08 RELOCATION OF EXISTING CORRUGATED HDPE PIPE STORM DRAIN, BELOW GRADE – INSTALLATION ONLY

Supply equipment and labor for the relocation of the corrugated HDPE pipe storm drain. Materials for this item will be existing in the Flare area. Payment for this work will be made on an LS basis.

4.09 CORRUGATED HDPE STORM DRAIN – MATERIALS AND INSTALLATION

Supply materials, equipment, and labor for the installation of new corrugated HDPE storm drain as shown on the Construction Drawings. Payment for this work will be on an LF basis.

4.10 GRATED LINE DRAIN – MATERIALS AND INSTALLATION

Supply materials, equipment, and labor for the installation of new grated line drain as shown on the Construction drawings and Caltrans Standard Plans D98 H & I. Payment for this work will be on a LF basis.

4.11 CONCRETE RETAINING WALL SYSTEM – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the concrete retaining wall as shown on the structural Drawings. Payment for this work will be on an LS basis.

4.12 8-INCH PIPE SUPPORT CONCRETE FOOTINGS – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the pipe support footings shown on Structural Drawings. Payment for this work will be on an EA basis.

4.13 FLARE AND AIR COMBUSTION BLOWER FOUNDATION – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the flare and air combustion blower foundation shown on Structural Drawings. Payment for this work will be on an LS basis.

4.14 BLOWER SKID FOUNDATION – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the blower skid foundation shown on the Structural Drawings. Payment for this work will be on an LS basis.

4.15 FLARE STACK INSTALLATION AND ANCHORING – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the flare stack anchoring shown on the Structural Drawings. Payment for this work will be on an LS basis.

4.16 COMBUSTION AIR BLOWER INSTALLATION AND ANCHORING – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the combustion air blower anchoring shown on the Structural Drawings. Payment for this work will be on an LS basis.

4.17 BLOWER SKID INSTALLATION AND ANCHORING – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the blower skid and air compressor anchoring shown on the Structural Drawings. Payment for this work will be on an LS basis.

4.18 8-INCH PIPE SUPPORT INSTALLATION AND ANCHORING – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the pipe support and related anchor bolts shown on the Structural Drawings. This will include all galvanized channel piping, end caps, supports, clamps, and associated hardware. Payment for this work will be on an EA basis.

4.19 3/8-INCH STAINLESS STEEL O.D. TUBING AIR PIPING AND FITTINGS, ABOVE GROUND – INSTALLATION ONLY

Supply all equipment and labor for the installation of above ground 3/8-inch diameter SST air pipe as shown on the Construction Drawings. Piping and fittings will be provided by the Flare Manufacturer. Payment for this item will be made on an LS basis.

4.20 2-INCH HDPE SDR-11 CONDENSATE PIPING AND FITTINGS, INSULATED ABOVE GROUND – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of above ground insulated 2-inch diameter HDPE SDR-11 condensate pipe as shown on the Construction Drawings. Piping and fittings will be provided by the Contractor. Payment for this item will be made on an LF basis.

4.21 2-INCH HDPE SDR-11 CONDENSATE PIPING AND FITTINGS, BELOW GROUND – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of below ground 2-inch diameter HDPE SDR-11 condensate pipe as shown on the Construction Drawings. Piping and fittings will be provided by the Contractor. Payment for this item will be made on an LF basis.

4.22 1/2-INCH SCHEDULE 40 BLACK IRON PIPE WITH PVC WRAP AND TWO 10-GALLON PROPANE TANKS (INSTALLED ON SKID MOUNTED RACK), ABOVE GROUND – MATERIALS AND INSTALLATION

Supply materials, equipment, and labor for the installation of above ground ½-inch diameter SCH 40 black iron pipe with PVC wrap and two 10-gallon propane tanks as shown on the Construction Drawings. Piping, fittings, and propane tanks will be provided by the Contractor. Payment for installation of Contractor supplied ½-inch diameter SCH 40 black iron pipe with PVC wrap and two 10-gallon propane tanks will be made on an LS basis.

4.23 10-INCH HDPE SDR-17 PIPE AND FITTINGS, ABOVE GROUND – MATERIALS AND INSTALLATION

Supply materials, equipment, and labor for the installation of below ground 10-inch diameter HDPE SDR-17 as shown on the Construction Drawings. Piping and fittings will be provided by the Contractor. Payment for installation of Contractor supplied 10-inch diameter HDPE SDR-17 will be made on an LF basis.

4.24 MISCELLANEOUS FITTINGS AND MATERIALS – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of miscellaneous fittings and materials for the flare station. This will include all associated hardware. Payment for this work will be made on an LS basis.

4.25 8-INCH EXPANSION JOINT – INSTALLATION ONLY

Supply equipment and labor for the installation of 8-inch diameter expansion joint via flange connection as shown on the Construction Drawings. Materials for this item will be provided by the Flare Manufacturer. Payment for installation of 8-inch diameter expansion joint via flange connection will be made on an EA basis.

4.26 FLAME ARRESTER – INSTALLATION ONLY

Supply equipment and labor for the installation of the flare flame arrester. Materials for this item will be provided by the Flare Manufacturer. Payment for this item will be made on an LS basis.

4.27 8-INCH PNEUMATIC FAIL CLOSE VALVE - INSTALLATION ONLY

Supply equipment and labor for the installation of the 8-inch pneumatic fail close valve. Materials for this item will be provided by the Flare Manufacturer. Payment for this work will be made on an EA basis.

4.28 8-INCH AUTOMATED FLOW CONTROL VALVE - INSTALLATION ONLY

Supply equipment and labor for the installation of the 8-inch automated flow control valve. Materials for this item will be provided by the Flare Manufacturer. Payment for this work will be made on an EA basis.

4.29 FLOW METER – INSTALLATION ONLY

Supply equipment and labor for the installation of the flow meter on the flare inlet pipe as shown on the Construction Drawings and Flare Manufacturer reference drawings. Materials for this item will be provided by the Flare Manufacturer. Payment for this work will be on an EA basis.

4.30 DIFFERENTIAL PRESSURE SWITCH – INSTALLATION ONLY

Supply equipment and labor for the installation of differential pressure switch as shown on the Construction Drawings and Flare Manufacturer reference drawings. Materials for this item will be provided by the Flare Manufacturer. Payment for this work will be on an EA basis.

4.31 EQUIPMENT GROUNDING (FLARE, COMBUSTION AIR BLOWER SKID, BLOWER SKID, AIR COMPRESSOR AND CONTROL PANEL) – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor necessary to electrically ground the new flare, combustion air blower skid, air compressor, and the control panel skid. Payment for this work will be made on an LS basis.

4.32 ELECTRICAL CONDUITS AND WIRING – MATERIALS AND INSTALLATION

Supply all wiring and conduits for the new flare, combustion air blower, and new control panel as shown on the Construction Drawings and PEI reference drawings. Install all major electrical components provided by PEI, as indicated on the drawings. This work includes installation of conduits and wiring for the new control panel, installation of conduits and wiring from the control panel to the combustion air blower, and installation of wiring of combustion air blower to new VFD in the control panel. Payment for this work will be made on an LS basis.

END OF SUBSECTION 01 29 00

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 32 23
SURVEYS AND LAYOUT DATA

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes general requirements for survey work to be performed by the Contractor.

1. Set offset stakes, slope stakes, and grade stakes for field layout of features of the work.

2. Perform surveys for measurement of pay quantities.

3. Perform surveys to record as-built conditions of the project.

1.02 DESCRIPTION

A. Reference Points. Prior to construction, verify with the City the locations of site reference points and survey control points as shown on the Construction Drawings. The reference points used are based on assumed coordinates, provided by others. The Contractor shall notify the City if survey control points are damaged upon discovery. The Contractor shall also notify the City of any damage caused by Contractor; and then repair or replace control points at no additional cost to the City.

B. Corrections by the City. The City reserves the right to perform any desired checking and correction of the Contractor's surveys, but this does not relieve the Contractor of the responsibility for adequate performance of the work.

C. Equipment and Personnel. Provide instruments and other survey equipment that is accurate, suitable for the surveys required in accordance with recognized professional standards, and in proper condition and adjustment. Perform work under the direct supervision of a licensed surveyor licensed in the state of California. Provide the City with calibration certificates for all equipment utilized during construction.

D. Field Notes and Records. Record surveys in field notebooks and provide copies of such records to the City at intervals required by the City. Furnish each field notebook to the City when filled or completed. Electronic notes may be used if printouts are furnished to the City and if the format of the printed information is approved by the City.

E. Use by the City. The City may at any time use line and grade points and markers established by the Contractor. The Contractor's surveys are a part of the work and may be checked by the City or representatives of the City at any time. The Contractor is responsible for (1) any lines, grades, or measurements which do not comply with specified design criteria or proper tolerances, or which are otherwise defective, and (2) for any resultant defects in the work. The Contractor will be required to conduct re-surveys or check surveys to correct errors indicated by review of the field notebooks or otherwise detected at no extra cost.

1.03 SURVEYS FOR LAYOUT AND PERFORMANCE OF WORK

Perform surveys for layout and performance of the work, reduce the field notes, make necessary calculations, and prepare drawings necessary to carry out such work.

1.04 SURVEYING ACCURACY AND TOLERANCES IN SETTING OF SURVEY STAKES

A. Perform control traverse field surveys and computations to an accuracy of at least 1:10,000.

B. The tolerances applicable in setting survey stakes are set forth below. Such tolerances do not supersede stricter tolerances required by the Drawings or Specifications, and do not otherwise relieve the Contractor of responsibility for measurements in compliance therewith.

Type of Mark	Horizontal Position	Elevation
Permanent reference points	1 in 10,000	±0.01 ft.
General excavation and earthwork	1 in 2,000	±0.10 ft.

1.05 COORDINATION WITH THE CITY

A. The Contractor shall keep the City informed on progress of survey work to allow the City sufficient time and ample opportunity to verify survey work without inconvenience or delay to Contractor.

1.06 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. As-Built Survey File in AutoCAD

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – PAYMENT (NOT USED)

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 01 32 23

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 33 23
SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND AS-BUILTS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall electronically submit to the Engineer shop drawings, product data, and samples for review as required by the Contract Documents. In ample time for each to serve its purpose and function, the Contractor shall submit to the Engineer such schedules, reports, drawings, lists, literature samples, instructions, directions, and guarantees as are specified or reasonably required for construction, operation, and maintenance of the work.

1.02 SCHEDULE

A. The Contractor shall submit a schedule of items to be submitted for review to the Engineer and the City within 10 working days of the contract award date. The Contractor shall also submit a Critical Path Method (CPM) schedule for the entire project to the Engineer and the City within 10 working days of the contract award date. This CPM schedule shall contain, at a minimum, all items listed in Subsection 01 29 00 – Basis of Payment. The CPM schedule shall allow normal construction delays, such as inclement weather. These schedules will be reviewed by the Engineer and the City for adherence with the overall project schedule. The Contractor shall revise the schedules per the Engineer's comments as necessary to maintain overall project schedule milestones.

1.03 SCHEDULE OF SUBMITTALS

A. A schedule of shop drawing submittals shall be made within ten (10) working days of the contract award date. If the Contractor requires additional time for certain items, the Contractor shall request, in writing, permission for extension of time, stating the affected items, the reason for the request, and the approximate date when the submittal can be made.

B. All submittals shall be made in time to avoid delaying the work.

1.04 REVIEW OF CONTRACTOR'S SUBMITTALS

A. Review and acceptance is required of any drawing, product specification, material specification, or equipment, before changes or substitutions can occur. The Engineer will return the marked copies indicating one of the following four (4) actions:

1. If review and checking indicates no exceptions, copies will be returned marked "APPROVED AS SUBMITTED" and work may begin immediately on incorporating the material and equipment covered by the submittal into the work.

2. If review and checking indicates limited corrections are required, copies will be returned marked "APPROVED AS NOTED". Work may begin immediately after incorporating into the work the material and equipment covered by the corrected submittal.

3. If review and checking indicates insufficient or incorrect data has been submitted, copies will be returned marked "RETURNED FOR CORRECTIONS". No work may begin on incorporating the material and equipment covered by this submittal into the work until the submittal is revised, resubmitted, and returned marked either "APPROVED AS SUBMITTED" or "APPROVED AS NOTED".

4. If review and checking indicates the material and equipment submitted is unacceptable, copies will be returned marked "RESUBMIT". No work may begin on incorporating the material and equipment covered by this submittal into the work until a new submittal is made and returned either "APPROVED AS SUBMITTED" or "APPROVED AS NOTED".

1.05 SUBMISSION REQUIREMENTS

A. Prior to submitting, the material shall be checked for compliance with these Specifications. Include transmittal with each submittal.

B. Shop Drawings shall include but not limited to:

1. Project title.

2. Name of Contractor, Subcontractor.

3. Field dimensions.

4. Identification of product and materials.

5. Fabrication and erection details.

6. Identification of deviations from Contract requirements.

7. Contractor's stamp (approximately 3" x 1/2") and signature signifying that each drawing submitted complies with the Contract Documents as follows:

Reviewed By:
Contractor's Name:
Job Name:
Job Location:
Job Number:
Date:

8. Reference numbers as to sheet and detail, or schedule, numbers shown on Contract Drawings, and specification section number where applicable.

9. Indication of complete method of connection, jointing, support, anchorage, reinforcement, and other features of construction, including abutting finish surface.

C. Product data shall include:

1. The date of submission and the dates of any previous submissions.

2. The project title and number.

3. The names of the Subcontractor and supplier.

4. Identification of the product, including the specification section number.

5. Field dimensions, clearly identified.

6. Relations to adjacent or critical features of the work or materials.

7. Applicable standards, such as ASTM, Federal specification numbers, or as indicated.

8. Identification of deviation from Contract Documents.

9. Identification of revisions on resubmittals.

10. Contractor's stamp, signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of the Contract Documents.

11. Performance characteristics and capacities.

12. Wiring or piping diagrams and controls.

13. Manufacturers recommended procedures for the installation of all components of the systems, such as, but not limited to; pipe, fittings, flex hoses, braces, brackets, supports, and all process equipment.

D. Samples shall consist of:

1. Samples of material, size, and finish specified.

2. Tags or labels (at least 3" x 4") which are attached to samples or inscribed with the following information: Job, City, material, texture, finish, model or catalog number, and Contractor's stamp with signature indicating that the Contractor has reviewed the submittal and that it is in conformance with the Contract Documents.

3. Full range of color, texture, and pattern, if not specified.

4. At the option of the City or Engineer, samples may be subject to testing, and in such event, additional samples as required shall be supplied by the Contractor at no additional cost.

5. Specification paragraph number.

E. Each submittal shall be accompanied by a letter of transmittal containing a complete itemized and numbered list of the submittal material together with the Subcontractor's name. Separate letters of transmittal shall accompany each submittal from different Subcontractor's and different categories (trades and building units).

F. Bound sets of brochures, catalog sheets, specifications and materials lists shall include an index sheet completely identifying the entire contents of the submittal in sequential order. The Contractor shall identify, stamp, and sign only this index sheet. Include a listing with specific model numbers, manufacturer, types, etc.

G. In lieu of signing each brochure or specification sheet, the Contractor may indicate on the letter of transmittal that he has reviewed and approved all the material included. This does not eliminate the requirement for identification stamp information.

H. Submittals: Forward all submittals to the Engineer.

1.06 RESUBMISSION REQUIREMENTS

A. The Engineer will return to the Contractor an electronic copy of brochures and prints, stamped and signed, with the corrections noted, if any.

B. Make all corrections or changes in the submittals required by the Engineer and resubmit only when so indicated.

C. Shop Drawings and product data:

1. Revise initial drawings or data, and resubmit only when so indicated on the submittal.

2. Indicate all changes which have been made other than those requested by the Engineer.

1.07 ENGINEER'S RESPONSIBILITIES

A. The Engineer will review submittals for design concept and general compliance with the Contract Documents. The contractor will not be responsible for quantity, size, or dimensional errors on the Shop Drawings.

B. The Engineer will affix to the submittal a stamp indicating the action to be taken, and will return the submittal within seven (7) working days after receipt.

C. Approval of a separate or specified item does not constitute acceptance of an assembly in which the item functions.

1.08 DISTRIBUTION

A. Contractor: Responsible for their own use and that of Subcontractor's, suppliers, the manufacturer, and field workers.

B. Engineer: Responsible for their own use and that of the City.

C. Construction Manager.

1.09 AS-BUILT DRAWINGS

A. When any fabrication deviates from the Contract Documents, the Contractor shall prepare complete As-Built drawings of the actual fabrication. This will include detailed specifications, dimensions, material used, parts, devices and other accessories used in the fabrications. One (1) electronic copy in PDF and AutoCAD of As-Builts shall be included within the Operation and Maintenance Manual.

B. The Contractor shall maintain a neat and accurately marked set of As-Built drawings showing the final locations and layout of all civil, mechanical, electrical, instrumentation equipment, piping and conduit, structures, PLC ladder logic diagrams, and other improvements. Drawings shall be updated daily, with all work instructions and change

orders, accommodations and adjustments shown. As-built drawings shall be kept in the job site trailer, or other location as approved by the Engineer, and shall be subject to inspection by the Engineer at all times. Progress payments, or portions thereof, may be withheld if as-built drawings are not accurate and current. As-built drawings shall be separate, clean blueprints reserved for the purpose of showing the complete picture of the components and assemblies installed.

C. Upon completion of the work, these As-Built drawings shall be transferred to the Engineer. Completed As-Built drawings will be signed by the Contractor, dated, and returned to the Engineer for approval. Hand-drawn sketches will not be accepted as completed As-Built drawings.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – PAYMENT (NOT USED)

END OF SUBSECTION 01 33 23

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 35 00
SPECIAL PROJECT PROCEDURES

PART 1 – GENERAL

1.01 PROJECT REQUIREMENTS

A. The installation shall be in strict conformance with all applicable Federal, State, and local regulations.

B. All work, materials and methods of construction shall be subject to the inspection of the City (or their authorized representative), who shall be the judge of quality and suitability for the purposes for which they are used. If any item fails to meet the City approval, the same must be replaced, corrected or otherwise made good, as the case may require, by the Contractor at his own expense.

C. Any deviations, exceptions, additions, deletions or recommendations to these Specifications must be submitted to the City in writing.

D. The work shall conform to such other addenda, revisions, and supplementary drawings relating thereto as may be furnished by the City, and to such drawings in explanation of details or minor modifications as may be furnished from time to time during construction, including such minor modifications as the City may consider necessary during the prosecution of the work. All such addenda, revisions, or supplementary drawings will be submitted to the City.

E. The written dimensions on the Drawings are presumed correct, but the Contractor shall be required to check all dimensions carefully before beginning the work. If any errors or omissions are discovered, the Engineer and the City shall be so advised in writing and shall make the proper corrections. After the completion of this project, the Contractor shall supply "As-Built" drawings as described in Subsection 01 33 23.

1.02 PERMITS AND LICENSES

A. The City will be responsible for obtaining any Monterey Bay Air Resources District (MBARD) Construction or Operating Permits. The Engineer shall obtain necessary building department permits and may require Contractor information to obtain the building permit. The Contractor shall be responsible for all other permits and licenses and complying with all applicable conditions of these permits.

1.03 AGENCY AND PRIVATE ENTITY COORDINATION AND PERMITTING

A. The work to be performed for this project will require significant planning and coordination with the City, and various regulatory agencies. The Contractor is responsible for obtaining permits, payment of fees and/or coordinating with all involved as needed to perform the construction as indicated on the project plans.

1.04 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. Permits and Licenses

2. Health & Safety Plan (HASP)

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – PAYMENT (NOT USED)

END OF SUBSECTION 01 35 00

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 43 00
QUALITY CONTROL / QUALITY ASSURANCE

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. The City will either supply or employ and pay for the services of an Engineer to perform construction monitoring/quality assurance services to assure the City that the work is completed according to the Specifications and Construction Drawings.

B. The Contractor shall cooperate with the Engineer to facilitate the execution of required services.

C. Employment of the Engineer shall in no way relieve the Contractor's obligations to perform the work and supply materials in accordance with the Contract Documents.

D. The Contractor shall provide all construction quality control (CQC) services required by the Specifications and Drawings for concrete testing, or any other testing related to product certification and/or installation certification required by the City or the manufacturer.

E. The Contractor shall inform the City of apparent errors, omissions, irregularities, and deficiencies, and request instructions in writing before proceeding with the work. The City may, by appropriate written instructions, correct errors and omissions, which shall be as binding upon the Contractor as though contained in the original Contract Documents.

F. The Contractor shall provide for independent inspection and testing services in accordance with the provisions of the California Building Code (CBC) and California Electric Code (CEC). Testing of concrete or other required items will be conducted by a certified independent testing laboratory, selected by the Owner or Engineer, and approved by the Engineer. Additionally, the Contractor shall schedule and pay for all "Special Inspections" as referenced in the Contract Documents, and as required by the City. All test results, Special Inspector's Reports, and final certification letters shall be submitted to the Engineer.

1.02 INSPECTION

A. Materials, equipment, and workmanship shall be subject to the inspection of, and rejection by, the City, if not in conformance with the Contract Documents. Defective materials, equipment, or work shall be replaced with new and acceptable materials, equipment, or work.

B. On all questions concerning the acceptability of materials or equipment, classification of materials or equipment, execution of the work, and the determination of costs, the decision of the City shall be final and binding upon all parties.

1.03 SAMPLES AND TESTS

A. At the option of the City, the source for supply materials for the work shall be subject to inspection before the delivery is started, or before or during the time such materials are used in the work. Representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer of materials to be used in the work in sufficient quantities or amounts for testing or examination.

B. Any tests of materials furnished by the Contractor shall be made in accordance with the commonly recognized standards of national technical organizations, and such special methods and tests are prescribed in the Contract Documents.

1.04 SAMPLING

A. The Contractor shall furnish such samples of materials as are requested by the City without charge. No material shall be used until the Engineer has had the opportunity to test or examine such materials. Samples will be secured and tested whenever necessary to determine the quality of the materials. Samples and test specimens prepared at the job site, such as concrete test cylinders, will be taken or prepared by the City in the presence and with the assistance of the Contractor.

1.05 TESTING

A. Except for tests otherwise specified, all routine tests of materials shall be at the expense of the Contractor and shall be performed in a laboratory designated by the City.

1.06 TEST STANDARDS

A. All sampling, specimen preparation, and testing of materials shall be in accordance with the standards of nationally recognized technical organizations.

B. The physical characteristics of all materials not particularly specified shall conform to the latest standards published by the American Society for Testing Materials, where applicable.

1.07 EQUIPMENT TESTS

A. All items of mechanical equipment shall be tested for proper operation, efficiency, and capacity.

1.08 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. Copies of the test results for any geological, concrete or other tests required.

PART 2 – PRODUCTS

(As defined under Part 1.)

PART 3 – EXECUTION

3.01 CONTRACTOR'S RESPONSIBILITIES

The Contractor shall:

A. Cooperate with the City, the Engineer and their personnel and provide access to work and to supplier's operations.

B. Secure and deliver to the Engineer adequate quantities of representative samples of materials proposed to be used which require testing.

C. Furnish copies of supplier's test report as required.

D. Furnish incidental labor and facilities:

1. To provide access to work to be tested.

2. To obtain and handle samples at the project site or at the source of the product to be tested.

3. To facilitate inspections and testing.

4. For storage and curing of test samples.

E. Coordinate activities to accommodate services with a minimum delay. Notify the Engineer 48 hours in advance of operations to allow for assignment of personnel and scheduling of tests. When tests or inspections cannot be performed after such notice, reimbursing the City for personnel and travel expenses incurred due to the Contractor's negligence will be required.

F. Employ and pay for the services of a separate qualified independent testing laboratory to perform additional inspections, sampling and testing required:

1. For the Contractor's convenience.

2. As required by these Specifications.

3. When retests must be performed due to non-compliance with Contract Documents.

G. Promptly submit a written report of each test to the Engineer. Each report shall include:

1. Date issued.

2. Project title and number.

3. Testing laboratory name, address and telephone number.

4. Name and signature of laboratory inspector.

5. Date and time of sampling or inspection.

6. Record of temperature and weather conditions.

7. Date of test.

8. Identification of product and specifications section.

9. Location of sample or test in the project.

10. Type of inspection or test.

11. Results of test and compliance with contract documents.

12. Interpretation of test results, when requested by the City.

H. Be responsible for re-testing where results of inspections and tests prove unsatisfactory and indicate noncompliance with requirements.

I. Unless otherwise specified, the Contractor shall protect construction exposed for testing and shall repair construction damaged by sampling, testing, or inspection.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 01 43 00

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 45 23
PRESSURE TESTING OF PIPE

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. Leak testing shall be conducted by the Contractor on the following lines:

1. All new LFG piping and processing equipment.

2. All new condensate conveyance piping and equipment.

3. All new compressed air supply lines.

B. The procedure and equipment to be used shall be approved by the Engineer prior to testing any line. Leakage tests shall be performed on all piping after installation and before backfilling where pipe is buried or encased.

PART 2 – PRODUCTS

2.01 GENERAL

A. The Contractor shall provide temporary sectionalizing devices and vents as required for testing. Vents are to be left plugged if not required for the permanent installation.

PART 3 – EXECUTION

3.01 TESTING PROCEDURE

A. The specified test pressures shall be as measured at the horizontal centerline of the lowest point of the piping under test.

B. Each pipeline shall be adequately braced and supported before tests are made. Partial backfilling between joints of pipelines in trenches is permissible to prevent movement under test pressure, subject to approval by the Engineer.

C. Pipelines that have no valves may be closed with blind flanges or caps on the ends of the section to be tested. Discrete sections of the system can be pressure tested separately in order to isolate leaks; however the final pressure test may be performed on large sections of the system.

D. Tests shall be made before the piping has been enclosed in any manner that will prevent inspection during the test.

E. Leakage testing for all positive pressure piping shall be performed by pressurizing piping to 10 pounds per square inch gauge (psig) and applying a soap and water solution (leak detection fluid) to all joints and the joints inspected for leakage by the formation of bubbles at the point of leakage. Any leaks detected must be repaired even if the test meets the set requirements. All of these lines, either individually or in common, are to be pressurized to 10 psig during which time there shall be no greater than a 10 percent drop in pressure, unless otherwise specified herin. All joints and connections shall be visually inspected for leaks after applying the leakage detecting fluid.

F. The test pressure for compressed air lines and condensate conveyance lines shall be 4 psig held for 30 minutes and then 100 psig for 30 minutes, during which time there shall be no greater than 10 percent drop in pressure, unless otherwise specified herein.

G. The Contractor, at his own expense, shall make necessary repairs or replacements in accordance with the Specifications. Repairing and testing shall be repeated until the pipeline installation conforms to the specified requirements and is acceptable to the Engineer.

H. After the test has been concluded, the pipeline shall be restored to a condition satisfactory to the Engineer.

I. Pumps, air compressors, instrumentation and similar equipment shall not be subjected to the pressure tests.

J. It is intended that piping, whether tested after installation or not, shall be air-tight and free from visible leaks. Each leak which is discovered within one year after final acceptance of the work by the City shall be repaired by and at the expense of the Contractor.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 01 45 23

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 47 23
FINAL CLEANING

PART 1 – GENERAL

1.01 FINAL CLEANING

The Contractor shall:

A. Employ experienced workmen or professional cleaners for final cleaning.

B. Expedite the cleaning, washing, waxing, and polishing. In addition, the Contractor shall perform final cleaning to remove all foreign matter, spots, soil, and construction dust, so as to get the project in a complete and finished condition ready for acceptance and the use intended. Remove all marks, dust, dirt, grease, labels, stains, fingerprints, and other soil or dirt from all painted, enameled, or varnished work and all other exposed finished surfaces.

C. Remove all glazing compound, sealant, stains, and paint from all glass. Wash and polish glass, using care not to scratch glass. At completion, replace all broken and scratched glass.

D. Broom clean slabs that are not scheduled to receive finishing material or coatings, paved surfaces, and rake clean other surfaces on grounds. Polish bright surfaces to a shine finish.

E. Repair, patch, and touch-up marred surfaces to the specified finish to match adjacent surfaces.

F. Keep project clean at all times.

G. Clean interiors of all header and lateral piping including sumps prior to placing into operation.

1.02 LIABILITY

A. The Contractor shall be held liable at no cost to the City for replacement costs of any plant material damaged or destroyed by contact with waste products such as, but not limited to, cleaning compounds, sealers, and chemicals, debris within constructed components or by the disposal of waste products into plant areas during construction.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 01 47 23

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 REQUIREMENTS

A. The Contractor shall comply with requirements of the NPDES as shown in subsection 1.06 and MBARD regulations. The Contractor shall furnish, install and maintain required construction aids and barriers as required to prevent public entry, and to protect the work, existing facilities, trees and plants from construction operations and other temporary facilities required to complete the work.

B. The Contractor shall provide and maintain methods, equipment and temporary construction, as necessary, to provide controls over environmental conditions at the construction site and related areas under Contractor's control.

C. The Contractor shall remove all temporary facilities at completion of work or when no longer necessary.

D. The Contractor shall not interfere with the normal operations of the City of Santa Cruz Resource Recovery Facility.

1.02 DUST CONTROL

A. The Contractor shall be prepared to spend as much time as may be required to keep dust under control. The air contaminant emission at the work area shall not exceed 20 percent opacity during the contract period. Local regulatory requirements may be more stringent than the maximum allowable stated above. The Contractor is responsible for identifying and obtaining necessary permits and complying with all applicable regulatory requirements. If the Contractor fails to provide the necessary dust control, to the City's satisfaction, the project will be shut down, at the Contractor's expense, until the Contractor presents satisfactory evidence to the City that they can continue work and prevent dust as required.

B. The Contractor shall provide continuous positive methods and apply dust control water to prevent raising dust from construction operation and provide positive means to prevent airborne dust from dispersing into the atmosphere. Chemical dust suppressant shall not be used. Dust suppressants shall be approved by the Engineer prior to use.

C. The Contractor shall spray with water all unpaved working areas prior to starting the work and subsequent spraying shall occur as needed during high winds or when fugitive dust is observed during the day to provide adequate dust control (mitigation measure).

1.03 WATER SERVICES

A. The Contractor shall have access to the onsite water supply at no cost during construction.

1.04 WATER CONTROL

A. The Contractor shall provide methods to control surface water to prevent damage to the Project, the site, or adjoining properties. The Contractor shall control fill, grading and ditching to direct surface drainage away from excavations, pits, tunnels and other construction areas; and to direct drainage to proper runoff.

B. The Contractor shall provide, operate, and maintain equipment of adequate capacity to control surface erosion.

C. The Contractor shall dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas.

1.05 DEBRIS CONTROL

A. All areas under Contractor's control shall be maintained free of extraneous debris.

B. The Contractor shall initiate and maintain a specific program to prevent accumulation of debris at construction site, storage and parking areas, or along access roads and haul routes.

1. The Contractor shall prohibit overloading of trucks to prevent spillage on access and haul routes. Traffic areas shall be periodically inspected to enforce requirements. All loads must be covered leaving the disposal site.

C. Waste and debris generated on site as part of construction activity may be disposed of at the City of Santa Cruz Resource Recovery Facility at no charge to the contractor. Waste and debris from sources other than on-site will be charged at gate rates.

D. Additional collections and disposal of debris shall be provided whenever the periodic schedule is inadequate to prevent accumulation.

1.06 POLLUTION CONTROL

A. The Contractor shall provide methods, means and facilities required to prevent contamination of soil, water, or atmosphere by the discharge of noxious substances from construction operations. If such contamination shall occur, the Contractor shall immediately notify the Engineer and the City.

B. The Contractor shall provide equipment and personnel to perform emergency measures required to contain any spillage and to remove contaminated soils or liquids; and shall excavate and dispose of any soil contaminated by the construction operations, and replace with suitable compacted fill, topsoil and vegetation as directed by the City.

C. The Contractor shall take special measures to prevent harmful substances from entering public waters; and shall prevent disposal of wastes, effluents, chemicals, sediments, or other such substances adjacent to streams, or in sanitary or storm sewers.

D. The Contractor shall provide systems to control atmospheric pollutants and shall:

1. Prevent toxic concentrations of chemicals.

2. Prevent harmful dispersal of pollutants into the atmosphere.

E. The Contractor shall provide adequate secondary containment structures for any above ground petroleum storage tank and/or drums.

The Contractor is responsible for installing Stormwater Management BMP's, and for providing BMP's inspections and repair before, during and after a storm event as required by the Local Enforcement Agency (LEA).

Contractor shall not be entitled to any time extensions or compensation for any cost due to any action required as a result of Contractor's compliance or failure to comply with site storm water pollution policies as within Contractor's control. Contractor will be responsible for ensuring that Contractor's subcontractor(s) comply with the provisions of this Section. Contractor shall be liable for any action or fine imposed by the regulatory agencies for any incidents of non-compliance.

The Contractor shall at all times exercise reasonable precaution to protect channels, storm drains and bodies of water from pollution, including siltation arising from Contractor's operations, or erosion siltation from completed areas. Pollution control work shall consist of implementing Best Management Practices or constructing facilities in accordance with local, state, or federal regulations which may be required to provide for control of pollutants.

1.07 EROSION CONTROL

A. The Contractor shall plan and execute construction and earthwork using methods to control surface drainage from cuts and fills and from borrow and waste disposal areas in order to prevent erosion and sedimentation; and shall:

1. Hold the number and size of areas of bare soil exposed at one time to a minimum, and

2. Provide temporary control measures such as berms, dikes, silt fence, silt dams, drains, etc., as shown on the Construction Drawings and as directed by the Engineer.

B. The Contractor shall construct fills and waste areas by selective placement to eliminate surface soils that are susceptible to erosion.

C. The Contractor shall periodically inspect earthwork to detect any evidence of the start of erosion, and apply corrective measures as required to control erosion.

D. During trenching activities, Best Management Practices shall be used to prevent erosion of soils temporarily stockpiled from excavated trenches. Practices such as silt fences and not working during rain events or windy days may be used to reduce soil erosion during installation of the gas collection piping (mitigation measure).

PART 2 – PRODUCTS

2.01 MATERIALS, GENERAL

A. Materials shall be new and suitable for the intended purpose but must not violate requirements of applicable codes and standards.

2.02 CONSTRUCTION AIDS

A. The Contractor shall provide all construction aids, equipment and materials required to facilitate execution of the work, including but not limited to: scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes and other such facilities and equipment.

PART 3 – EXECUTION

3.01 PREPARATION

A. The Contractor shall consult with Engineer and review site conditions and factors which affect construction procedures and construction aids, including adjacent properties and public facilities which may be affected by execution of the Work.

3.02 GENERAL

A. Installation of facilities shall be of a neat and reasonably uniform appearance, structurally adequate for required purposes.

B. The Contractor shall maintain barriers during entire construction period.

C. The Contractor shall relocate barriers as required by progress of construction.

3.03 TREE AND PLANT PROTECTION

A. The Contractor shall preserve and protect existing trees and plants at the site and those adjacent to the site, except those designated for removal.

B. The Contractor shall consult with the City and remove agreed-upon roots and branches which interfere with construction. The Contractor shall employ a qualified tree surgeon to remove roots and branches, and to treat cuts.

C. The Contractor shall provide temporary barriers to a height of six feet around each tree or plant or around each group of trees or plants in the area of the work.

D. The Contractor shall protect root zones of trees and plants and shall perform the following in areas of protected trees and plants:

1. Not allow vehicular traffic or parking.

2. Not store materials or products.

3. Prevent dumping of refuse or chemically injurious materials or liquids.

4. Prevent water ponding or continuous running water.

E. The Contractor shall carefully supervise excavating, grading and filling, and subsequent construction operations to prevent damage to existing vegetation, utilities, irrigation system, or monitoring devices.

F. The Contractor shall replace, or suitably repair, trees, plants and irrigation system which have been damaged or destroyed due to construction operations at Contractor's cost.

3.04 REMOVAL

A. The Contractor shall completely remove temporary barriers, materials, equipment, and services:

1. When construction needs can be met by use of permanent construction; or

2. At completion of Project.

B. The Contractor shall clean and repair damage caused by installation or by use of temporary facilities including:

1. Removal of foundations and underground installations for construction aids,

2. Grading areas of site affected by temporary installations to required elevations and slopes, and

3. Cleaning of the area.

C. The Contractor shall restore existing facilities used for temporary purposes to specified or original condition.

D. The Contractor shall restore permanent facilities, if any, used for temporary purposes to specified conditions.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 01 50 00

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 66 00
PRODUCT STORAGE AND PROTECTION

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall transport, deliver, handle, and store materials and equipment at the job site in such manner as to prevent damage, including damage which might result from the intrusion of foreign matter or moisture. All existing site items which continue to be used such as probes, equipment, piping, utility boxes, valve boxes, etc. in the immediate area of construction, must be protected and are the responsibility of the Contractor. The Contractor shall comply with the following:

1. Manufacturer instructions for material and equipment regarding temperature limitations.

2. Other environmental conditions which are required to maintain the original quality of the materials and equipment.

3. Material handling instructions designed to prevent damage to products and finishes.

B. Packaging:

1. The Contractor shall maintain packaged materials in manufacturers' original containers with labels intact until they are incorporated into the work.

2. Packaged material shall bear the name of the manufacturer and the product, including brand name, color, stock number, and all other complete identifying information.

C. The Contractor shall remove all damaged or otherwise unsuitable materials and equipment promptly from the job site.

D. Storing, the Contractor shall:

1. Locate storage piles, stacks, or bins so as to avoid being disturbed. Provide barricades as required to protect storage from damage.

2. Store all materials and equipment in accordance with manufacturer instructions, above grade, and properly protected from weather and construction activities. Provide space heaters to prevent condensation as necessary.

E. Protection, the Contractor shall:

1. Protect all finished surfaces.

2. Ensure that all finished surfaces are clean, unmarred, and suitably protected until accepted by the City.

3. Consult individual Specification sections for additional specific product handling and protection requirements such as painting or other.

F. Existing equipment protection:

1. Prior to beginning any site work, locate all monitoring wells, flare station, piezometers, utility boxes, valve boxes, or other utilities.

2. Install markers identifying the location of these devices.

3. The purpose of the work is to protect these items during construction.

4. Any items damaged during construction by the Contractor will be replaced by the Contractor at no cost to the City.

G. Monitoring device protection:

1. Prior to beginning any site work, locate all monitoring wells, piezometers, utility boxes, valve boxes or other utilities.

2. Install markers identifying the location of these devices.

3. The purpose of the work is to protect these items during construction.

4. Any items damaged during construction by the Contractor will be replaced by the Contractor at no cost to the Owner.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 01 66 00

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 71 23
FIELD ENGINEERING

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The Contractor shall provide field layout (lines and grades) of work and maintain and preserve all stakes and other markers as required to complete the Work and as requested by the City and the Engineer.

B. The Contractor shall provide As-Built Drawings for all items specified in Subsection 01 33 23.

1.02 QUALIFICATIONS OF SURVEYOR

A. Field layout shall be performed by or under the supervision of a land surveyor registered in California, acceptable to the City.

1.03 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. Surveyor Qualifications
2. As-Built Drawings
3. Record Drawings

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 SURVEY REFERENCE POINTS

A. Existing horizontal and vertical control points for the Project are shown on the Construction Drawings.

B. The Contractor shall locate and protect control points prior to starting site work and preserve all permanent reference points during construction.

C. The Contractor shall not make changes or relocations to control points without prior written approval from the City.

D. The Contractor shall report to the Engineer when any control point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

E. The Contractor shall replace Project control points which may be lost or destroyed by the Contractor at no additional cost to the City. Replacements shall be re-established based on original survey control.

F. Contractor shall establish and maintain a minimum of two permanent benchmarks at locations approved by the Engineer. Horizontal and vertical locations of the benchmarks shall be recorded on the As-Built Drawings.

3.02 PROJECT SURVEY REQUIREMENTS

A. Establishment of lines and levels, located and lay-out, by instrumentation and similar appropriate means for all work indicated by the Drawings or Specifications.

B. As construction proceeds, check every element for line, level, and plumb.

C. Locations of existing culverts and other utilities shown on the Drawings are approximate and shall be field-verified by the Contractor prior to construction as required to complete the work. As-builts of discovered utilities shall be submitted to the Engineer.

D. The Contractor shall maintain a complete, accurate log of all control and survey work as it progresses.

E. At request of the Engineer, the Surveyor shall submit documentation to verify accuracy of field engineering work.

F. Plan As-Built Drawings shall be at a scale used in the project Drawings, unless otherwise approved by the Engineer.

G. Record Drawings shall be certified by the Surveyor and shall show dimensions, locations, angles and elevations of construction and site work.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 01 71 23

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 75 00
STARTUP AND TESTING

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall provide startup and testing after the equipment has been installed.

1.02 EQUIPMENT STARTUP

A. The Contractor shall provide the services of an experienced factory-trained service engineer, throughout the duration of startup, until completion of startup. After the equipment has been installed, factory-trained service personnel shall perform final adjustments and inspection, lubricate, check oil levels, and ensure that the equipment is in proper condition for operation.

B. All parts shall operate satisfactorily in all respects, under continuous maximum achievable load and in accordance with the specified requirements for the full duration of the test period. If any part of a unit shows evidence of unsatisfactory or improper operation during the test period, correction or repairs shall be made by the Contractor at the Contractor's expense, and the test, as specified above, shall be performed again until all parts operate satisfactory.

1.03 FINAL TEST OPERATION

A. After the equipment is installed, and start-up services are performed, and ready to be placed into full-time operation, the Contractor will test all equipment under actual or simulated operating conditions. All defects of material or workmanship which appear during this test period shall be corrected by the Contractor. After such corrections are made, the test may be run again before substantial completion, as determined by the City, if deemed advisable by the Engineer.

B. The Contractor shall supply all power, water, oil, grease, auxiliaries, and operating personnel required for this final test operation.

1.04 PRESSURE TESTING OF PIPE

A. All piping shall be tested in accordance with Subsection 01 45 23 Pressure Testing of Pipe.

1.05 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. Manufacturers' Certifications

2. Pipe Pressure Test Results

PART 2 – PRODUCTS

(As defined under Part 1)

PART 3 – EXECUTION

(As defined under Part 1)

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment for startup services shall be included in the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 01 75 00

SECTION 01 00 00 – GENERAL REQUIREMENTS

SUBSECTION 01 92 13
FACILITY OPERATIONS AND MAINTENANCE PROCEDURES

PART 1 – GENERAL

1.01 QUALITY CONTROL

A. In preparation of data required by this Subsection, the Contractor shall use only personnel who are trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Subsection, and skilled in technical writing to the degree needed for communicating the essential data.

1.02 SUBMITTALS

A. Preliminary: Prior to completion of the project, the Contractor shall submit two (2) copies of a the manufacturer provided Operations and Maintenance Manual or Manuals to the Engineer for review and comments.

B. Final: Unless otherwise directed in other pertinent sections or in writing by the Engineer, the Contractor shall submit two (2) paper copies and one (1) electronic copy in PDF of the final Operations and Maintenance Manual to the Engineer 14 days prior to indoctrination of the City's Operation and Maintenance personnel.

C. Revisions: Following the indoctrination and instruction of operation and maintenance personnel, the Contractor shall review all proposed revisions of Operations and Maintenance Manuals with the Engineer.

1.03 MANUALS

A. Format: Size: 8½-inch x 11-inch. Heavy-duty plastic or cardboard three-ring binder.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made.

Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 01 92 13

SECTION 03 00 00 - CONCRETE

SUBSECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Form-facing material for cast-in-place concrete.
2. Form liners.
3. Insulating concrete forms.
4. Shoring, bracing, and anchoring.
5. Masonry block retaining wall system.

1.3 DEFINITIONS

A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.

B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
1. Review the following:
a. Special inspection and testing and inspecting agency procedures for field quality control.
b. Construction, movement, contraction, and isolation joints
c. Forms and form-removal limitations.
d. Shoring and reshoring procedures.
e. Anchor rod and anchorage device installation tolerances.

1.5 ACTION SUBMITTALS

A. Product Data: For each of the following:
1. Exposed surface form-facing material.
2. Concealed surface form-facing material.

3. Forms for cylindrical columns.
4. Pan-type forms.
5. Void forms.
6. Form liners.
7. Insulating concrete forms.
8. Form ties.
9. Waterstops.
10. Form-release agent.

B. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.

1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301 (ACI 301M).
3. Location of construction joints is subject to approval of the Engineer.
4. Indicate location of waterstops.
5. Indicate form liner layout and form line termination details.
6. Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.
7. Indicate layout of insulating concrete forms, dimensions, course heights, form types, and details.

C. Samples:

1. For waterstops.
2. For Form Liners: 12-inch by 12-inch (305-mm by 305-mm) sample, indicating texture.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing and inspection agency.

B. Research Reports: For insulating concrete forms indicating compliance with International Code Council Acceptance Criteria AC353.

C. Field quality-control reports.

D. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

A. Testing and Inspection Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

B. Mockups: Formed surfaces to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship.

1. Build panel approximately 100 sq. ft. (9.3 sq. m) in the location indicated or, if not indicated, as directed by the Engineer.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Form Liners: Store form liners under cover to protect from sunlight.

B. Insulating Concrete Forms: Store forms off ground and under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

C. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

B. Design, engineer, erect, shore, brace, and maintain insulating concrete forms in accordance with ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design cross ties to transfer the effects of the following loads to the cast-in-place concrete core:
    a. Wind Loads: As indicated on Drawings.
        1) Horizontal Deflection Limit: Not more than 1/240 of the wall height.

2.2 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.
3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 03 30 00 "Cast-In-Place Concrete", and as follows:
    a. Plywood, metal, or other approved panel materials.
    b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
        1) APA HDO (high-density overlay).

2) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
3) APA Structural 1 Plyform, B-B or better; mill oiled and edge sealed.
4) APA Plyform Class I, B-B or better; mill oiled and edge sealed.

B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.

1. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces without spiral or vertical seams not exceeding specified formwork surface class.

1. Provide forms with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation, with straight end forms.

2.3 WATERSTOPS

A. Flexible PVC Waterstops: U.S. Army Corps of Engineers CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints, with factory fabricate corners, intersections, and directional changes.

1. Profile: Flat dumbbell with center bulb
2. Dimensions: 6 inches by 3/8 inch thick (150 mm by 10 mm thick)

2.4 RELATED MATERIALS

A. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

E. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
2. Form release agent for form liners shall be acceptable to form liner manufacturer.

F. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive damp-proofing or waterproofing.

2.5 MASONRY BLOCK RETAINING WALL SYSTEM

A. Masonry Block Material for the retaining wall system shall conform to Section 202 of the SSPWC.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301 (ACI 301M).

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M) and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.

C. Limit concrete surface irregularities as follows:
1. Surface Finish-3.0: ACI 117 Class A, 1/8 inch (3.0 mm).

D. Construct forms tight enough to prevent loss of concrete mortar.
1. Minimize joints.
2. Exposed Concrete: Symmetrically align joints in forms.

E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
3. Install keyways, reglets, recesses, and other accessories, for easy removal.

F. Do not use rust-stained, steel, form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
1. Provide and secure units to support screed strips
2. Use strike-off templates or compacting-type screeds.

H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
2. Locate temporary openings in forms at inconspicuous locations.

I. Chamfer exterior corners and edges of permanently exposed concrete.

J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches (305 mm).

K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Engineer prior to forming openings not indicated on Drawings.

L. Construction and Movement Joints:

1. Construct joints true to line with faces perpendicular to surface plane of concrete.
2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.
3. Place joints perpendicular to main reinforcement.
4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.

    a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
6. Space vertical joints in walls as indicated on Drawings

    a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.

1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
4. Install dovetail anchor slots in concrete structures, as indicated on Drawings.
5. Clean embedded items immediately prior to concrete placement.

3.3 INSTALLATION OF WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm.

1. Install in longest lengths practicable.
2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
3. Allow clearance between waterstop and reinforcing steel of not less than 2 times the largest concrete aggregate size specified in Section 033000 "Cast-In-Place Concrete."
4. Secure waterstops in correct position at 12 inches (305 mm) on center.
5. Field fabricate joints in accordance with manufacturer's instructions using heat welding.

    a. Miter corners, intersections, and directional changes in waterstops.
    b. Align center bulbs.
6. Clean waterstops immediately prior to placement of concrete.
7. Support and protect exposed waterstops during progress of the Work.

3.4 INSTALLATION OF INSULATING CONCRETE FORMS

A. Comply with ACI 301 (ACI 301M) and manufacturer's instructions.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).

C. Install forms in running bond pattern.

1. Align joints.
2. Align furring strips.

D. Construct forms tight to prevent loss of concrete mortar.

E. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.

1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Engineer prior to forming openings not indicated on Drawings.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.

1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.

2. Close temporary ports and openings with tight fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

G. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

H. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

I. Shore insulating concrete forms to ensure stability and to resist stressing imposed by construction loads.

3.5 REMOVING AND REUSING FORMS

A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 72 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work.

1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
2. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.

1. Align and secure joints to avoid offsets.
2. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.6 SHORING AND RESHORING INSTALLATION

A. Comply with ACI 318 (ACI 318M) and ACI 301 (ACI 301M) for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.7 MASONRY BLOCK RETAINING WALL SYSTEM INSTALLATION

A. Masonry walls shall be constructed as indicated on the Drawings and in accordance with the requirements of SSPWC Section 303-4 “Masonry Construction” and SPPWC, 2012 Edition, Standard Plan 618-3 Type B “Masonry Retaining Wall”.

3.8 FIELD QUALITY CONTROL

A. Special Inspections: Owner or Engineer will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
2. Inspect insulating concrete forms for shape, location, and dimensions of the concrete member being formed.

END OF SUBSECTION 03 10 00

SECTION 03 00 00 - CONCRETE

SUBSECTION 03 20 00
CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Steel reinforcement bars.
   2. Welded-wire reinforcement.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review the following:
      a. Special inspection and testing and inspecting agency procedures for field quality control.
      b. Construction contraction and isolation joints.
      c. Steel-reinforcement installation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:
   1. Each type of steel reinforcement.
   2. Epoxy repair coating.
   3. Zinc repair material.
   4. Bar supports.
   5. Mechanical splice couplers.

B. Shop Drawings: Comply with ACI SP-066:
   1. Include placing drawings that detail fabrication, bending, and placement.
   2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
   1. Location of construction joints is subject to approval of Engineer.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For delegated design engineer and testing and inspection agency.

B. Delegated Design Engineer Qualifications: Include the following:
   1. Experience providing delegated design engineering services of the type indicated.
   2. Documentation that delegated design engineer is licensed in the state in which Project is located.

C. Welding certificates.
   1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.

D. Material Certificates: For each of the following, signed by manufacturers:
   1. Epoxy-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."
   2. Dual-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."

E. Material Test Reports: For the following, from a qualified testing agency:
   1. Steel Reinforcement:
      a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.

F. Field quality-control reports.

G. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

C. Mockups: Reinforcing for cast-concrete formed surfaces, to demonstrate tolerances and standard of workmanship.
   1. Build panel approximately 100 sq. ft. (9.3 sq. m) for formed surface in the location indicated on Drawings or, if not indicated, as directed by Engineer.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
   1. Store reinforcement to avoid contact with earth.
   2. Do not allow epoxy-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
   3. Do not allow dual-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
   4. Do not allow stainless steel reinforcement to come into contact with uncoated reinforcement.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, Grade 60 (Grade 420), deformed.

B. Low-Alloy Steel Reinforcing Bars: ASTM A706/A706M, deformed.

C. Headed-Steel Reinforcing Bars: ASTM A970/A970M.

D. Galvanized Reinforcing Bars:
   1. Steel Bars: ASTM A615/A615M, Grade 60 (Grade 420), deformed bars.
   2. Zinc Coating: ASTM A767/A767M, Class I zinc coated after fabrication and bending.

E. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

2.2 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A615/A615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A615/A615M, Grade 60 (Grade 420), plain-steel bars, ASTM A775/A775M epoxy coated.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
   1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
      a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

b. For epoxy-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
c. For dual-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
d. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
e. For stainless steel reinforcement, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

D. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch (1.2908 mm) in diameter.
1. Finish: Plain

E. Stainless Steel Tie Wire: ASTM A1022/A1022M, not less than 0.0508 inch (1.2908 mm) in diameter.

F. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A775/A775M.

G. Zinc Repair Material: ASTM A780/A780M.

2.3 FABRICATING REINFORCEMENT

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

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:
1. Do not cut or puncture vapor retarder.
2. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch (25 mm), not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318 (ACI 318M).

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Lap splices as indicated on Drawings.
1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches (610 mm), whichever is greater.
2. Stagger splices in accordance with ACI 318 (ACI 318M).
3. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.

G. Install welded-wire reinforcement in longest practicable lengths.
1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
   a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches (305 mm).
2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches (50 mm) for plain wire and 8 inches (200 mm) for deformed wire.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

3.3 JOINTS

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by the Engineer.
1. Place joints perpendicular to main reinforcement.
2. Continue reinforcement across construction joints unless otherwise indicated.
3. Do not continue reinforcement through sides of strip placements of floors and slabs.

B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117 (ACI 117M).

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:
   1. Steel-reinforcement placement.
   2. Steel-reinforcement mechanical splice couplers.
   3. Steel-reinforcement welding.

END OF SUBSECTION 03 20 00

SECTION 03 00 00 - CONCRETE

SUBSECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:
   1. Section 03 10 00 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
   2. Section 03 20 00 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.

1.2 DEFINITIONS

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

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor's superintendent.
      b. Independent testing agency responsible for concrete design mixtures.
      c. Ready-mix concrete manufacturer.
      d. Concrete Subcontractor.
      e. Special concrete finish Subcontractor.
   2. Review the following:
      a. Special inspection and testing and inspecting agency procedures for field quality control.
      b. Construction joints, control joints, isolation joints, and joint-filler strips.
      c. Semirigid joint fillers.
      d. Vapor-retarder installation.
      e. Anchor rod and anchorage device installation tolerances.

f. Cold and hot weather concreting procedures.
g. Concrete finishes and finishing.
h. Curing procedures.
i. Forms and form-removal limitations.
j. Shoring and reshoring procedures.
k. Methods for achieving specified floor and slab flatness and levelness.
l. Floor and slab flatness and levelness measurements.
m. Concrete repair procedures.
n. Concrete protection.
o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
p. Protection of field cured field test cylinders.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.
1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Silica fume.
6. Performance-based hydraulic cement
7. Aggregates.
8. Admixtures:
a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
9. Color pigments.
10. Fiber reinforcement.
11. Vapor retarders.
12. Floor and slab treatments.
13. Liquid floor treatments.
14. Curing materials.
a. Include documentation from color pigment manufacturer, indicating that proposed methods of curing are recommended by color pigment manufacturer.
15. Joint fillers.
16. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:
1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.

5. Calculated equilibrium unit weight, for lightweight concrete.
6. Slump limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
10. Intended placement method.
11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:
1. Construction and Contraction Joint Layout: Indicate proposed construction and contraction joints required to construct the structure.
a. Location of construction and contraction joints is subject to approval of the Engineer.
2. Rebar layout, details, and mill test reports.

D. Samples: For manufacturer's standard colors for color pigment

E. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:
1. Concrete Class designation.
2. Location within Project.
3. Exposure Class designation.
4. Formed Surface Finish designation and final finish.
5. Final finish for floors.
6. Curing process.
7. Floor treatment if any.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:
1. Installer: Include copies of applicable ACI certificates.
2. Testing agency: Include copies of applicable ACI certificates.

B. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
2. Admixtures.
3. Fiber reinforcement.
4. Curing compounds.
5. Floor and slab treatments.
6. Bonding agents.
7. Adhesives.
8. Vapor retarders.
9. Semirigid joint filler.

10. Joint-filler strips.
11. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:
   1. Portland cement.
   2. Fly ash.
   3. Slag cement.
   4. Blended hydraulic cement.
   5. Silica fume.
   6. Performance-based hydraulic cement.
   7. Aggregates.
   8. Admixtures:
      a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.

D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.

E. Research Reports:
   1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
   2. For sheet vapor retarder/termite barrier, showing compliance with ICC AC380.

F. Preconstruction Test Reports: For each mix design.

G. Field quality-control reports.

H. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician.
   1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
   1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.
   1. Personnel performing laboratory tests to be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor to be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

D. Field Quality-Control Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
   1. Personnel conducting field tests to be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
   1. Include the following information in each test report:
      a. Admixture dosage rates.
      b. Slump.
      c. Air content.
      d. Seven-day compressive strength.
      e. 28-day compressive strength.
      f. Permeability.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301 (ACI 301M).

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 306.1 and as follows.
   1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   2. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M).
   3. Do not use frozen materials or materials containing ice or snow.

4. Do not place concrete in contact with surfaces less than 35 deg F (1.7 deg C), other than reinforcing steel.
5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M), and as follows:
1. Maintain concrete temperature at time of discharge to not exceed 95 deg F (35 deg C).
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 (ACI 301M) unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:
1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:
1. Portland Cement: ASTM C150/C150M, Type II/V.
2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
4. Blended Hydraulic Cement: ASTM C595/C595M, Type IS, portland blast-furnace slag cement.
5. Silica Fume: ASTM C1240 amorphous silica.

C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.
1. Alkali-Silica Reaction: Comply with one of the following:
a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.

b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. (2.37 kg/cu. m) for moderately reactive aggregate or 3 lb./cu. yd. (1.78 kg/cu. m) for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301 (ACI 301M).

2. Maximum Coarse-Aggregate Size: 1 inch (25 mm) nominal.
3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C260/C260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride in steel-reinforced concrete.
1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

F. Water and Water Used to Make Ice: ASTM C94/C94M, potable

2.3 CURING MATERIALS

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

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
1. Color:
a. Ambient Temperature Below 50 deg F (10 deg C): Black.
b. Ambient Temperature between 50 deg F (10 deg C) and 85 deg F (29 deg C): Any color.
c. Ambient Temperature Above 85 deg F (29 deg C): White.

D. Curing Paper: 8-feet- (2438-mm-) wide paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.

E. Water: Potable or complying with ASTM C1602/C1602M.

F. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.

2.4 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.

C. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:
   1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.5 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3 mm) and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
   2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand, as recommended by underlayment manufacturer.
   4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested in accordance with ASTM C109/C109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.
   1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
   2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested in accordance with ASTM C109/C109M.

2.6 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301 (ACI 301M).
   1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash or Other Pozzolans: 25 percent by mass.
   2. Slag Cement: 50 percent by mass.
   3. Silica Fume: 10 percent by mass.
   4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.
   5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
   1. Use high-range water-reducing admixture in concrete, as required, for placement and workability as needed.
   2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
   3. Use water-reducing admixture in pumped concrete, and concrete with a w/cm below 0.50 as needed.
   4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

D. Color Pigment: Add color pigment to concrete mixture in accordance with manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.7 CONCRETE MIXTURES

A. Class A: Normal-weight concrete used for footings, grade beams, and tie beams.
   1. Exposure Classes: ACI 318 (ACI 318M) F0, S1, W0, C1.
   2. Minimum Compressive Strength: 4000 psi (34.5 MPa) at 28 days.
   3. Maximum w/cm: 0.45.

4. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm) or 8 inches (200 mm), plus or minus 1 inch (25 mm) for concrete with verified slump of 3 inches (75 mm), plus or minus 1 inch (25 mm) before adding high-range water-reducing admixture at Project site.
5. Air Content:
    a. Exposure Class F1: 4.5 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-inch (25-mm) nominal maximum aggregate size
    b. Exposure Classes F2 and F3: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-inch (25-mm) nominal maximum aggregate size.
6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.
    1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
    2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
    3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
    1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
    2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
   1. Daily access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
   4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
   1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
   3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.4 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
   1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
   2. Face laps away from exposed direction of concrete pour.
   3. Lap vapor retarder over footings and grade beams not less than 6 inches (150 mm), sealing vapor retarder to concrete.
   4. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
   5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
   6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
   7. Protect vapor retarder during placement of reinforcement and concrete.
      a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches (150 mm) on all sides, and sealing to vapor retarder.

B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder in accordance with manufacturer's written instructions.

3.5 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
   1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by the Engineer.
   2. Place joints perpendicular to main reinforcement.
      a. Continue reinforcement across construction joints unless otherwise indicated.
      b. Do not continue reinforcement through sides of strip placements of floors and slabs.
   3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
   4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
   5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
   6. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
   7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-third of concrete thickness as follows:
   1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
   2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.

2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface, where joint sealants, specified in Section 07 92 00 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints:
1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

F. Dowel Plates: Install dowel plates at joints where indicated on Drawings.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Engineer and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by the Engineer in writing, but not to exceed the amount indicated on the concrete delivery ticket.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M), but not to exceed the amount indicated on the concrete delivery ticket.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.

3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301 (ACI 301M).
    a. Do not use vibrators to transport concrete inside forms.
    b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer.
    c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:
1. ACI 301 (ACI 301M) Surface Finish SF-3.0:
    a. Patch voids larger than 3/4 inch (19 mm) wide or 1/2 inch (13 mm) deep.
    b. Remove projections larger than 1/8 inch (3 mm).
    c. Patch tie holes.
    d. Surface Tolerance: ACI 117 (ACI 117M) Class A.
    e. Locations: Apply to concrete surfaces exposed to view or to be covered with a coating or covering material applied directly to concrete

B. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:
1. Smooth-Rubbed Finish:
    a. Perform no later than one day after form removal.
    b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.

c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.
d. Maintain required patterns or variances as shown on Drawings or to match design reference sample.

2. Grout-Cleaned Rubbed Finish:
   a. Clean concrete surfaces after contiguous surfaces are completed and accessible.
   b. Do not clean concrete surfaces as Work progresses.
   c. Mix 1 part portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
   d. Wet concrete surfaces.
   e. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.
   f. Maintain required patterns or variances as shown on Drawings or to match design reference sample.
3. Cork-Floated Finish:
   a. Mix 1 part portland cement to 1 part fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint.
   b. Mix 1 part portland cement and 1 part fine sand with sufficient water to produce a mixture of stiff grout. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
   c. Wet concrete surfaces.
   d. Compress grout into voids by grinding surface.
   e. In a swirling motion, finish surface with a cork float.
   f. Maintain required patterns or variances as shown on Drawings or to match design reference sample.
4. Scrubbed Finish: After concrete has achieved a compressive strength of from 1000 to 1500 psi (6.9 to 10.3 MPa), apply scrubbed finish.
   a. Wet concrete surfaces thoroughly and scrub with stiff fiber or wire brushes, using water freely, until top mortar surface is removed and aggregate is uniformly exposed.
   b. Rinse scrubbed surfaces with clean water.
   c. Maintain continuity of finish on each surface or area of Work.
   d. Remove only enough concrete mortar from surfaces to match design reference sample.

C. High-Pressure Water-Jet Finish: Apply the following to as-cast surface finishes where indicated on Drawings:
   1. Perform high-pressure water jetting on concrete that has achieved a minimum compressive strength of 4500 psi (31 MPa).
   2. Coordinate with formwork removal to ensure that surfaces to be high-pressure water-jet finished are treated at same age for uniform results.
   3. Surface Continuity: Perform high-pressure water-jet finishing in as continuous an operation as possible, maintaining continuity of finish on each surface or area of Work.
   4. Maintain required patterns or variances in reveal projection to match design reference sample.

D. Bushhammer Finish: Apply the following to as-cast surface finishes where indicated on Drawings:
   1. Perform bushhammer finish to concrete that has achieved a minimum compressive strength of 4500 psi (31 MPa).
   2. Surface Continuity:
      a. Perform bushhammer finishing in as continuous an operation as possible, maintaining continuity of finish on each surface or area of Work.
   3. Surface Cut:
      a. Maintain required depth of cut and general aggregate exposure.
      b. Use power tool with hammer attachments for large, flat surfaces, and use hand hammers for small areas, at corners and edges, and for restricted locations where power tools cannot reach.
   4. Remove impressions of formwork and form facings with exception of tie holes.
   5. Maintain required patterns or variances of cut as shown on Drawings or to match design reference sample.
   6. Maintain control of concrete chips, dust, and debris in each Work area, limiting migration of airborne materials and dust by use of tarpaulins, wind-breaks, or similar devices.

E. Related Unformed Surfaces:
   1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
   2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces exposed to view
7. Finish surfaces to the following tolerances, in accordance with ASTM E1155 (ASTM E1155M), for a randomly trafficked floor surface:
    a. Slabs on Ground:
        1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3 mm) and also no more than 1/16 inch (1.6 mm) in 2 feet (610 mm)].

C. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
1. Coordinate required final finish with Engineer before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Engineer before application.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:
1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 6 inches (150 mm) high unless otherwise indicated on Drawings, and extend base not less than 6 inches (150 mm) in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
3. Minimum Compressive Strength: 4000 psi (34.5 MPa) at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.
    a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
    b. Cast anchor-bolt insert into bases.
    c. Install anchor bolts to elevations required for proper attachment to supported equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.
1. Cast-in inserts and accessories, as shown on Drawings.
2. Screed, tamp, and trowel finish concrete surfaces.

3.10 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
1. Comply with ACI 301 (ACI 301M) and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M) for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h (1 kg/sq. m x h), calculated in accordance with ACI 305.1, before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:
1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:

a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
b. Continuous Sprinkling: Maintain concrete surface continuously wet.
c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
    1) Recoat areas subject to heavy rainfall within three hours after initial application.
    2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:
1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
    a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
        1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
            a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).
            b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
        2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.
            a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
            b) Cure for not less than seven days.
        3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
            a) Water.
            b) Continuous water-fog spray.
    b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
    a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).
    b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.
    a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
    b) Cure for not less than seven days.
3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
    a) Water.
    b) Continuous water-fog spray.

c. Floors to Receive Polished Finish: Contractor has option of the following:
1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
    a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).
    b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
    a) Water.
    b) Continuous water-fog spray.

d. Floors to Receive Chemical Stain:
1) As soon as concrete has sufficient set to permit application without marring concrete surface, install curing paper over entire area of floor.
2) Install curing paper square to building lines, without wrinkles, and in a single length without end joints.
3) Butt sides of curing paper tight; do not overlap sides of curing paper.
4) Leave curing paper in place for duration of curing period, but not less than 28 days.

e. Floors to Receive Urethane Flooring:

1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches (150 mm) and sealed in place.
3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.

f. Floors to Receive Curing Compound:
1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Maintain continuity of coating, and repair damage during curing period.
4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

g. Floors to Receive Curing and Sealing Compound:
1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES

A. Conform to ACI 117 (ACI 117M).

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than 28 days' old.

3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
4. Rinse with water; remove excess material until surface is dry.
5. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
1. Defer joint filling until concrete has aged at least one month(s).

B. Do not fill joints until construction traffic has permanently ceased.

C. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

D. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints.

E. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete:
1. Repair and patch defective areas when approved by Engineer.
2. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete.
a. Limit cut depth to 3/4 inch (19 mm).
b. Make edges of cuts perpendicular to concrete surface.

c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
d. Fill and compact with patching mortar before bonding agent has dried.
e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
   a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
   b. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Engineer.

D. Repairing Unformed Surfaces:
1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
   a. Correct low and high areas.
   b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
   a. Finish repaired areas to blend into adjacent concrete.
5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
   a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
   b. Feather edges to match adjacent floor elevations.
6. Correct other low areas scheduled to remain exposed with repair topping.
   a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations.
   b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
7. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete.

a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around.
b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
d. Place, compact, and finish to blend with adjacent finished concrete.
e. Cure in same manner as adjacent concrete.

8. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar.
   a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
   b. Dampen cleaned concrete surfaces and apply bonding agent.
   c. Place patching mortar before bonding agent has dried.
   d. Compact patching mortar and finish to match adjacent concrete.
   e. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.15 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
   1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
   2. Testing agency to immediately report to the Engineer, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
   3. Testing agency to report results of tests and inspections, in writing, to Owner, the Engineer, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
      a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
         1) Project name.
         2) Name of testing agency.

3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
4) Name of concrete manufacturer.
5) Date and time of inspection, sampling, and field testing.
6) Date and time of concrete placement.
7) Location in Work of concrete represented by samples.
8) Date and time sample was obtained.
9) Truck and batch ticket numbers.
10) Design compressive strength at 28 days.
11) Concrete mixture designation, proportions, and materials.
12) Field test results.
13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
14) Type of fracture and compressive break strengths at seven days and 28 days.

C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

D. Inspections:
1. Headed bolts and studs.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.
6. Batch Plant Inspections: On a random basis, as determined by the Engineer.

E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C143/C143M:
a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
b. Perform additional tests when concrete consistency appears to change.

3. Slump Flow: ASTM C1611/C1611M:
    a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
    b. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.
    a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C1064/C1064M:
    a. One test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each composite sample.
6. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
    a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C31/C31M:
    a. Cast and laboratory cure two sets of four 6-inch (150 mm) by 12-inch (300 mm) or 4-inch (100 mm) by 8-inch (200 mm) cylinder specimens for each composite sample.
    b. Cast, initial cure, and field cure two sets of four standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C39/C39M.
    a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
    b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.
    c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa) if specified compressive strength is 5000 psi (34.5 MPa), or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi (34.5 MPa).
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by the Engineer but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests:

a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer.
b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by the Engineer.
1) Acceptance criteria for concrete strength to be in accordance with ACI 301 (ACI 301M), Section 1.6.6.3.

13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 (ASTM E1155M) within 48 hours of completion of floor finishing and promptly report test results to the Engineer.

3.16 PROTECTION

A. Protect concrete surfaces as follows:
1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SUBSECTION 03 30 00

SECTION 05 00 00 - METALS

SUBSECTION 05 12 00
STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The CONTRACTOR shall furnish, fabricate, and place all structural steel and make all connections necessary to provide a complete work and in accordance with the Contract Documents.

1.2 REFERENCES

A. American Institute of Steel Construction (AISC):
   1. Specification for Structural Steel Buildings
   2. Specification for Structural Joints using High-Strength Bolts
   3. Manual of Steel Construction
   4. Seismic Provisions for Structural Steel Buildings
   5. Code of Standard Practice for Steel Buildings and Bridges
   6. AISC Quality Certification Program
   7. AISC Erector Certification Program

B. American Society of Mechanical Engineers (ASME):
   1. BPVC SEC IX Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing

C. American Society of Nondestructive Testing (ASNT):
   1. ASNT-TC-IA Personnel Qualification and Certification in Nondestructive Testing

D. American Welding Society (AWS):
   1. D1.1 Structural Welding Code-Steel
   2. QC 1 Standard for AWS Certification of Welding Inspectors

E. ASTM International (ASTM):
   1. A6 Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Steel Piling.
   2. A36 Standard Specification for Structural Steel
   3. A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
   4. A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

5. A143 Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedures for Detecting Embrittlement
6. A153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
7. A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
8. A325 Standard Specification for High-Strength Bolts for Structural Steel Joints
9. A384 Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
10. A385 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
11. A490 Standard Specification for Heat-Treated Steel Structural bolts, 150 ksi Minimum Tensile Strength.
12. A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
13. A501 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
14. A563 Standard Specification for Carbon and Alloy Steel Nuts
15. A572 Standard Specification for High-Strength Low Alloy Columbium-Vanadium Structural Steel
16. A588 Standard Specification for High-Strength Low Alloy Structural Steel with 50 ksi Minimum Yield Point to 4 in. thick
17. A673 Standard Specification for Sampling Procedure for Impact Testing of Structural Steel
18. A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
19. A992 Standard Specification for Steel for Structural Shapes for Use in Building Frames
20. B695 Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
21. F436 Standard Specification for Hardened Steel Washers
22. F959 Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners
23. F1852 Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/150 ksi Minimum Tensile Strength

1.3 SUBMITTALS

A. Action Submittals:
   1. Provide shop drawings showing erection plans, member size and their connections.
   2. Anchor bolt layouts.

3. Hardened washer details (if applicable).
4. Joint details for complete penetration welds
5. Schedules for fabrication procedures
6. Primer and other coatings for items in this Section
7. Name and address of manufacturer(s)
8. Product specifications
9. Manufacturers' testing procedures and standards
10. Preparation and installation or application instructions, as appropriate

B. Informational Submittals:
1. Mill Certificates of tests made in accordance with ASTM A6.
2. High-Strength Bolts (Plain Noncoated and Hot-Dip Galvanized):
a. Certificates of Compliance that products meet chemical and mechanical requirements of standards specified.
b. Manufacturer's inspection test report results for production lot(s) furnished, to include:
1) Tensile strength
2) Yield strength
3) Reduction of area
4) Elongation and hardness
3. Certified Mill Test Reports for Bolts and Nuts:
a. Name and address of manufacturer.
b. Bolts correctly marked.
c. Marked bolts and nuts used in required mill tests and manufacturer's inspection tests.
4. Direct Tension Indicators (DTIs): Furnish manufacturer's test report meeting requirements of ASTM F959.
5. Tension Control (TC) Bolts: Furnish manufacturer’s test report meeting requirements of ASTM A325 and ASTM F1852.
6. Methods proposed to resolve misalignment between anchor bolts and bolt holes in steel members.
7. Welding Procedures, Qualifications, and Inspection Report. Provide in accordance with AWS D1.1/D1.1M for each welded joint whether prequalified or qualified by testing, including the following:
a. Power Source (constant current or constant voltage).
b. Electrode manufacturer and trade name, for demand-critical welds
8. AISC Quality Certification: AISC certificate showing name and address of certified firm, effective date, and category of certification.

1.4 QUALITY ASSURANCE

A. Mill identification marks in accordance with ASTM A6.

B. AISC Quality Certification for Fabricator: Conventional Steel Structures (Sbd).

C. Welding Qualifications:
   1. Welding Procedure Specifications: In accordance with AWS D1.1 (Annex E) or ASME BPVC SEC IX (Forms QW-482 and QW-483).
   2. Welder/Welding Operator Performance Qualifications: In accordance with AWS D1.1 (Annex E), or ASME BPVC SEC IX (Form QW-484).
   3. Certified Welding Inspector: Certified in accordance with AWS QC1, and having prior experience with the welding codes specified.
   4. Testing Agency: Personnel performing tests shall be Nondestructive Testing Level II Certified in accordance with ASNT SNT-TC-1A.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Load structural members in such a manner that they will be transported and unloaded without damage to coatings and without being excessively stressed, deformed, or otherwise damaged.

B. Storage:
   1. Protect structural steel members and packaged materials from corrosion and deterioration.
   2. Store in dry area and not in direct contact with ground.
   3. Protect fasteners from dirt and moisture. Do not remove lubricant from bolts and nuts.
   4. Handle materials to avoid distortion or damage to members or supporting structures.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Rolled Plates, Shapes except W-Shapes, and Bars: ASTM A36, unless indicated otherwise.

B. W-Shapes: ASTM A992, unless indicated otherwise on Drawings.

C. Plate material for frame connections shall be ASTM A572, Grade 50, where indicated on Drawings.

D. Steel Pipe: ASTM A500 Round.

E. Square and Rectangular Hollow Structural Sections (HSS): ASTM A500, Grade C (Fy equals 50 ksi).

2.2 FASTENERS

A. Anchor Bolts: As specified in Section 05 50 00, METAL FABRICATIONS AND CASTINGS.

B. High-Strength Bolts: ASTM A325 or ASTM A490, bolt type 1, galvanized. Bolt length and thread length shall be as required for the connection type shown, with hardened washers as required.

C. Direct Tension Indicators (DTIs) or Load Indicator Washers:
   1. ASTM F959, coating type to match bolt finish.
   2. Type A325 or A490, to match bolt type.
   3. Manufacturers and Products:
      a. TurnaSure LLC, Langhorne, PA; DTI's.
      b. Applied Bolting Technology Products, Ludlow, VT; DTI's, regular or Squirter type.

D. Tension Control (TC) Bolts:
   1. High-strength, ASTM A325 and F1852.
   2. Manufacturers:
      a. LeJeune Bolt Company, Burnsville, MN.
      b. Nucor Fastener, Saint Joe, IN.
      c. T.S. Bolts and Tools, Bristol Machine Co., Walnut, CA.
      d. Haydon Bolts, Philadelphia, PA.
      e. Vermont Fasteners Manufacturing, Swanton, VT.

E. Machine Bolts (M.B.): ASTM A307

F. Nuts: ASTM A563, type to match bolt type and finish.

G. Hardened Steel Flat and Beveled Washers: ASTM F436, type to match bolt finish.

H. Welded Shear Studs: As specified in Section 05 50 00, METAL FABRICATIONS AND CASTINGS.

2.3 ANCILLARY MATERIALS

A. Surface Preparation and Primer:
   1. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
      a. SSPC-SP 2
      b. SSPC-SP 3
      c. SSPC-SP 7 (WAB)/NACE WAB-4
      d. SSPC-SP 14 (WAB)/NACE WAB-8
      e. SSPC-SP 11

f. SSPC-SP 6 (WAB)/NACE WAB-3
g. SSPC-SP 10 (WAB)/NACE WAB-2
h. SSPC-SP 5 (WAB)/NACE WAB-1
i. SSPC-SP 8

2. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.
3. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
   a. Stripe paint corners, crevices, bolts, welds, and sharp edges.
   b. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Grout:
1. Metallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.
2. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.4 FABRICATION

A. General:
1. Fabricate as shown and in accordance with AISC Specification for Structural Steel Buildings and AISC Code of Standard Practice for Steel Buildings and Bridges.
2. Columns shall be full length members without splices, unless shown otherwise or approved by ENGINEER.
3. Mark and match mark materials for field assembly.
4. Complete assembly, including bolting and welding of units, before start of finishing operations.
5. Fabricate to agree with field measurements.

B. Connections:
1. Shop Connections: Weld or bolt, as shown.

2. Meet requirements of AISC Manual of Steel Construction tables for bolted double-angle shear connections, unless indicated otherwise.
3. Meet OSHA requirements for one independent bolt at beams framing in to column web connections.
4. Provide oversized holes for anchor bolts in column base plates in accordance with AISC Manual of Steel Construction, unless indicated otherwise.

C. Welded Construction:
1. Conform to governing welding codes for type of weld and material for each weld.
2. Groove and Butt Joint Welds: Complete penetration, unless otherwise indicated.
3. Interface with Other Work.

D. Holes:
1. As necessary or as indicated for securing other Work to structural steel framing, and for passage of other Work through steel framing members.
2. No flame-cut holes will be permitted without prior approval of ENGINEER.
3. Weld threaded nuts to framing, and other specialty items as shown to receive other Work.

E. Shop Paint Primer:
1. Do not shop prime the following surfaces, unless indicated otherwise:
   a. Faying surfaces of slip critical bolted connections.
   b. Within 2 inches of field-welded connections.
   c. Steel members to be completely encased in reinforced concrete or coated with cementitious fireproofing.

F. Galvanizing:
1. Fabricate steel to be galvanized in accordance with ASTM A143, A384, and A385. Avoid fabrication techniques that could cause distortion or embrittlement of steel.
2. Remove welding slag, splatter, burrs, grease, oil, paint, lacquer, and other deleterious material prior to delivery for galvanizing.
3. Remove by blast cleaning or other methods surface contaminants and coatings not removable by normal chemical cleaning process in the galvanizing operation.
4. Hot-dip galvanize steel members, fabrications, and assemblies after fabrication in accordance with ASTM A123.
5. Hot-dip galvanize A325 bolts, nuts, washers, and hardware components in accordance with ASTM A153.
6. Oversize holes to allow for zinc alloy growth.
7. Shop assemble bolts, nuts, and washers with special lubricant and test in accordance with ASTM A325 and A563.

8. Tension-control (TC) bolts, nuts, and washers shall be mechanically zinc coated in accordance with ASTM F1852 and B695, Class 50.
9. Galvanize components of bolted assemblies separately before assembly.

2.5 SOURCE QUALITY CONTROL

A. Welding:
   1. Visually inspect fabrication welds in accordance with AWS D1.1, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.
   2. An independent testing agency will be retained by Owner or Engineer to perform the following inspection and testing of fabrication welds.
      a. Groove welds:
         1) Radiographic (RT) or ultrasonic (UT) testing for 10 percent of randomly selected welds, unless otherwise indicated.
         2) Use RT only for butt joint groove welds.
      b. Fillet welds larger than 5/16-inch: Liquid penetrant (PT) or magnetic particle (MT) for 10 percent of randomly selected welds, unless otherwise indicated.
      c. All Welds: 100 percent visually inspected (VT).
   3. The Certified Welding Inspector (CWI) shall perform inspection prior and during assembly, during welding, and after welding. CWI duties include:
      a. Verifying conformance of specified job material and proper storage.
      b. Monitoring conformance with approved Welding Procedure Specification.
      c. Monitoring conformance of Welder/Welding Operator Performance Qualification.
      d. Inspecting weld joint fit-up and in-process inspection.
      e. Providing 100 percent visual inspection of all welds.
      f. Supervising nondestructive testing personnel and evaluating test results.
      g. Maintaining records and preparing report confirming results of inspection and testing comply with the Work.
   4. Repair and retest rejected weld defects until sound weld metal has been deposited in accordance with appropriate welding codes.

B. Special inspection of fabrication process and shop welding will be provided by Owner or Engineer as indicated on Structural Drawing S-002.

C. Hot-Dip Galvanizing:
   1. An independent testing agency will be retained by OWNER to inspect and test hot-dip galvanized fabricated items in accordance with ASTM A123 and A153.

2. Visually inspect and test for thickness and adhesion of zinc coating for minimum of three test samples from each lot in accordance with ASTM A123 and A153.
3. Reject and retest nonconforming articles in accordance with ASTM A123 and A153.

PART 3 - EXECUTION

3.1 STEEL MEMBER ERECTION

A. Meet requirements of AISC Specification for Structural Steel Buildings and AISC Code of Standard Practice for Steel Buildings and Bridges, with exceptions as specified.

B. CONTRACTOR is responsible for design and installation of temporary bracing to support components as erection proceeds.

C. High-Strength Bolted Connections:
   1. Tighten in accordance with AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts.
   2. Hardened Washers:
      a. Provide at locations required by Washer Requirements section of AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts, to include slip critical connections using slotted or oversized holes or A490 bolts.
      b. Use beveled style and extra thickness where required by AISC Specification.
      c. Use square or rectangular beveled washers at inner flange surfaces of American Standard beams and channels.
      d. Do not substitute DTIs for hardened flat washers required at slotted and oversize holes.
   3. For bearing-type connections not fully tensioned (N, X), tighten to snug tight condition. Use hardened washer over slotted or oversize holes in outer plies.

D. Fully Tensioned Bolted Connections:
   1. Use DTIs or TC bolts at slip critical (SC) and fully tensioned (FT) bearing-type connections.
   2. DTIs:
      a. Position within bolted assembly in accordance with ASTM F959.
      b. Install bolts, with DTIs plus hardened washers as required, in all holes of an assembly and tighten until plies are in firm contact and fasteners are uniformly snug tight.
   3. Final tighten bolts, beginning at most rigid part of bolted connection and progressing toward free edges, until final twist-off of TC bolts or until DTIs

have been compressed to an average gap equal to or less than shown in Table 2, ASTM F959.

E. Welded Connections:
   1. Welding and Fabrication by Welding: Conform to AWS D1.1 Structural Welding Code based on material and type of weld.
   2. Groove and Butt Joint Welds: Complete penetration, unless otherwise indicated.

3.2 ANCHOR BOLTS

A. Coordinate installation of anchor bolts and other connectors required for securing structural steel to in-place work.

B. Provide templates and other devices for presetting bolts and other anchors to accurate locations.

C. Projection of anchor bolts beyond face of concrete and threaded length shall be adequate to allow for full engagement of all threads of hold-down nuts, adjustment of leveling nuts, washer thicknesses, and construction tolerances, unless indicated otherwise.

D. Placement Tolerances:
   1. As required by AISC Code of Standard Practice for Steel Buildings and Bridges, unless indicated otherwise.
   2. Embedded anchor bolts shall not vary from the dimensions as shown on Drawings by more than the following:
      a. Center to center of any two bolts within an anchor group: 1/8 inch.
      b. Center to center of adjacent anchor bolt groups: 1/4 inch.
      c. Variation from perpendicular to theoretical bearing surface: 1:50.

3.3 SETTING BASES AND BEARING PLATES

A. Clean concrete and masonry bearing surfaces of bond reducing materials and roughen to improve bond to bearing surfaces.

B. Clean bottom surface of base and bearing plates.

C. Set loose and attached base plates and bearing plates for structural members on wedges, shims, leveling nuts, or other adjustable devices. Use leveling plates where indicated on Drawings.

D. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with

edge of base or bearing plate prior to placing grout. Weld plate washers to base plates where indicated in Drawings.

E. Grout Under Base plates prior to placing loads on structure.
   1. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.

3.4 FIELD ASSEMBLY

A. Set structural frames accurately to lines and elevations shown.

B. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly.

C. Align and adjust various members forming a part of a complete frame or structure before permanently fastening.

D. Level and plumb individual members of structure within tolerances shown in AISC Code of Standard Practice for Steel Buildings and Bridges.

E. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be completed and in service.

F. Perform necessary adjustments to compensate for minor discrepancies in elevations and alignment.

G. Provide additional field connection material as required by AISC Code of Standard Practice for Steel Buildings and Bridges.

H. Splice members only where indicated and accepted on shop drawings.

3.5 MISFITS AT BOLTED CONNECTIONS

A. Where misfits in erection bolting are encountered, immediately notify ENGINEER for approval of one of the following methods of correction:
   1. Ream holes that must be enlarged to admit bolts and use oversized bolts.
   2. Plug weld misaligned holes and redrill holes to admit standard size bolts.
   3. Drill additional holes in connection, conforming with AISC Standards for bolt spacing and end and edge distances, and add additional bolts.

4. Reject member containing misfit, incorrect sized, or misaligned holes and fabricate new member to ensure proper fit.

B. Do not enlarge incorrectly sized or misaligned holes in members by burning or using a drift pin.

3.6 MISFITS AT ANCHOR BOLTS

A. Resolve misalignments between anchor bolts and bolt holes in steel members in accordance with approved submittal.

B. Do not flame cut to enlarge holes without prior approval of ENGINEER.

3.7 GAS CUTTING

A. Do not use gas cutting torches in field for correcting fabrication errors in structural framing.

B. Secondary members not under stress and concealed in finished structure may be corrected by gas cutting torches, if approved by ENGINEER.

C. Finish flame-cut sections equivalent to sheared and punched appearance.

3.8 REPAIR AND CLEANING

A. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop primer.

B. Remove and grind smooth tack welds, fit-up-lugs, and weld runoff tabs.

C. Remove weld back-up bars and grind smooth where indicated on Drawings.

D. Apply touchup paint primer by brush or spray of same thickness and material as that used in shop application.

3.9 REPAIR OF DAMAGED HOT-DIP GALVANIZED COATING

A. Conform to ASTM A780.

B. For minor repairs at abraded areas, use sprayed zinc conforming to ASTM A780.

C. For flame cut or welded areas, use zinc-based solder, or zinc sticks, conforming to ASTM A780.

D. Use magnetic gauge to determine that thickness is equal to or greater than base galvanized coating.

3.10 FIELD QUALITY CONTROL

A. High-Strength Bolted Connections:
   1. An independent testing agency will be retained by OWNER to perform the following inspection and testing in accordance with the AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts:
      a. Marking identification and conformance to ASTM standards.
      b. Alignment of bolt holes.
      c. Placement, type, and thickness of hardened washers.
      d. Tightening of bolts.
   2. Bearing-Type Connections Not Fully Tensioned (N, X): Snug tight condition with plies of joint in firm contact.
   3. Fully Tensioned (FT) Bearing and Slip Critical (SC) Connections:
      a. Conduct preinstallation test.
      b. Monitor installation and tightening of DTIs or TC bolts.
      c. Monitor condition of faying surfaces for slip critical connections.
   4. Preinstallation Test:
      a. Conduct jobsite test prior to start of work using a bolt tension measuring device.
      b. Select representative sample of not less than three bolts of each diameter, length, and grade.
      c. Include DTIs and flat hardened washers as required to match actual connection assembly.
      d. Conduct test in accordance with Specification for Structural Joints Using ASTM A325 or A490 Bolts.
   5. Nondestructive Testing (NDT) Report: Prepare and submit a written NDT report identifying location of inspected bolted connections and summary of corrections as required to meet code acceptance criteria.
   6. Defective Connections: Correct and reinspect defective and improperly tightened high-strength bolted connections. Retest fully tensioned bolts as necessary to demonstrate compliance of completed work.

B. Welded Connections:
   1. Visually inspect field welds in accordance with AWS D1.1, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.
   2. An independent testing agency will be retained by OWNER to perform the following inspection and testing of field welds.
   3. Unless otherwise specified, perform nondestructive testing (NDT) of welds at a spot testing frequency as shown below in accordance with the referenced welding codes. Perform ultrasonic on complete joint penetration groove

welds that cannot be readily radiographed. In case there is a conflict the higher frequency level of NDT shall apply:

a. Complete Joint Penetration (CJP) Butt Joint Welds: 10 percent random Radiographic (RT).
b. Groove Welds:
    1) Radiographic (RT) or ultrasonic (UT) testing for 10 percent of randomly selected welds, unless otherwise indicated.
    2) Use RT only for butt joint groove welds.
c. Fillet Welds Larger Than 5/16 Inch: Liquid penetrant (PT) or magnetic particle (MT) testing for 10 percent of randomly selected welds, unless otherwise indicated.
d. Partial Joint Penetration (PJP) Groove Welds: 10 percent random PT or MT.
e. All Welds: 100 percent visually inspected (VT).

4. Weld Acceptance:
    a. Visual Testing:
        1) Structural Pipe and Tubing: AWS D1.1, paragraph 6.9, Visual Inspection, Tubular Connections.
        2) All Other Structural Steel: AWS D1.1, paragraph 6.9, Visual Inspection, Statically Loaded Nontubular Connections.
        3) Stud Connections: AWS D1.1, paragraph 7.8.1.
    b. Ultrasonic Testing: Perform UT of CJP groove welds in accordance with AWS D1.1, paragraph 6.13.3, Class R Indications.
    c. Radiographic Testing: Perform RT of CJP butt joint welds in accordance with AWS D1.1, paragraph 6.12.1.
    d. PT or MT:
        1) Perform on fillet and PJP groove welds in accordance with AWS D1.1, paragraph 6.10.
        2) Acceptance shall be in accordance with VT standards specified above.
5. The CWI shall be present whenever field welding is performed. The CWI shall perform inspections prior and during assembly, during and after welding. CWI duties include:
    a. Verifying conformance of specified job material and proper storage.
    b. Monitoring conformance with approved WPS.
    c. Monitoring conformance of WPQ.
    d. Inspecting weld joint fit-up and in-process inspection.
    e. Providing 100 percent visual inspection of all welds.
    f. Supervising nondestructive testing personnel and evaluating test results.
    g. Maintaining records and preparing report confirming results of inspection and testing comply with the Work.
6. Repair and retest rejected weld defects until sound weld metal has been deposited in accordance with appropriate welding codes.

C. Special inspection will be provided by OWNER as indicated on Drawings.

D. Welded Shear Studs: Inspect and test welded shear studs as specified in Section 05 50 00, METAL FABRICATIONS AND CASTINGS.

END OF SUBSECTION 05 12 00

SECTION 05 00 00 - METALS

SUBSECTION 05 50 00
METAL FABRICATIONS AND CASTINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SCOPE OF WORK

A. The CONTRACTOR shall furnish, fabricate, and install miscellaneous metalwork, such as connection plates, ladders, floor plates, ladder extensions, fall protection system, stair nosing and treads and appurtenances, complete, in accordance with the requirements of the Contract Documents.

1.3 REFERENCES

A. The Aluminum Association, Inc. (AA):
   1. The Aluminum Design Manual

B. American Association of Highway Transportation Officials (AASHTO):
   1. HS-20 Truck Loading

C. American Galvanizers Association (AGA):
   1. Inspection of Products Hot-Dip Galvanized After Fabrication.

D. American Institute of Steel Construction (AISC):
   1. S329, Allowable Stress Design
   2. Specification for Structural Joints using ASTM A325 or A490 Bolts.

E. American Iron and Steel Institute (AISI):
   1. Stainless Steel Types

F. American National Standards Institute (ANSI):
   1. A10.11 Safety Requirements for Personnel and Debris Nets
   2. A14.3 Ladders - Fixed - Safety Requirements
   3. B1.1 Unified-inch Screw Threads (UN and UNR Thread Form)

G. American Welding Society (AWS):
   1. D1.1 Structural Welding Code - Steel

2. D1.2 Structural Welding Code - Aluminum
3. D1.6 Structural Welding Code - Stainless Steel

H. ASTM International (ASTM):
1. A36/A36M Specification for Carbon Structural Steel
2. A48 Specification for Gray Iron Castings
3. A53/A53M Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
4. A108 Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality
5. A123/A123M Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
6. A143 Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
7. A153/A153M Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
8. A193/A193M Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
9. A194/A194M Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both
10. A240/A240M Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
11. A276 Specification for Stainless Steel Bars and Shapes
12. A278 Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650 Degree
13. A283/A283M Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
14. A307 Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile
15. A325 Specification for Structural Bolts, Steel, Heat Treated 120/105 ksi Minimum Tensile Strength
16. A380 Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
17. A384 Practice for Safeguarding Against Warpage and Distortion during Hot-Dip Galvanizing of Steel Assemblies
18. A385 Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
19. A489 Specification for Carbon Steel Lifting Eyes
20. A500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
21. A501 Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
22. A563 Specification for Carbon and Alloy Steel Nuts
23. A653 Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

24. A780 Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
25. A786/A786M Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates
26. A793 Specification for Rolled Floor Plate, Stainless Steel
27. A967 Specification for Chemical Passivation Treatments for Stainless Steel Parts
28. A992/A992M Specification for Steel for Structural Shapes for Use in Building Framing
29. B209 Specification for Aluminum and Aluminum-Alloy Sheet and Plate
30. B308/B308M Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles
31. B429 Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
32. B632/B632M Specification for Aluminum-Alloy Rolled Tread Plate
33. D1056 Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
34. F436 Specification for Hardened Steel Washers
35. F468 Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use
36. F593 Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
37. F594 Specification for Stainless Steel Nuts
38. F844 Specification for Washers, Steel, Plain (Flat), Unhardened for General Use
39. F1554 Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

I. International Code Council (ICC):
1. Evaluation Reports for Concrete and Masonry Anchors.

J. NSF International (NSF):

K. Occupational Safety and Health Administration (OSHA):
1. 29 CFR 1910.27 Fixed Ladders
2. 29 CFR 1926.105 Safety Nets
3. 29 CFR 1926.502 Fall Protection Systems Criteria and Practices

L. Specialty Steel Industry of North America (SSINA):
1. Specifications for Stainless Steel
2. Design Guidelines for the Selection and Use of Stainless Steel
3. Stainless Steel Fabrication
4. Stainless Steel Fasteners

1.4 DEFINITIONS

A. Submerged: Location at or below top of wall of open water-holding structure, such as a basin or channel, or surface inside a covered water-holding structure, or exterior face of below grade wall.

B. Interior Wet Area: Location inside building or structure where floor is sloped to floor drains or gutters and is subject to liquid spills or washdown, or where wall, floor, or roof slab is common to a water-holding or earth-retaining structure.

C. Interior Dry Area: Location inside building or structure where floor is not subject to liquid spills or washdown, nor where wall or roof slab is common to a water-holding or earth-retaining structure.

D. Corrosive Area: Containment area or area exposed to delivery, storage, transfer, or use of chemicals.

1.5 SUBMITTALS

A. Action Submittals:
   1. Shop Drawings:
      a. Metal fabrications such as pipe supports, ladders, fabricated supports or connection plates and floor plates. Show dimensions, indicate profile, size count and reference materials of construction by ASTM designation and grade, including welding and fastener information.
      b. Specific instructions for concrete anchor installation, including drilled hole size, preparation, placement procedures, and instructions for safe handling of anchoring systems.
   2. Design Calculations: Design calculations shall be prepared by a California licensed professional civil or structural engineer. The calculations shall be submitted for review and approved by the ENGINEER prior to fabrication.
      a. Calculations shall include, but not be limited to, ladders, pipe brackets, floor plates or support flanges, and fasteners.
      b. Calculations shall be stamped and signed by a California civil or structural professional engineer.
   3. Samples: Color samples of abrasive stair nosings.

B. Informational Submittals:

C. Concrete and Masonry Drilled Anchors:
   1. Manufacturer's product description and installation procedures.
   2. Current ICC evaluation report.
   3. Adhesive Anchor Installer Certification.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. All fabrication shall be performed in an approved fabrication shop subject to special inspection in accordance with the CBC.
2. Adhesive Anchor Installers: Trained and certified by manufacturer.
3. Galvanized Coating Applicator: Company specializing in hot-dip galvanizing after fabrication and following procedures of Quality Assurance Manual of the American Galvanizers Association.

B. Special Inspection: The following portions of the work require continuous special inspection by a deputy inspector.
1. Shop fabrication and field welding
2. Installation of epoxy adhesive anchors in drilled holes

1.7 DELIVERY, STORAGE, AND HANDLING

A. Insofar as practical, factory assemble items specified herein. Assemblies that due to necessity have to be shipped unassembled shall be packaged and tagged in manner that will protect materials from damage and will facilitate identification and field assembly.

B. Package stainless steel items in a manner to provide protection from carbon impregnation.

C. Protect painted coatings and hot-dip galvanized finishes from damage due to metal banding and rough handling. Use padded slings and straps.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Unless otherwise indicated, meet the following requirements:

Item	ASTM Reference
Steel Shapes and Plates	A36/A36M
Steel Pipe	A500 Round
Structural Steel Tubing	A500, Grade C
Stainless Steel:	
Bars and Angles	A276, AISI Type 316
Shapes	A276, AISI Type 304
Steel Plate, Sheet, and Strip	A240/A240M, AISI Type 316

Item	ASTM Reference
Bolts, Threaded Rods, Anchor Bolts, and Anchor Studs	F593, AISI Type 316, Condition CW
Nuts	F594, AISI Type 316, Condition CW
Steel Bolts and Nuts:	
Carbon Steel	A307 bolts, with A563 nuts
High-Strength	A325, Type 1 bolts, with A563 nuts
Anchor Bolts and Rods	F1554, Grade 55, with weldability supplement S1.
Eyebolts	A489
Threaded Rods	A36/A36M
Flat Washers (Unhardened)	F844
Flat and Beveled Washers (Hardened)	F436
Thrust Ties for Steel Pipe:	
Threaded Rods	A193/A193M, Grade B7
Nuts	A194/A194M, Grade 2H
Plate	A283/A283M, Grade D
Welded Anchor Studs	A108, Grades C-1010 thru C-1020
Aluminum Plates and Structural Shapes	B209 and B308/B308M, Alloy 6061-T6
Aluminum Bolts and Nuts	F468, Alloy 2024-T4
Cast Iron	A48, Class 50B or better

B. Bolts, Washers, and Nuts: Use stainless steel, hot-dip galvanized steel, zinc-plated steel, and aluminum material types as indicated in FASTENER SCHEDULE at end of this section.

C. Corrosion Protection: Unless otherwise indicated, miscellaneous metalwork of fabricated steel, which will be used in a corrosive environment and/or will be submerged shall be stainless steel unless noted otherwise.

2.2 ANCHOR BOLTS AND ANCHOR BOLT SLEEVES

A. Cast-In-Place Anchor Bolts:
   1. Headed type, unless otherwise shown on Drawings.
   2. Material type and protective coating as shown in FASTENER SCHEDULE at end of this section.

B. Anchor Bolt Sleeves:
   1. Plastic:
   2. Single unit construction with corrugated sleeve.
   3. Top of sleeve shall be self-threading to provide adjustment of threaded anchor bolt projection.
   4. Material: High density polyethylene.
   5. Manufacturer: Sinco Products, Inc., Middletown, CT. (800-243-6753).

C. Fabricated Steel: ASTM A36/A36M.

2.3 CONCRETE AND MASONRY DRILLED ANCHORS

A. General:
   1. Use AISI Type 316 stainless, hot-dip galvanized, or zinc-plated steel, as shown in FASTENER SCHEDULE at end of this section.
   2. Product shall have a current evaluation reports by ICC.

B. Expansion Anchors:
   1. Manufacturers and Products:
      a. ITW Ramset/Red Head, Wood Dale, IL; Trubolt Wedge Anchor.
      b. Hilti, Inc., Tulsa, OK; Kwik-Bolt II Stud Anchor.
      c. Powers Rawl, New Rochelle, NY; Power-Stud Anchor.
      d. Simpson Strong-Tie Co., Inc., Pleasanton, CA; Wedge-All Anchor.

C. Epoxy Adhesive Anchors:
   1. Threaded Rod:
      a. ASTM F593 stainless steel threaded rod, diameter as shown on Drawings.
      b. Length as required, to provide minimum depth of embedment.
      c. Clean and free of grease, oil, or other deleterious material.
      d. For hollow-unit masonry, provide stainless steel wire cloth screen tube to fit threaded rod.
   2. Adhesive:
      a. Two-component, designed to be used in adverse freeze/thaw environments, with gray color after mixing.
      b. Cure Temperature, Pot Life, and Workability: Compatible for intended use and environmental conditions.
      c. Nonsag, with selected viscosity base on installation temperature and overhead application where applicable.

3. Packaging and Storage:
    a. Disposable, self-contained cartridge system capable of dispensing both components in the proper mixing ratio and fitting into a manually or pneumatically operated caulking gun.
    b. Store adhesive cartridges on pallets or shelving in covered storage area, in accordance with manufacturer's written instructions.
    c. Cartridge Markings: Include manufacturer's name, product name, material type, batch or serial number, and adhesive expiration date.
    d. Dispose of cartridges if shelf life has expired.
4. Manufacturers and Products:
    a. ITW Ramset/Red Head, Wood Dale, IL; Epcon Ceramic 6 Epoxy or A7 Adhesive Anchor System. (Use only Epcon A7 Adhesive System for hollow masonry.)
    b. Hilti, Inc., Tulsa, OK; HSE 2421 Epoxy Anchoring System
    c. Powers Rawl, New Rochelle, NY; Power Fast Epoxy Injection Gel Cartridge System.
    d. Simpson Strong-Tie Co., Inc., Pleasanton, CA; Structural Epoxy-Tie Adhesive SET
    e. Covert Operations, Inc., Long Beach, CA; CIA-Gel 7000 Epoxy Anchors.
    f. Unitex, Kansas City, MO; Pro-Poxy 300 and Pro-Poxy 300 Fast Epoxy Adhesive Anchors.

2.4 EMBEDDED STEEL SUPPORT FRAMES FOR FLOOR PLATE AND GRATING

A. Steel angle support frames to be embedded in concrete shall be stainless steel, ASTM A276, AISI Type 316, unless indicated otherwise.

B. Welded stainless steel anchors to stainless steel support frames.

2.5 ABRASIVE NOSING FOR CONCRETE STAIRS

A. Unless otherwise shown on Drawings, furnish flush type abrasive nosings on stair treads.

B. Nosing Components:
    1. Homogeneous epoxy abrasive, with minimum 50 percent aluminum oxide content, formed and cured upon an extruded aluminum base.
    2. Epoxy abrasive shall extend over and form curved front edge of nosing.
    3. Base of Nosing: Extruded aluminum alloy, 6063-T5, heat-treated.

C. Anchoring System: Double-set anchors consisting of two rows of integrally extruded anchors.

D. Size: 3 inches wide by 1/4 to 3/8 inch thick by length as shown.

E. Color: Selected by ENGINEER from manufacturer's standard color range.

F. Manufacturers and Products:
   1. Wooster Products, Inc., Wooster, OH; Spectra Type WP3J.
   2. American Safety Tread Co., Inc., Helena, AL; Type BF-311D.

2.6 STEEL BAR GRATING STAIR TREADS

A. Description: Steel pressure-lock bar grating with bearing bar spacing of 1 3/16" and [checker plate or cast abrasive nosing with mounting angle]. Stair tread finish shall match stair stringer member's finish.

B. Tread to have carrier plate at each end for bolted connection to stair stringer web.

C. Manufacturers:
   1. Grating Pacific, Los Alamitos, CA
   2. McNichols Co., Tampa FL
   3. IKG Borden, Clark, NJ

2.7 FLOOR PLATE

A. Material:
   1. Galvanized Steel: Carbon steel, ASTM A786/A786M, commercial grade, hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
   2. Stainless Steel: ASTM A793, AISI Type 304.
   3. Aluminum: ASTM B632/B632M, Alloy 6061-T6.

B. Minimum Thickness:
   1. Steel: 1/4 inch, unless shown otherwise on Drawings.
   2. Aluminum: 3/8 inch, unless shown otherwise on Drawings.
   3. Sized to limit deflection of the plate loaded at 100 pounds per square foot to a span-to-deflection ratio of no more than 1/240 or ¼-inch, whichever is less.

C. Surface shall be raised-lug pattern or diamond tread and smooth on the opposite side, unless shown otherwise on Drawings. The lugs shall be a length of one inch minimum and be raised a minimum 0.050 inches above the plate surface. The lugs shall be in a pattern in which the lugs are oriented at 90 degrees to the adjacent lug in two orthogonal directions. The rows of lugs shall be oriented at 45 degrees to the edges of the plates.

D. Slip-Resistant Surface:
   1. Provide where indicated on Drawings.
   2. Manufacturers and Products:
      a. IKG/Borden, Clark, NJ; MEBAC 2.
      b. W.S. Molnar Co., Detroit, MI; SLIPNOT Grade 2-Medium.

c. Approved equal

2.8 IRON CASTINGS

A. Iron castings shall be uniform in quality, free from blowholes, porosity, hard spots, shrinkage, distortion, or other defects. They shall be smooth and well cleaned by shotblasting.

B. Covers and grating shall have equal and level bearing on their frames with the covers flush with the frame. The cover and grating shall not rock or rattle when loading is applied. Round covers and frames shall be machined bearing surfaces.

C. Covers and grating with matching frames shall be designed to support the following loading:
   1. Where located within a structure, the design loading shall match that required for the adjacent floor area, or if the loading is not noted, a load of 300 pounds per square foot shall be used.
   2. Exterior covers and grates shall be designed for AASHTO H20 vehicle loading, unless noted otherwise.

2.9 LADDERS

A. Fabricate ladders with rails, rungs, landings, and cages to meet applicable requirements of OSHA, CFR Part 1910.27, and ANSI A14.3.
   1. Concentrated load of 250 pounds plus 30 percent impact on rungs.
   2. Maximum rung deflection of l/360.
   3. Concentrated load of 250 pounds plus 30 percent impact between consecutive attachments.

B. Flat Bar Ladders:
   1. Punch rails and pass rungs through rails, weld on outside around perimeter of rung.
   2. Weld brackets to ladder rail to secure ladder to wall with bolted connection.
   3. Hot-dip galvanize steel after fabrication in accordance with ASTM A123/A123M and A385.

C. Aluminum Pre-Engineered Pipe Ladders:
   1. Rungs:
      a. Aluminum extrusions of Alloy 6063-T6.
      b. Nonslip grip surface, 1-inch wide flat top, semicircular or rectangular bottom with mill finish.
   2. Side Rails: ASTM B429, Alloy 6063-T6, 1-1/2 inches, Schedule 40 pipe or 2 ½-inch wide minimum channel with anodized finish, AA M32-C22-A41.
   3. Fasteners for Ladder Attachments and Cage Assembly: Stainless steel.
   4. Welded or glued construction is not acceptable.

5. Fabricate to longest length as practical but not to exceed 24 feet.
6. Furnish support attachments to side rails at 6 feet maximum spacing.
7. Manufacturers:
    a. O' Keeffe's, Inc., San Francisco, CA
    b. Precision Stair Corp., Morristown, TN
    c. Thompson Fabricating Co. Inc., Tarrant, AL.

D. Ladder Extension: Where a hatch cover is installed over the ladder or indicated on the drawings, a ladder extension shall be furnished and installed on the ladder. The extension shall be either a Ladder-Up safety post Model LU-3 (Type 304 stainless steel) or Ladder-Up safety post Model LU-2 (hot dip galvanized) as manufactured by the Bilco Co., or approved equal. The device shall be manufactured of high strength steel with telescoping tubular section that locks automatically when fully extended. Upward and downward movement shall be controlled by a stainless steel spring balancing mechanism. Unit shall be completely assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer's instructions.

E. Side Rail Extensions: Where a fall protection device is required, instead of a ladder extension specified in Item D above, the Contractor may provide side rail extensions.
1. All of the materials for the side rail extension shall be the same material as the ladder (hot-dipped galvanized).
2. The side rail extension shall consist of a swing lock style ladder extension attached to each side rail of the ladder as manufactured by Brooks Products, Specialty Dept., Inwesco Company or approved equal.
3. The ladder extension shall be of sufficient size, dimension and capacity to match the ladder and comply with all requirements of OSHA. The extension shall be located three (3) inches below the inside bottom of the hatch cover in the down position and shall swing up and lock in position for entry in the up position.
4. All rails shall be fabricated from a minimum of 3/8" steel flat bar stock. The swing connection shall include a ¾" (minimum) diameter rod pin welded to the ladder side rail, a 7/8" x 4" (minimum) slot, 8 1/2" x 5/8" (minimum) side bar and a 6" x 5/8" (minimum) side bar.
5. Each side rail extension shall include a 4" long lifting handle welded to the rail to use to lift up the extension. Contractor shall submit a shop drawing of the side rail extension for the Engineer's approval.

2.10 FALL PROTECTION DEVICE

A. General:
1. Conforms to ANSI A14.3 and OSHA CFR Part 1910.27.

2. Belt and harness shall withstand minimum drop test of 250 pounds in 6-foot free fall.
3. Fall Prevention System Material: Hot-dip galvanized steel in accordance with ASTM A123/A123M.

B. Components and Accessories:
1. Main Components: Sleeve or Trolley, Safety Harness, and Carrier or Climbing Rail.
2. Ladder rung clamps with hot-dip galvanized steel mounting brackets and hardware.
3. Removable extension kit with tiedown rod or trolley gate, mandrel, and carrier rail for ladders under manholes and hatches.

C. Manufacturers and Products:
1. North Safety Products, Specialty Products Division, Toronto, Ontario, Canada; Saf-T-Climb Fall Prevention System.
2. Miller Equipment, Franklin, PA; Sure Track Rail System.
3. TS Products, St. Charles, IL; TS Safety Rail System.

2.11 FABRICATION

A. General:
1. Finish exposed surfaces smooth, sharp, and to well-defined lines.
2. Furnish necessary rabbets, lugs, and brackets so work can be assembled in neat, substantial manner.
3. Conceal fastenings where practical; where exposed, flush countersink.
4. Drill metalwork and countersink holes as required for attaching hardware or other materials.
5. Grind cut edges smooth and straight. Round sharp edges to small uniform radius. Grind burrs, jagged edges, and surface defects smooth.
6. Fit and assemble in largest practical sections for delivery to site.

B. Materials:
1. Use steel shapes, unless otherwise noted.
2. Steel to be hot-dip galvanized: Limit silicon content to less than 0.04 percent or to between 0.15 and 0.25 percent.
3. Fabricate aluminum in accordance with AA Specifications for Aluminum Structures – Allowable Stress Design.

C. Welding:
1. Weld connections and grind exposed welds smooth. When required to be watertight, make welds continuous.
2. Welded fabrications shall be free from twisting or distortion caused by improper welding techniques.
3. Steel: Meet fabrication requirements of AWS D1.1, Section 5.

4. Aluminum: By Gas Metal Arc (MIG) or Gas Tungsten Arc (TIG) process in accordance with AWS D1.2. Discoloration of exposed aluminum surfaces, whether or not due to welding, shall constitute a basis for rejection of the entire assembly.
5. Stainless Steel: Meet requirements of AWS D1.6.
6. Welded Anchor Studs: Prepare surface to be welded and weld with stud welding gun in accordance with AWS D1.1, Section 7, and manufacturer's instructions.
7. Complete welding before applying finish.

D. Painting:
1. Shop prime with rust-inhibitive primer, unless otherwise indicated.
2. Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals, with electrolysis protective coating.
3. Do not apply protective coating to galvanized steel anchor bolts, unless indicated otherwise.

E. Electrolysis Protection:
1. Electrolysis protective material shall be alkali-resistant asphaltum base paint.
2. Manufacturers and product:
   a. Koppers "Bitumastic 50"
   b. Texaco "Cement 1401"
   c. Approved equal

F. Galvanizing:
1. Fabricate steel to be galvanized in accordance with ASTM A143, ASTM A384, and ASTM A385. Avoid fabrication techniques that could cause distortion or embrittlement of the steel.
2. Provide venting and drain holes for tubular members and fabricated assemblies in accordance with ASTM A385.
3. Remove welding slag, splatter, burrs, grease, oil, paint, lacquer, and other deleterious material prior to delivery for galvanizing.
4. Remove by blast cleaning or other methods surface contaminants and coatings not removable by normal chemical cleaning process in the galvanizing operation.
5. Galvanize steel members, fabrications, and assemblies after fabrication by hot-dip method in accordance with ASTM A123/A123M.
6. Hot-dip galvanize bolts, nuts, washers, and hardware components in accordance with ASTM A153/A153M. Oversize holes to allow for zinc alloy growth. Shop-assemble bolts and nuts.
7. Galvanize steel sheets in accordance with ASTM A653.
8. Galvanize components of bolted assemblies separately before assembling. Galvanizing of tapped holes is not required.

G. Accessories: Furnish as required for a complete installation. Fasten by welding or with stainless steel bolts or screws.

2.12 SOURCE QUALITY CONTROL

A. Visually inspect all fabrication welds and correct any deficiencies.
   1. Steel: AWS D1.1, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.
   2. Aluminum: AWS D1.2.
   3. Stainless Steel: AWS D1.6.

PART 3 - EXECUTION

3.1 INSTALLATION OF METAL FABRICATIONS

A. General:
   1. Install metal fabrications plumb or level, accurately fitted, free from distortion or defects.
   2. Install rigid, substantial, and neat in appearance.
   3. Install manufactured products in accordance with manufacturer's recommendations.
   4. Obtain ENGINEER approval prior to field cutting steel members or making adjustments not scheduled.

B. Aluminum:
   1. Do not remove mill markings from concealed surfaces.
   2. Remove inked or painted identification marks on exposed surfaces not otherwise coated after installed material has been inspected and approved.
   3. Fabrication, mechanical connections, and welded construction shall be in accordance with the AA Aluminum Design Manual.

C. Pipe Sleeves:
   1. Provide sleeve where pipes pass through concrete or masonry.
   2. Holes drilled with a rotary drill may be provided in lieu of sleeves in existing walls.
   3. Provide a center seep ring flange for water stoppage on sleeves in exterior or water-bearing walls.
   4. Provide a rubber caulking sealant or a modular mechanical unit to form a watertight seal in the annular space between pipes and sleeves.

3.2 CAST-IN-PLACE ANCHOR BOLTS

A. Accurately locate and hold anchor bolts in place with templates at the time concrete is placed.

B. Use anchor bolt sleeves for location adjustment and provide two nuts and one washer per bolt of same material as bolt.

C. Minimum Bolt Size: 1/2-inch diameter by 12 inches long, unless otherwise shown.

3.3 CONCRETE AND MASONRY DRILLED ANCHORS

A. Begin installation only after concrete or masonry to receive anchors has attained design compressive strength.

B. Install in accordance with manufacturer's instructions.

C. Provide minimum embedment, edge distance, and spacing as shown on Drawings.

D. Use only type of drill, type of drill bit and diameter recommended by anchor manufacturer. Clean hole of debris and dust with brush and compressed air as recommended.

E. Using a non-destructive method, to locate reinforcing in substrate prior to drilling. If drilled hole is required to be abandoned, the hole shall be filled with cement grout.

F. Epoxy Adhesive Anchors:
   1. Do not install adhesive anchors when temperature of concrete is below 40 degrees F or above 100 degrees F.
   2. Remove any standing water from hole with oil-free compressed air. Inside surface of hole shall be dry where required by manufacturer's instructions.
   3. Do not disturb anchor during recommended curing time.
   4. Do not exceed maximum torque as specified in manufacturer's instructions.

3.4 COMMON MACHINE BOLTS AND NUTS

A. General: Bolts shall be inserted accurately into the bolt holes without damaging the thread. Bolt heads shall be protected from damage during installation. Bolt heads and nuts shall rest squarely against the base metal. Where bolts are to be used on beveled surfaces having slopes greater than 1 in 20 with a plane normal to the bolt axis, beveled washers shall be provided to give full bearing to the head or nut. Where self-locking nuts are not furnished, bolt threads shall be upset to prevent the nuts from backing off.

B. Bolt Insertion: Bolts shall be of the length that will extend entirely through but not more than 1/4-inch beyond the nuts. Bolt heads and nuts shall be drawn tight

against the work. Bolt heads shall be tapped with a hammer while the nut is being tightened. After having been finally tightened, the nuts shall be locked.

3.5 ABRASIVE NOSINGS

A. Provide abrasive nosings on concrete steps not being supplied or coated with another type of nosing or nonskid material.

3.6 SAFETY CLIMB DEVICE SYSTEM

A. Provide for each ladder where unbroken height between levels exceeds 20 feet, or at lesser height where indicated on Construction Drawings.

B. Install in accordance with manufacturer's instructions.

C. Furnish additional accessories required to complete the system for each ladder.

D. Furnish one harness for each ladder equipped with a safety climb device.

E. Furnish pivot section at platforms, landings, and roofs.

F. When installed to required height, fall prevention system shall be rigid and an integral part of the structure.

3.7 ELECTROLYTIC PROTECTION

A. Aluminum and Galvanized Steel:
   1. Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals with electrolytic protection coating specified in this Section.
   2. Do not apply protective coating to galvanized steel anchor bolts or galvanized steel welded anchor studs, unless indicated otherwise.
   3. Allow coating to dry before installation of the material.
   4. Protect coated surfaces during installation.
   5. Should coating become marred, prepare and touch up in accordance with paint manufacturer's written instructions.

B. Titanium: Where titanium equipment is in contact with concrete or dissimilar metal, provide full-face neoprene insulation gasket, 3/32-inch minimum thickness and 70-durometer hardness.

C. Stainless Steel:

1. During handling and installation, take necessary precautions to prevent carbon impregnation of stainless steel members.
2. After installation, visually inspect stainless steel surfaces for evidence of iron rust, oil, paint, and other forms of contamination.
3. Remove contamination in accordance with requirements of ASTM A380 and A967.
4. Brushes used to remove foreign substances shall utilize only stainless steel or nonmetallic bristles.
5. After treatment, visually inspect surfaces for compliance.

3.8 PAINTING AND REPAIR OF GALVANIZED STEEL

A. Repair of Damaged Hot-Dip Galvanized Coating:
   1. To prepare surface, remove all oil, grease, soil, and soluble material by cleaning with water and detergent (SSPC, SP1) followed by brush off blast cleaning (SSPC, SP 7), over an area extending at least 4 inches into the undamaged area.
   2. For minor repairs at abraded areas, apply Galvinox, Galvo-Weld, Drygalv or equal zinc conforming to ASTM A780.
   3. For flame cut or welded areas, use zinc-based solder, or zinc sticks, conforming to ASTM A780.
   4. Use magnetic gauge to determine that thickness is equal to or greater than the base galvanized coating.

3.9 FASTENER SCHEDULE

A. Anchor Bolts Cast Into Concrete for Structural Steel Column Base Plates
   1. Interior Dry Areas: Plain uncoated
   2. Exterior and Interior Wet or Humid Areas: Stainless steel headed anchor bolts.

B. Anchor Bolts Cast Into Concrete for Equipment Bases
   1. All Locations: Stainless steel headed anchor bolts, unless otherwise specified with equipment

C. Anchor Bolts Cast Into Concrete for Metal Fabrications and Structural Components
   1. Interior Dry Areas: Hot-dip galvanized steel headed anchor bolts
   2. Submerged, Exterior, Interior Wet, and Corrosive Areas: Stainless steel headed anchor bolts with fusion bonded coating

D. Drilled Anchors for Metal Components to Cast-in-Place Concrete (e.g., Ladders, Handrail Posts, Electrical Panels, and Equipment)
   1. Interior Dry Areas: Zinc-plated or stainless steel wedge or expansion anchors.

2. Submerged, Exterior, Interior Wet, and Corrosive Areas: Adhesive stainless steel anchors

E. Anchors in Grout-Filled Concrete Masonry Units
   1. Exterior and Interior Wet and Dry Areas: Hot-dip galvanized steel headed anchor bolts.

F. Connections for Structural Steel Framing
   1. Exterior and Interior Wet and Dry Areas: Galvanized headed bolts, unless noted otherwise

G. Connections for Steel Fabrications and Wood Components
   1. Exterior and Interior Wet and Dry Areas: Hot-dip galvanized carbon steel bolted connections

H. Connections for Aluminum Components
   1. All locations: Stainless steel bolted connections, unless otherwise specified with equipment.

I. All Others
   1. All locations: Stainless steel fasteners

J. Antiseizing Lubricant: Use on all stainless steel threads.

K. Do not use adhesive anchors to support fire-resistive construction or where ambient temperature will exceed 120 degrees F.

END OF SECTION 05 50 00

SECTION 22 00 00 – MECHANICAL AND PLUMBING

SUBSECTION 21 11 00
HIGH DENSITY POLYETHYLENE PIPE

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. High density polyethylene (HDPE) pipe, complete with fittings, joining materials, hangers and other accessories shall be furnished and installed where shown on the Construction Drawings, or are required for proper installation and functioning of the piping.

1.02 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. HDPE pipe and fittings

2. HDPE Welders Certification(s)

3. Provide manufacturing test specification data listing resin type, cell classification, stock density, melt flow, flexural modulus, tensile strength, and coloration.

4. Include results of tests with shipment of materials, with two (2) additional copies of test results furnished to the Engineer.

PART 2 – PRODUCTS

2.01 COMPONENTS

A. All HDPE LFG header pipe and fittings shall be made from a polyethylene resin Type 3408, manufactured with ultraviolet inhibitors.

B. The standard dimension ratio (SDR) for the HDPE pipe shall be 17 for 4-inch and greater pipe. For pipe less than 4-inch, SDR 11 shall be used. For pipe 2-inch or less, SDR-9 shall be used. Pipe SDR will only vary if noted otherwise on the Construction Drawings.

C. The HDPE pipe fittings shall have the same specifications and pressure ratings of the HDPE pipe. Fittings shall have a minimum SDR of 11.

D. HDPE pipe elbows and tees shall be molded-type for 12-inch and under. Fabricated-type elbows and tees shall not be used, except for 18-inch piping.

E. All LFG condensate HDPE pipe shall be HDPE and the standard dimension ratio shall be SDR-11. Pipe SDR will only vary if noted otherwise on the Construction Drawings.

F. The HDPE condensate pipe fittings shall have the same specifications and pressure ratings of the HDPE pipe. Fittings shall have a minimum SDR of 11.

2.02 PHYSICAL PROPERTIES OF HDPE PIPE RESIN

A. Density: ASTM D-1505, not less than 0.941 - 0.955 gm/cu cm.

B. Melt Flow: ASTM D-1238 - Condition E, not greater than 0.15.

C. Flexural Modulus: ASTM D-790, 110,000 to less than 160,000 psi.

D. Tensile Strength at Yield: ASTM D-638, 3,000 to less than 3,500 psi.

E. Environmental Stress Crack Resistance (ESCR): ASTM D-1693 - Condition C, shall be in excess of 5,000 hrs with zero failure.

F. Hydrostatic Design Basis: ASTM D-2837, 1600 psi at 23ºC.

2.03 HDPE PIPE

1. High performance, high molecular weight, high density polyethylene pipe (type PE 4710 resin).
2. ASTM D-1248 (Type III, Class C, Category 5, P34).
3. ASTM D-3350, minimum cell classification value 345434C.
4. Standard dimension ratio: See Drawings.
5. Marking: Intervals of 5 ft or less
    a. Manufacturer's name or trademark.
    b. Nominal pipe size.
    c. Type of plastic resin (i.e., PE 4710).
    d. Standard dimension ratio (i.e., SDR-17).
    e. ASTM D-2513.
    f. Extrusion date, period of manufacture or lot, or batch number.

G. Dimensions:

1. Conform to standard dimensions and tolerances of ASTM D-2513.

2.04 HDPE FITTINGS

H. Fittings from polyethylene compound having cell classification equal to or exceeding compound used in pipe to ensure compatibility of polyethylene resins.

I. Polyethylene fittings shall be fabricated from polyethylene pipe by means of thermal butt-fusion, and shall be fabricated for sizes 14-inch and larger. Fittings for sizes 12 inch and smaller shall be molded fittings. Extrusion welds on fittings will not be allowed. The ends of the fabricated fittings shall not be trimmed to match the pipe section to which they are going to be joined. Molded and most fabricated polyethylene fittings shall have the same or higher-pressure rating as the pipe when installed in accordance with the latest technical specifications. 14-inch and larger wye and cross fabricated fittings may be de-rated.

J. Joints

1. Joints shall be thermal butt-fusion, except where connecting to unions, valves, and equipment with connections that may require future disassembly.
2. No mechanical couplings shall be used unless shown on the Drawings.
3. Extrusion welds will not be allowed.

K. Flange Connections:

1. 150-lb carbon steel or convoluted epoxy coated ductile iron backup rings for flanged connections as recommended by manufacturer.
2. Type 316 stainless steel hex head nuts and bolts and accompanying flat washers.
3. Viton full-face flange gaskets.
4. Flanges and bolt patterns consistent with ANSI B16.5/AWWA C207/ASTM A536, as recommended by the manufacturer.

L. Dimensions of fittings conform to standard dimensions and tolerances according to ASTM D-3261.

M. Markings:

1. Manufacturer’s name or trademark.
2. Nominal size.
3. Type of plastic resin (i.e. PE 4710).
4. Standard dimension ratio (i.e., SDR-17).
5. ASTM D-2513.
6. Extrusion date, lot number, or batch number.

N. Pressure rating of fittings shall be equal to or greater than pressure rating of pipe.

O. Branch saddle connections are strictly prohibited unless approved by the Engineer.

PART 3 – EXECUTION

3.01 STORAGE AND HANDLING

A. All pipes and fittings shall be handled carefully in loading and unloading. They shall be lifted by hoists and lowered on skid ways in such a manner as to avoid shock. Derricks, ropes or other suitable equipment shall be used for lowering the pipe into the trench. Pipe and fittings shall not be dropped or dumped.

B. Take special precaution when handing pipe fittings is such a way to prevent surface damage such as gouging, marring, scraping, or warping, or in any way piercing the piping wall such that would de-rate the pipe factory performance specifications.

3.02 FIELD QUALITY CONTROL

A. Pipe may be rejected for failure to conform to Specifications, or for:

1. Fractures or cracks passing through pipe wall, except single crack not exceeding two (2) inches in length at either end of pipe which could be cut off and discarded. Pipes within one shipment will be rejected if defects exist in more than 5 percent of shipment or delivery.
2. Cracks sufficient to impair strength, durability, or serviceability of pipe.
3. Defects indicating improper proportioning, mixing, and molding.
4. Damaged ends, where such damage would prevent making satisfactory joints.

B. Acceptance of fittings, stubs, or other specifically fabricated pipe sections shall be based on visual observation by the Engineer at the Project site and documentation that they conform to these Specifications.

3.03 INSTALLATION

A. General:

1. Pipes and fittings shall be carefully lowered into trench to limit stress to pipes, fittings, and joints.
2. Pipe and fittings shall be installed so that there will be no deviation at the joints and so that inverts present a smooth surface. Pipe and fittings that do not fit together to form a tight-fitting joint are not permitted.
3. Pipes shall be installed at the locations and to the required lines and grades shown in the Construction Drawings and provided in these Specifications, using an approved method of control. The Engineer has the authority to order the removal or relaying of pipe laid contrary to the specifications, her/his instructions, or during her/his absence.

4. Excavations shall be maintained free of water during the progress of the work. No pipes shall be laid in water, nor shall there be any joints made up in water. All slides or cave-ins of the trenches or cuts shall be remedied to the satisfaction of the Engineer.
5. Cleanliness of installed pipe and fitting interiors shall be maintained throughout the Work. Cap pipe sections longer than single joint on both ends during placement, except during fusing operations.
6. All adjustments to the line and grade of pipe laid on earth foundation shall be done by scraping away or placing compacted fill under the barrel of the pipe, and not by blocking or wedging the pipe. In all cases, the trench under the joint shall be excavated to permit an even bearing surface for the barrel of the pipe.
7. Fittings shall be installed as required and in accordance with the Construction Drawings and Specifications. The installation of fittings after the pipeline has been laid will not be permitted without written approval from the Engineer. In such cases, complete details pertaining to the proposed type of fittings and the installation procedure shall be submitted by the Contractor to the Engineer for review before approval will be considered.
8. Approval by the Engineer is required prior to changing the location of any of the Project due to field conditions. Changes in pipe sizes are prohibited without a written consent from the Engineer.
9. All installed pipe shall form completely connected systems, including connections to valves and appurtenances specified in other sections, to result in a satisfactorily operating installation.

3.04 PIPE JOINING

A. The HDPE pipe and pipe fittings shall be joined by the butt fusion method unless otherwise specified on the Drawings.

B. Mechanical joining to other piping materials, fittings, and valves shall be accomplished with an HDPE-to-stainless steel transition fitting or an HDPE flange adapter and ductile iron backup flanges.

C. The bolts and nuts used for mechanical joining shall be A-307 cadmium-plated steel. The ductile iron backup flanges shall be compatible for joining with ANSI-B 16.5, 150-pound bolt circle flanges, and shall be epoxy coated.

D. Butt fusion and saddle fusion of HDPE pipe shall be performed by qualified personnel. All personnel used by the Contractor or a Subcontractor for pipe installation shall have an HDPE welding certificate. The Contractor shall submit copies of these certificates for

verification by the Engineer. No HDPE pipe shall be installed prior to submittal of this verification.

E. HDPE to PVC transitions for small diameter piping shall be performed with an HDPE-to-stainless steel transition fitting. A threaded PVC schedule 80 male adapter shall be utilized when transitioning from the threaded portion of the transition fitting to the PVC pipe.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 21 11 00

SECTION 22 00 00 – MECHANICAL AND PLUMBING

SUBSECTION 21 11 00
STAINLESS STEEL PIPE, TUBE, AND FITTINGS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. SS pipe complete with fittings, joining materials, hangers, and appurtenances shall be furnished for the flare station improvements and installed as shown on the Construction Drawings.

B. SS tubing complete with fittings, joining materials, hangers, and appurtenances shall be furnished for the flare station as shown on the Construction Drawings.

1.02 SUBMITTALS REQUIRED

A. The contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. SS pipe and fittings
2. Jointing materials and sealing compounds
3. Welders Certifications

PART 2 – PRODUCTS

2.01 COMPONENTS

A. All SS conveyance pipe and fittings shall conform to ANSI B36.19M-85. All SS pipe shall be schedule 10 or schedule 40, as shown on the Construction Drawings. Steel type shall be 316 sheet and plate per ASTM 240. Fabrication shall be in accordance with ASTM A778 with dimensional tolerances in accordance with ASTM A530. Welding procedures shall be in accordance with ANSI B31.1, paragraph 127.5.

B. Pipe supports, guides and anchors shall be located as required by MSS-SP69 and shall be fabricated in accordance with MSS-SP58.

C. All LFG SS pipe 3-inches and smaller in size shall be 316 and shall conform to ANSI B36.19.

PART 3 – EXECUTION

3.01 STORAGE AND HANDLING

A. All pipes and fittings shall be handled carefully in loading and unloading. They shall be lifted by hoists and lowered on skid ways in such a manner to avoid shock. Pipe and fittings shall not be dropped or dumped. Ensure that piping has accurate alignments and grade adequately to support pipes. Where temporary supports are used, ensure rigidity to prevent shifting or distortion of pipe. Pitch pipes toward low points and provide for draining low points. Provide for expansion where necessary. Before assembly, remove dirt and chips from inside pipe and fittings.

B. To the extent possible, avoid dragging piping on the ground and accidental gouging, marring, scraping, or in any way piercing the piping wall such that would de-rate the pipe factory performance specifications.

3.02 PIPE JOINING

A. SS pipes 3-inches in diameter and larger shall be flange-joined or weld-joined. Flange joints shall be with bolt studs and nuts on each end. Welded type fittings shall be butt weld type manufactured in accordance with ASTM-A-774, bolts and nuts shall be grade B conforming to ASTM A307-78. Welded joints shall be in accordance with ANSI B31.1, paragraph 127.5. Provide sworn certificates showing compliance with materials used and shop tests performed with appropriate standards. Submit reports for welding certification per ANSI B31.1 paragraph 127.6.

B. SS lines less than 3-inches in diameter shall be tubing and utilize compression fittings for joining or threaded schedule 40 pipe, as indicated on the Drawings. Compression fittings shall be 316 SS having pressure rating equal to or higher than the SS tubing.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 21 11 00

SECTION 22 00 00 – MECHANICAL AND PLUMBING

SUBSECTION 22 05 00
FLEXIBLE CONNECTIONS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. Flexible connectors shall consist of flange-connected expansion joints, threaded flexible SS hose, or flexible rubber couplings with stainless steel clamps located as shown on the drawings.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. Flex couplings and hoses shall be installed per manufacturer's recommendations and as indicated on the Construction Drawings.

B. The installation dimensions of flex hoses are dependent on the ambient temperature during installation. The higher the temperature the greater the compresses state of the flex hose during installation. During cold weather the flex hose will be installed at an extended condition due to the contraction of the piping. Refer to the manufacturer's installation instructions. Based on the site location, flexible connections should be installed at the coldest point in the day.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 22 05 00

SECTION 22 00 00 – MECHANICAL AND PLUMBING

SUBSECTION 22 05 23
VALVES

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. This section covers all valves and appurtenances except where specific requirements are given in other sections. The Contractor shall install all valves complete with all operators, specialty items and appurtenances as shown on the Construction Drawings and specified herein. Pipe and valve shall be coordinated to ensure proper installation of the valves and piping in conformance with the specified requirements.

PART 2 – PRODUCTS

2.01 BUTTERFLY VALVES

A. Shall conform to AWWA Standard C504 for rubber seated butterfly valves, except as seats shall be mounted securely for complete immobility under all operating conditions.

B. Valve seat shall be mounted on the body only. Mounting on the disk will not be acceptable.

C. Manufacturers: Muessco, Keystone, Flow-Seal, Asahi, Demco, or approved equal.

D. Body of butterfly valve to be of lug design, cast iron, and bolt pattern compatible with 150 lb. ANSI flanges. Lug body shall be drilled and tapped for mounting bolts.

E. Disk shall be type 304 or 316 SS.

F. Seats and seals shall be Viton.

G. Shaft shall be type 304 or 316 SS. Either one-piece unit extending completely through the valve disk or stub shaft comprising two separate shafts inserted into valve disk hubs shall be utilized.

H. Each butterfly valve greater than 4-inch and and less than 12-inch shall have gear operator with removable valve wheel. Further, each 4-inch or less in nominal size shall have a lever operator with 10-position locking mechanism.

2.02 BALL VALVES

A. Ball valves shall be manufactured by Asahi or approved equal.

B. Ball valves shall be True Union Type.

C. Full port design.

D. Pressure rated at 150 psi at 73 degrees F.

E. Body shall be constructed of PVC, or CPVC plastic, as indicated on the drawings.

F. Seals and seats shall be Teflon or Viton.

2.03 CHECK VALVES

A. Check valves shall be manufactured by Cameron 6" TECHNO™ or approved equal.

B. Dual Plate, Metal Hinged, Wafer Style Check Valve.

C. Pressure rated at 150 psi at 225 degrees F.

D. Body shall be constructed of Carbon Steel.

E. Valve Plate shall be 316 SS, Seals: Buna-N, Springs: 316 SS, Trim: 316 SS.

F. ASME Class: 150, Face-face: 3-7/8", Cv: 800.

PART 3 – EXECUTION

3.01 GENERAL REQUIREMENTS

A. Each valve shall be inspected before installation to ensure that all foreign substances have been removed from within the valve body; and they shall be opened and closed to see that all parts are in working condition. Geared valves shall be inspected to see that all gears are properly lubricated.

B. All automatic operated valves shall be tagged in accordance with the instrument tag numbers shown on the Construction Drawings.

C. It is the Contractor's responsibility to assure proper operation of valves. At all times the valve shall be capable of opening and closing 100% without any interference from the adjoining pipe and/or fittings. Should interference occur between a butterfly valve and the pipe due to the wall thickness of the pipe and/or fittings, the Contractor shall consult with the valve manufacturer and taper the ends of the adjoining pipe and/or fittings (spacers) to allow free movement without any interference.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 22 05 23

SECTION 22 00 00 – MECHANICAL AND PLUMBING

SUBSECTION 22 67 13
MISCELLANEOUS PROCESS PIPE AND APPURTENANCES

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. Galvanized carbon steel piping, complete with fittings, joining materials, hangers and other appurtenances shall be furnished for the Flare Station as shown on the Construction Drawings.

B. Black iron piping complete with fittings, jointing materials, hangers and other appurtenances shall be furnished for the flare station and installed as shown on the Construction Drawings.

1.02 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. Galvanized carbon steel piping and fittings

2. Black iron piping and fittings

3. Thread seal compounds

PART 2 – PRODUCTS

2.01 COMPONENTS

A. All galvanized carbon steel compressed air conveyance pipe and fittings shall conform to ASTM A181-87 and ASTM A105-87a.

B. All black iron propane conveyance pipe and fittings shall conform to ASTM A53, schedule 40, in all sizes.

C. The galvanized carbon steel and black iron pipe fittings shall have the same specifications and pressure rating of the galvanized carbon steel pipe and black steel pipe, respectively.

PART 3 – EXECUTION

3.01 STORAGE AND HANDLING

A. All pipes and fittings shall be handled carefully when loading and unloading. They shall be lifted by hoists and lowered on skid ways in such a manner to avoid shock. Pipe and fittings shall not be dropped or dumped.

3.02 PIPE JOINING

A. Black iron pipe and galvanized carbon steel pipe, 2-inch and smaller, shall be threaded. Threaded fittings shall conform to ANSI B16.3 class 150 and 300.

B. Below grade black iron pipe shall be wrapped in PVC.

B. The Contractor shall give special attention to the appearance of the completed installation and make provisions for the expansion and contraction of the pipe fittings and joints during normal operation. Great care shall be exercised to prevent the destruction of passage ways.

C. Threads shall be cut full and clean with sharp dies and the ends shall be reamed to remove burrs. No more than three pipe threads shall be exposed at each connection and use Teflon tape on male thread only in making joints.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 22 67 13

SECTION 26 00 00 – ELECTRICAL

SUBSECTION 26 05 26
GROUNDING AND BONDING

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Grounding electrodes and conductors.

B. Equipment grounding conductors.

C. Bonding.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code, California Electrical Code.

1.03 GROUNDING ELECTRODE SYSTEM

A. Rod electrode.

1.04 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: Must be less than 25 ohms.

1.05 SUBMITTALS

A. Submit under provisions of Subsection 01 33 23.

B. Product Data: Provide data for grounding electrodes and connections.

C. Test Reports: Indicate overall resistance to ground and resistance of each electrode.

D. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of exothermic connectors.

1.06 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Subsection 01 33 23.

B. Accurately record actual locations of grounding electrodes.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years documented experience.

1.08 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 – PRODUCTS

2.01 ROD ELECTRODE

A. Manufacturers:

1. Any recognized manufacturer of ground rods bearing the UL label.

B. Material: Copper-clad steel or stainless steel.

C. Diameter: ¾-inch (19 mm).

D. Length: 10 feet (3 m).

2.02 MECHANICAL CONNECTORS

A. Manufacturers:

1. Burndy.

2. Ilsco.

3. Thomas and Betts.

4. Substitutions: Under provisions of Subsection 01 33 23.

B. Material: Bronze or Aluminum.

2.03 EXOTHERMIC CONNECTIONS

A. Manufacturers:

1. Cadweld.

2. Substitutions: Under provisions of Subsection 01 33 23.

2.04 WIRE

A. Material: Stranded copper.

B. Grounding Electrode Conductor: Size to meet NFPA 70 requirements as minimum or as shown on drawings.

2.05 GROUNDING WELL COMPONENTS

A. Well Pipe: Minimum 8-inch (200 mm) diameter by 24-inch (600 mm) long clay tile or concrete pipe with belled end.

B. Precast concrete ground rod well with cover as described below.

C. Well Cover: Cast iron with legend "GROUND" embossed on cover.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify that final backfill and compaction has been completed before driving rod electrodes, if required.

3.02 INSTALLATION

A. Install Products in accordance with manufacturer's instructions.

B. Install rod electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.

C. Provide grounding well pipe with cover at each rod location. Install well pipe top flush with finished grade.

D. Provide bonding to meet Regulatory Requirements.

E. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

3.03 FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

B. Use suitable test instruments to measure resistance to ground of system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall-of-potential method.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 26 05 26

SECTION 26 00 00 – ELECTRICAL

SUBSECTION 26 05 00
ELECTRICAL WORK – GENERAL

PART 1 – GENERAL

1.01 DESCRIPTION

A. Provide all labor, materials, and equipment indicated on the drawings and in these specifications for the construction and testing of the electrical system for the Flare Station Improvements.

B. The Contractor shall make connections of all field wiring to terminal strips in all panels as defined on Construction Drawings.

1.02 QUALITY ASSURANCE

A. Install electrical work in conformance with latest rules and requirements of National Fire Protection Association Standard No. 70 (National Electrical Code), The California Electrical Code and with requirements of the City of Santa Cruz.

1.03 SUBMITTALS

A. Any deviation from the following list of contract drawings will necessitate that the Contractor submit the following revised drawings to the Engineer for review and approval prior to any construction taking place.

1. Single-line Drawings
2. Electrical Plan
3. Electrical Wiring Diagram
4. Control Panel
5. VFD Panel
6. Conduit/Wire Schedule, Details, and Notes

Note: All of the above listed revised drawings shall be reviewed and approved by a Professional Electrical Engineer currently registered in the State of California.

B. Shop Drawings and Data: Submit in accordance with Subsection 01 33 23. Include manufacturer's drawings, bills of material, equipment layouts, catalog data, wiring diagrams, and other documentary or descriptive information as required for each assembly, submitted in one package, insofar as possible.

C. Bills of material: Include a numbered list of all components, with manufacturer's name, catalog number, rating, and other identification. Place item number or similar identification on all other drawings where item appears.

D. Submit time-current characteristic curves for all circuit breakers and fuses.

E. Submit list of type and make of conduit, fittings, wires, cables, switches, fixtures, receptacles, push-buttons, sleeves and inserts, etc.

F. As part of the Operations and Maintenance Manual, submit instructions for installation, operation, and maintenance of equipment, and parts list. Specifically mark standard publications forming a part of this contract. Cross out, blank out, or otherwise delete any non-applicable items, or clearly identify applicable items.

G. Install nameplates on all devices or pieces of equipment for which use or identification is not readily apparent, such as starters, relays, contactors, push-buttons, indicating lights, and switches. Ensure position of nameplates is readable after equipment installation.

H. As soon as possible after award of contract, submit all information and data on wires, cables, and other long delivery items proposed. Early submission for review and early ordering is required to avoid delays in completion of work.

1.04 INTERFERENCE AND ERRONEOUS LOCATIONS

A. Locations of electrical equipment, devices, outlets, and similar items, as indicated, are approximate only. Exact locations to be determined or accepted by Construction Manager and/or Engineer during construction.

B. Verify, in field, all data and final locations of work, done under other sections of specifications, required for placing of electrical work.

C. In case of interference with other work or erroneous locations with respect to equipment or structures, furnish all labor and materials necessary to complete work.

1.05 APPROVAL AND MARKING EQUIPMENT

A. Ensure that devices and materials are listed and/or labeled by Underwriters' Laboratories, Inc., wherever standards have been established by that agency. Where

Underwriters' Laboratories listing is not available for equipment, submit certified test reports of adequately equipped, recognized, independent testing laboratory, approved by the local inspecting authority, indicating that equipment is in conformance with local code requirements or any other applicable requirements. In lieu of independent test reports, written approval of equipment by local electrical inspecting authority will be acceptable. Tests and/or inspections necessary for approval of equipment will be performed at no additional cost to the City of Santa Cruz.

B. Clearly mark equipment, devices, and material with name or trademark of manufacturer and rating in volts and amperes and other pertinent information on a nameplate.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PROTECTION OF ELECTRICAL EQUIPMENT

A. Protect electrical equipment from the weather, especially from water dripping or splashing upon it, at all times during shipment, storage, and construction. Do not store equipment outdoors. Where equipment is installed or stored in moist areas, such as unheated buildings, etc., provide acceptable means to prevent moisture damage, such as uniformly distributed source of heat to prevent condensation. Furnish protective means, as acceptable to the Owner and the Engineer. Contractor shall ensure that the temperature within the panels does not exceed the maximum operating temperature rating of the components inside the panels.

3.02 DEFECTIVE OR DAMAGED EQUIPMENT

A. Thoroughly dry out equipment or material subjected to possible water damage, and put through special dielectric test as directed, without additional compensation.

B. Replace defective or damaged equipment at no additional cost to the Owner.

3.03 DRAWINGS AND SPECIFICATIONS

A. Drawings and specifications are typical of work done and of arrangement desired. Furnish and install accessories and appurtenances, which Engineer deems functionally necessary for complete installation, whether or not explicitly, indicated or described.

3.04 SEISMIC CONSIDERATIONS

A. Install each piece of equipment such that it is anchored to resist a lateral seismic force of the operating weight of the equipment in compliance with ICBO Uniform Building Codes (UBC), current edition. Consider this force to be acting at the center of gravity of the

piece under consideration. No equipment shall be anchored to vertical structural elements without written approval of the Engineer.

B. Anchor all raceways, ductwork, accessories, appurtenances, etc., furnished with equipment to resist a lateral seismic force of equal to a percentage of its operating weight in compliance with said ICBO's UBC, without excessive deflection. Consider this force acting at the center of gravity on the piece under consideration.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 26 05 00

SECTION 26 00 00 – ELECTRICAL

SUBSECTION 26 05 29
SUPPORTING DEVICES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Conduit and equipment supports.

B. Anchors and fasteners.

1.02 REFERENCES

A. NECA - National Electrical Contractors Association.

B. ANSI/NFPA 70 - National Electrical Code, California Electrical Code.

1.03 SUBMITTALS

A. Submit under provisions of Subsection 01 29 00.

B. Product Data: Provide manufacturer's catalog data for fastening systems.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 – PRODUCTS

2.01 PRODUCT REQUIREMENTS

A. Materials and Finishes: Provide adequate corrosion resistance.

B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduits. Consider weight of wire in conduit when selecting products.

C. Anchors and Fasteners:

1. Concrete Structural Elements: Use expansion anchors and/or preset inserts.

2. Steel Structural Elements: Use beam clamps, and/or welded fasteners.

3. Concrete Surfaces: Use self-drilling anchors and/or expansion anchors.

4. Hollow Masonry: Use toggle bolts and/or hollow wall fasteners.

5. Solid Masonry Walls: Use expansion anchors and/or preset inserts.

6. Sheet Metal: Use sheet metal screws.

7. Wood Elements: Use wood screws.

2.02 STEEL CHANNEL

A. Manufacturer:

1. Unistrut.

2. Power Strut.

3. Substitutions: Under provisions of Subsection 01 33 23.

B. Description: Galvanized steel.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".

C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.

D. Do not use spring steel clips and clamps.

E. Do not use powder-actuated anchors.

F. Do not drill or cut structural members.

G. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

H. Install surface-mounted cabinets and panelboards with minimum of four anchors.

I. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1-inch (25 mm) off wall.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 26 05 29

SECTION 26 00 00 – ELECTRICAL

SUBSECTION 26 05 33
CONDUIT

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Metal conduit.

B. Liquid-tight metallic flexible metal conduit.

C. Nonmetal conduit.

D. Fittings and conduit bodies.

1.02 RELATED SECTIONS

A. Subsection 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Subsection 26 05 53 – Electrical Identification.

C. Subsection 26 27 26 - Supporting Devices.

1.03 REFERENCES

A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.

B. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

C. ANSI/NFPA 70 - National Electrical Code.

D. NECA "Standard of Installation."

E. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.

F. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).

1.04 DESIGN REQUIREMENTS

A. Submit under provisions of Subsection 01 33 23.

B. Conduit Size: ANSI/NFPA 70.

1.05 SUBMITTALS

A. Submit under provisions of Subsection 01 33 23.

B. Product Data: Provide for metallic conduit, liquid-tight flexible metal conduit, nonmetallic conduit, fittings, and conduit bodies.

1.06 PROJECT RECORD DOCUMENTS

A. Accurately record actual routing of all conduits larger than 2-inches.

1.07 REGULATORY REQUIREMENTS

A. Submit under provisions of Subsection 01 33 23.

B. Conform to requirements of ANSI/NFPA 70.

C. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.08 FIELD SAMPLES

B. Provide field sample of conduit, two (2) each at 2 feet long.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle Products to site under provisions of Subsection C01640.

B. Accept conduit on site. Inspect for damage.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

D. Protect PVC conduit from sunlight.

1.10 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 – PRODUCTS

2.01 CONDUIT REQUIREMENTS

A. Minimum Size: ¾-inch (19 mm) unless otherwise specified.

B. Underground Installations: Use PVC-coated rigid steel conduit unless otherwise noted.

C. All other locations: Use rigid steel.

2.02 METAL CONDUIT

A. Manufacturers:

1. Triangle/PWC, Inc.

2. Republic Steel Corporation.

3. Allied Tube and Conduit.

4. Acceptable equivalent.

B. Rigid Steel Conduit: ANSI C80.1.

C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit.

2.03 PVC COATED METAL CONDUIT

A. Manufacturers:

1. Rob Roy Industries.

2. Thomas & Betts (OCAL-BLUE).

3. Acceptable equivalent.

B. Description: NEMA RN 1; rigid steel conduit with external PVC coating, 40 mil (0.1mm) thick.

C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel fittings with external PVC coating to match conduit.

2.04 LIQUID-TIGHT METALLIC FLEXIBLE METAL CONDUIT

A. Manufacturers:

1. Anaconda.

2. Acceptable Equivalent.

B. Description: Interlocked steel construction with PVC jacket, Type UA or UL.

C. Fittings: ANSI/NEMA FB 1.

2.05 NONMETALLIC CONDUIT

A. Manufacturers:

1. Carlon.

2. Cantex.

3. Acceptable Equivalent.

B. Description: NEMA TC 2; Schedule 40 PVC.

C. Fittings and Conduit Bodies: NEMA TC 3.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install conduit in accordance with NECA "Standard of Installation."

B. Underground is classified as Class I, Division 1, Group D. Install seal-offs as conduits daylight from underground.

C. Arrange supports to prevent misalignment during wiring installation.

D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

E. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

F. Arrange conduit to maintain headroom and present neat appearance.

G. Route exposed conduit square, plumb and parallel and perpendicular to walls, equipment and other piping.

H. Route conduit in and under slab from point-to-point.

I. Do not cross conduits in slab.

J. Maintain adequate clearance between conduit and piping.

K. Maintain 12-inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).

L. All joints and terminations of rigid steel conduit and PVC-jacketed rigid steel conduit shall be made by means of threaded fittings. The use of threadless fittings is not acceptable.

M. Cut conduit square using saw or pipe cutter; de-burr cut ends.

N. Bring conduit to shoulder of fittings; fasten securely.

O. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

P. Use conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

Q. Install no more than equivalent of four 90-degree bends in each conduit between boxes. Use hydraulic one-shot bender to fabricate or factory elbows for bends in metal conduit larger than 2-inch (50 mm) size.

R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

S. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control, and expansion joints.

T. Provide suitable pull string in each empty conduit except sleeves and nipples.

U. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

V. Ground and bond conduit under provisions of Subsection 26 05 26.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 26 05 33

SECTION 26 00 00 – ELECTRICAL

SUBSECTION 26 05 53
ELECTRICAL IDENTIFICATION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Nameplates and labels.

B. Wire and cable markers.

C. Conduit markers.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code, California Electrical Code.

1.03 SUBMITTALS

A. Submit under provisions of Subsection 01 33 23.

B. Product Data: Provide catalog data for nameplates, labels, and markers.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under regulatory requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Where applicable, furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 – PRODUCTS

2.01 NAMEPLATES AND LABELS

A. Locations:

1. Each electrical distribution and control equipment enclosure.

2. Communication cabinets.

3. Terminal boxes.

B. Letter Size:

1. Use minimum 1/8-inch (3 mm) letters for identifying individual equipment and loads.

2.02 WIRE MARKERS

A. Manufacturers:

1. Brady.

2. Thomas and Betts.

3. Substitutions: Under provisions of Subsection 01 33 23.

B. Description: Machine-printed cloth tape, vinyl tape, split sleeve, or tubing type wire markers.

C. Locations: Each conductor at panel board gutters, pull boxes, outlet and junction boxes, terminal strips, and each load connection.

D. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.

2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on drawings.

PART 3 – EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive nameplates.

3.02 APPLICATION

A. Install nameplates parallel to equipment lines.

B. Secure nameplate to equipment front using screws or rivets.

C. Secure nameplate to inside surface of door on panel board that is recessed in finished locations.

D. Wire markers shall be installed by workers with clean oil-free hands. Clean all dirt, grease, oil, pulling compound, etc. from wires before installing markers.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 26 05 53

SECTION 26 00 00 – ELECTRICAL

SUBSECTION 26 27 16
CABINETS AND ENCLOSURES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Control Panel and all Control Panel Components.

1.02 RELATED SECTIONS

A. Subsection 26 27 26 - Wiring Devices.

1.03 REFERENCES

A. NEMA 250 - Enclosures for Electrical Equipment (1,000 Volts Maximum).

B. NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems.

C. ANSI/NFPA 70 - National Electrical Code, California Electrical Code.

1.04 SUBMITTALS

A. Submit under provisions of Subsection 01 33 23.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.05 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install Products in accordance with manufacturer's instructions.

B. Install enclosures and boxes plumb. Anchor securely to structural supports at each corner.

C. Install cabinet fronts plumb.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 26 27 16

SECTION 26 00 00

SUBSECTION 26 27 26
WIRING DEVICES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Wall switches.

B. Receptacles.

1.02 REFERENCES

A. NECA - Standard of Installation.

B. NEMA WD 1 - General Requirements for Wiring Devices.

C. NEMA WD 6 - Wiring Device - Dimensional Requirements.

D. NFPA 70 - National Electrical Code, California Electrical Code.

1.03 SUBMITTALS FOR REVIEW

A. Submit under provisions of Subsection 01 33 23.

B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

1.04 SUBMITTALS FOR INFORMATION

A. Submit under provisions of Subsection 01 33 23.

B. Submit manufacturer's installation instructions.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.06 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 – PRODUCTS

2.01 WALL SWITCHES

A. Manufacturers:

1. Arrow Hart.

2. Hubbell.

3. Bryant.

4. Substitutions: Refer to Subsection 01 33 23.

B. Description: NEMA WD 1, Heavy-Duty, AC only general-use snap switch.

C. Body and Handle: Ivory or Brown plastic with toggle handle.

D. Ratings: Match branch circuit and load characteristics.

2.02 RECEPTACLES

A. Manufacturers:

1. Arrow Hart.

2. Hubbell.

3. Bryant.

4. Substitutions: Refer to Subsection 01 33 23.

B. Description: NEMA WD 1, Heavy-duty general use receptacle.

C. Device Body: Ivory or Brown plastic.

D. Configuration: NEMA WD 6, type as specified and indicated.

E. Convenience Receptacle: Type 5-20.

F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

PART 3 – EXECUTION

3.01 EXAMINATION

A. The Contractor shall verify existing conditions prior to beginning work.

B. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.02 PREPARATION

A. Clean debris from outlet boxes.

3.03 INSTALLATION

A. Install in accordance with NECA "Standard of Installation".

B. Install devices plumb and level.

C. Install switches with OFF position down.

D. Install receptacles with grounding pole on bottom.

E. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

F. Connect wiring devices by wrapping conductor around screw terminal.

3.04 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes to obtain mounting heights specified and indicated on drawings.

B. Install wall switch 48-inches (1.2m) above finished floor.

C. Install convenience receptacle 18-inches (450mm) above finished floor.

3.05 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Verify that each receptacle device is energized.

D. Test each receptacle device for proper polarity.

E. Test each GFCI receptacle device for proper operation.

3.06 CLEANING

A. Subsection 01 47 23 – Final Cleaning: Cleaning installed work.

B. Clean exposed surfaces to remove splatters and restore finish.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 26 27 26

SECTION 31 00 00 – SITE WORK

SUBSECTION 31 00 00
EARTHWORK

PART 1 – GENERAL

1.01 SUMMARY DESCRIPTION

A. This section sets forth the requirements for fill and excavation.

B. The Contractor shall assure that the Inspector shall, at all times, have safe access to the work for the purpose of monitoring, observation, and quality assurance (QA) implementation.

1.02 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this Section. This submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. Sieve Analysis, Permeability, Soundness and Durability

PART 2 – PRODUCTS

2.01 EARTH FILL MATERIAL

A. Fill materials shall be free of organic matter, debris, and cobbles. Unless otherwise specified, fill material shall have a maximum particle size of 6 inches.

B. Fill materials, as shown on the drawings, shall be compacted to 90% relative compaction (as determined by ASTM D1557) at optimum to 2% above optimum moisture content.

2.01 SLOPE STABILIZATION MATERIAL

A. Slope stabilization materials shall consist of on-site clay and processed green waste and shall be supplied by the City.

PART 3 – EXECUTION

3.01 GENERAL

A. All earthwork shall conform to the following requirements, where applicable, unless otherwise noted in these Specifications:

1. The Earthwork Contractor shall be solely responsible for the satisfactory completion of all earthwork in accordance with the Drawings and Specifications.

2. The Earthwork Contractor shall be solely responsible for the satisfactory completion of all earthwork in accordance with the Drawings and Specifications.

3. All material considered by the Inspector to be unsuitable for use in the construction of the access road and pad shall be removed. All materials incorporated as part of compacted fill must be inspected and placement must be observed by the inspector.

4. All clearing, grubbing, stripping, and site preparation for the Project shall be accomplished to the satisfaction of the inspector prior to placement of fill material.

5. The ground surface prepared to receive fill shall be moisture conditioned and graded until it is uniform and free from uneven features which may prevent uniform compaction. The ground surface to receive fill shall be brought to approximate optimum moisture content, mixed as required, and compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D1557. The prepared surface shall be firm and unyielding. Prior to fill placement, the ground surface to receive fill shall be inspected by the Engineer.

6. Uncompacted lifts shall not exceed 8 inches in height.

7. Where tests by the inspector indicate that the moisture content or density of any layer of fill, or portion thereof, is below the Project requirements, the particular layer or portion thereof shall be re-worked by the Contractor and retested by the inspector. If failing tests are again noted, the area shall be reworked by the Contractor until the required moisture/density has been attained. No additional fill shall be placed over an area until the prior fill has been tested horizontally and vertically and meets the requirements of these Specifications to the satisfaction of the inspector.

8. Where work is interrupted by heavy rains, fill operations shall not be resumed until observations and field tests by the inspector indicate the moisture content and density of the in-place fills and/or materials intended for placement are within the limits previously specified. This requirement

does not preclude the Earthworks Contractor from disking or aerating excessively wet areas to enhance drying.

9. As determined by the inspector, fill over cut slopes shall be properly keyed through top soils, colluvium, or creep material into firm material. All transitions shall be stripped of all loose soils prior to placing fill.

10. Throughout construction, all excavation and/or fill areas shall be graded to provide positive drainage to appropriate collection/transport structures and to prevent ponding of water. Surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site.

11. The Earthwork Contractor shall assume all responsibility for damage to the installed containment system components arising from sequencing and location of haul routes

3.02 EXCAVATION

A. The Contractor shall complete excavations as indicated on the Drawings and as specified herein. If the Contractor excavates below design grades, the Contractor shall place Fill in compliance with Article 3.1 of these specifications, to re-establish proper grade, at the Contractor's own expense.

B. Removal and replacement of unsuitable soils below proposed grades may be required in some areas.

C. Excess material shall be stockpiled on site or used as a material of construction in accordance with this specification.

D. The areas of excavation shall be graded to drain and the contractor's operations shall be performed in accordance with Monterey Bay Unified Air Pollution Control District dust control requirements.

E. Excavated material shall be placed a sufficient distance from the edge of the excavation to prevent cave ins or slides.

3.03 EARTHFILL

A. Material generated in the excavation may be incorporated into earth fills, provided that it complies with the requirements of Article 2.1, of this section.

B. Earthfill shall be placed in accordance with Article 3.1 of this section, to the grades and/or limits indicated on the drawings. All slope fill shall be placed in horizontal lifts, (not parallel to the gradient of the slope), and shall be trimmed back to the gradients indicated on the

drawings.

3.04 STOCKPILE

A. Material generated during excavation operations, or remaining at the conclusion of the work, shall be transported to the designated stockpile(s), unless otherwise authorized by the Engineer, and placed in accordance with the Drawings. The Contractor shall provide daily cover material stockpile to operations as required by the City. The slopes of all stockpiles shall be track walked, during placement, to minimize soil erosion from wind and/or inclement weather.

B. The Contractor shall also comply with the requirements of the Construction General Permit (CGP), the erosion control provisions of the Contract, the approved Industrial Permit SWPPP for the site, and the Contractor's approved SWPPP.

3.05 REFUSE REMOVAL AND RECONSOLIDATION

A. The Contractor may encounter refuse during excavation operations. All refuse within the limits of proposed excavation shall be excavated, transported to the active waste fill area for disposal. At the conclusion of each day's operation, all exposed waste material in the excavation area shall be covered with a minimum of 6-inches of soil, or other material as approved by the Engineer.

B. The Contractor shall be responsible for implementation and monitoring of all requirements of the Regional Water Quality Control Board.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 31 00 00

SECTION 31 00 00 – SITE WORK

SUBSECTION 31 10 00
CLEARING, GRUBBING, AND DEMOLITION

PART 1 – GENERAL

1.01 SUMMARY DESCRIPTION

A. This section sets forth the requirements for clearing, grubbing, and demolition of existing improvements within the project limits.

1.02 WORK INCLUDED

A. Clearing, grubbing, and demolition shall consist of removing and disposing of all objectionable material and improvements, not designated to be protected, from within the limits of work. Various existing improvements will also be removed and disposed of as part of the clearing and grubbing tasks. See Contract Drawings for items to be removed by the Contractor and items to be removed by the City.

B. The Contractor is advised that not all asphalt pavement, concrete, piping, and/or erosion control improvements are reflected on the drawings. Prior to submitting a Bid, prospective contractors shall review existing site conditions to determine to their satisfaction, the extent of clearing, grubbing, and removal limits. The Contractor shall remove all existing asphalt concrete pavement, base materials, concrete, or other objectionable material from within the construction limits, in accordance with these Specifications.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. Clearing and grubbing shall be performed in accordance with Section 17-2 of Caltrans Standard Specifications. Vegetative material within the limits of work shall be stripped to a sufficient depth to remove all vegetation including roots.

B. In general, material generated from clearing and grubbing operations shall be transported directly to and disposed of in the active landfill area as directed by the City. No “tipping” fees or charges will be assessed to the Contractor for disposal of material generated from work associated with this project.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 31 10 00

SECTION 31 00 00 – SITE WORK

SUBSECTION 31 25 00
EROSION CONTROL

PART 1 – GENERAL

1.01 SUMMARY DESCRIPTION

A. This section describes the general requirements for permanent erosion control measures associated with the performance of the Work.

1.02 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this Section. This submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. Manufacturer's literature/catalog cuts for straw rolls.

2. Manufacturer's literature/catalog cuts for hydroseed.

3. Manufacturer's literature/catalog cuts for silt fence.

PART 2 – PRODUCTS

2.01 STRAW ROLL

A. Straw rolls shall be 9-inches in diameter and shall be manufactured from certified 100% weed rice straw, which is wrapped in a tubular biodegradable netting. Fiber rolls shall be as manufactured by Earth Saver or an approved equivalent.

2.02 SILT FENCE

A. Silt fence fabric shall be woven polypropylene with a minimum width of 36 inches and a minimum tensile strength of 0.45-kN. The fabric shall conform to the requirements in ASTM designation D4632 and shall have an integral reinforcement layer. The reinforcement layer shall be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric shall be between 0.1 sec-1 and 0.15 sec-1 in conformance with the requirements in ASTM designation D4491. Contractor must submit certificate of compliance for the proposed material.

B. Wood stakes shall be commercial quality lumber of the size and shape shown on

the plans. Each stake shall be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

C. Staples used to fasten the fence fabric to the stakes shall be not less than 45 mm (1.75 inches) long and shall be fabricated from 1.57 mm (0.06 inch) or heavier wire.

2.03 HYDROSEED

A. Seed mixes provided by the contractor shall be furnished in accordance with Section 21 of the Standard Specifications.

B. Before seeding, the Contractor shall furnish written evidence (seed label or letter) to the Engineer that the seed is not required to be labeled under the California Food and Agricultural Code and that it conforms to the purity and germination requirements herein.

C. Seed (per seed Type) shall be a minimum of 50% pure live seed (PLS) content. Pure live seed content is defined as the product of, 1) the percentage of tested purity and 2) the percentage of tested germination of the specified seed (pure live seed content % - purity x % germination = 50%) unless otherwise stated. The pure live seed content minimum may be reduced by the City's Consulting Biological Firm if the specified minimum is not available.

D. All legumes shall be inoculated with a viable bacteria compatible for use with that species of seed. Contractor shall furnish written statement of inoculation. The application rate for seed shall be the weight exclusive of inoculating materials.

E. Inoculated seed shall be sown within 20 days of inoculation or shall be re-inoculated. The inoculant shall be added at the rate of five times the amount recommended on the inoculant package.

F. Seed shall be pre-mixed by the seed supplier. A one-ounce sample may be requested by the City's Consulting Biological Firm.

Components	**Rate/Acre**
Bromus carinatus	8 lbs/Acre
Clarkia bottae	2 lbs/Acre
Deschampsia holcifornis	4 lbs/Acre
Elymus glancus	8 lbs/Acre
Eschscholzia californica Poppy	2 lbs/Acre
Melica imperfecta	4 lbs/Acre
Nassella pulchra	6 lbs/Acre
Vulpia microstachys	8 lbs/Acre

As an alternative, the City may elect to substitute the approved Santa Cruz Erosion

Mix for the above referenced mix.

PART 3 – EXECUTION

3.01 STRAW ROLL INSTALLATION

A. The straw rolls shall be installed immediately following completion of earthworks operations in individual areas

B. Contractor shall install the straw rolls at the locations shown on the Drawings and in accordance with the manufacturer's recommendations and the details on the Drawings.

3.02 SILT FENCE

A. Silt fences shall be installed in accordance with the manufacturer's recommendations and the details on the Drawings.

B. Soil shall be trenched to allow 6 inches of the silt fence fabric to fall below the ground surface. Trench shall be backfilled to original grade leaving 6 inches of silt fence fabric below ground.

C. Posts shall be driven a minimum of 18 inches depth below the ground surface. If the silt fence is installed on a slope, the posts shall be positioned on the downward side and if the silt fence is installed on a flat surface, the posts shall be installed to the outside of the fabric.

D. Connection/jointing of silt fences shall be completed by tightly overlapping the ends of the rolls a minimum of twelve inches or by overlapping the end posts and securing the two posts together tightly with plastic wire ties and/or steel bailing wire.

3.03 HYDROSEED APPLICATION

A. All areas designated to receive seed are to be pre-dampened to a 2-inch depth. Do not seed on hot, dry slopes.

B. Hydroseed shall be applied to the designated areas between the dates of September 1 to November 15 of same year.

C. Installation on Slopes

D. Hydroseeding for slope areas shall be performed by a 2-step application process. The second application shall be placed over the first application within a 4-hour period.

E. First application shall include the following hydroslurry components:

Components	Purity/Germination	Rate/Acre
Bromus carinatus	95/80	8 lbs/Acre
Clarkia bottae	98/75	2 lbs/Acre
Deschampsia holcifornis	90/60	4 lbs/Acre
Elymus glancus	90/80	8 lbs/Acre
Eschscholzia californica Poppy	98/75	2 lbs/acre
Melica imperfecta	80/60	4 lbs/Acre
Nassella pulchra	70/60	6 lbs/Acre
Vulpia microstachys	90/60	8 lbs/Acre
Fiber		800 lbs/Acre
Fertilizer 8-8-8 (or approved alternate)		400/Acre

F. A second application of 3000 lbs/acre of straw will cover the first application. Stabilize the straw mulch to the slope by straw crimping or by an application of a hydroslurry consisting of 700 lbs per acre fiber; and 120 lbs per acre organic tackifier, and water. Agitate per Section 21 Erosion Control.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 31 25 00

SECTION 31 00 00 – SITE WORK

SUBSECTION 31 50 00
EXCAVATING SUPPORT AND PROTECTION

PART 1 – GENERAL

1.01 DESCRIPTION

A. This section sets forth the requirements for furnishing all labor, equipment, and materials, and performing all operations in connection with the excavation, backfilling, and compaction and preparation of subgrade for the Flare Station in accordance with the Construction Drawings and Specifications.

1.02 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. Compaction Curve for Foundation Soils (ASTM D1557)

2. Density Test Results

PART 2 – PRODUCTS

2.01 UNCLASSIFIED FILL

A. Unclassified fill material for the proposed slab foundation shall be generated from approved onsite stockpiles, or excavated from areas on the site, as approved by the Engineer.

B. Unclassified fill material shall be free from vegetation, trash, debris, or other deleterious materials. Rocks or rock fragments greater than 3 inches in any dimension shall be removed and disposed of as directed by the CQA Monitor/Officer. Rocks or rock fragments less than 3 inches shall be distributed evenly throughout the unclassified fill. "Nesting" of rock or rock fragments will not be permitted.

2.02 BEDDING MATERIAL

A. The Contractor shall over excavate for and provide a twelve (12) inch thick prescribed backfill layer for the flare stack and air combustion blower slab and the blower skid

slab (per Drawing details). This bedding material shall be placed and compacted at a uniform density and fine graded. The bedding material shall meet the requirements as described in the geotechnical report and contract drawings.

B. The Contractor shall prepare all subgrade per the requirements as stated in the geotechnical report and contract drawings.

2.03 Chain Link Fence

A. Chain link fence shall conform to Caltrans Standard Plans A85 and A85A, and requirements in Section 206-6 of the SSPWC.

PART 3 – EXECUTION

3.01 GENERAL

All earthwork shall conform to the following requirements, where applicable, unless otherwise noted in these Specifications:

A. The Contractor shall be solely responsible for the satisfactory completion of all earthwork in accordance with the Drawings and Specifications.

B. Equipment used in the excavation, transport, stockpiling, processing, placement and compaction of all materials used in earthwork construction of the composite liner system will be standard-of-practice grading machinery of known specifications suitable for performing the required work in a timely and efficient manner.

C. All material considered by the CQA Monitor/Officer to be unsuitable for use in the construction of the foundation fill shall be removed. All materials incorporated as part of compacted fill must be inspected and placement must be observed by the CQA Monitor/Officer.

D. All clearing, grubbing, stripping, and site preparation for the Project shall be accomplished to the satisfaction of the CQA Monitor/Officer prior to placement of fill material.

E. Prior to placement of fill, the existing surface shall be scarified; moisture conditioned and graded until it is uniform and free from uneven features which may prevent uniform compaction. The ground surface to receive fill shall be brought to 5 percent above optimum moisture content, mixed as required, and compacted 88 to 92 percent relative compaction in the upper 8 inches. The prepared surface shall be firm and unyielding. Prior to fill placement, the ground surface to receive fill shall be inspected by the CQA Monitor/Officer and a third-party special inspection firm, retained by the Contractor, as needed to confirm density requirements are met.

F. Fill material shall be placed in horizontal lifts with a maximum uncompacted thickness not to exceed eight (8) inches. Each layer shall be spread evenly and thoroughly mixed to obtain a near uniform condition in each layer. In areas of excess lift thickness, regrading of the surface to the maximum lift thickness will be completed prior to proceeding with compaction in that area.

G. Unclassified fills shall be brought to ±5 percent of optimum moisture content, mixed as required, and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557.

H. Where tests by the CQA Monitor/Officer or special inspector indicate that the moisture content or density of any layer of fill, or portion thereof, is below the Project requirements, the particular layer or portion thereof shall be re-worked by the Contractor and retested by the CQA Monitor/Officer or special inspector. If failing tests are again noted, the area shall be reworked by the Contractor until the required moisture/density has been attained. No additional fill shall be placed over an area until the prior fill has been tested horizontally and vertically and meets the requirements of these Specifications to the satisfaction of the CQA Monitor/Officer or special inspector.

I. Where work is interrupted by heavy rains, fill operations shall not be resumed until observations and field tests by the CQA Monitor/Officer indicate the moisture content and density of the in-place fills and/or materials intended for placement are within the limits previously specified. This requirement does not preclude the Earthworks Contractor from disking or aerating excessively wet areas to enhance drying.

J. As determined by the CQA Monitor/Officer, fill over cut slopes shall be properly keyed through top soils, colluvium, or creep material into firm material. All transitions shall be stripped of all loose soils prior to placing fill.

K. Throughout construction, all excavation and/or fill areas shall be graded to provide positive drainage to appropriate collection/transport structures and to prevent ponding of water. Surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site.

L. The Earthworks Contractor shall assume all responsibility for damage to the installed containment system components as a result of their activities.

3.02 DUST CONTROL

A. The Contractor shall furnish all labor, materials, and equipment required to maintain dust control as described in Subsection 4.05 of the City Standard Specifications.

3.03 EROSION CONTROL

A. During earthwork activities, Best Management Practices shall be used to prevent erosion of soils temporarily stockpiled from excavation and fill areas. Practices such as silt fences and not working during rain events or windy days may be used to reduce soil erosion.

3.04 CHAIN LINK FENCE

A. Construct chain link fence in accordance with Section 304-3 of the SSPWC.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 31 50 00

SECTION 31 00 00 – SITE WORK

SUBSECTION 31 60 00
SPECIAL FOUNDATION AND LOADBEARING ELEMENTS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall furnish all labor, equipment, and materials necessary for construction of the Flare Station Improvements including the concrete foundation, footings, pedestals, and all other incidentals and appurtenances required by the Construction Drawings and as specified herein.

1.02 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. Concrete mix design and Certificate of Compliance
2. Reinforcing steel and Certificate of Compliance
3. Curing compound and Certificate of Compliance
4. Testing results
5. Silicone joint sealant
6. Gravel, Sand, and Crushed Miscellaneous Base (CMB)

PART 2 – PRODUCTS

2.01 CONCRETE

A. The Contractor shall mix and deliver concrete in accordance with ASTM C94. Concrete shall have minimum ultimate compressive strength of 4,000 psi at 28 days for all structural slab and footings unless otherwise shown on plans.

B. Concrete shall conform to the requirements of Section 201 of the SSPWC. The Contractor shall submit Certificates of Compliance indicating that the material supplied is in accordance with project Specifications. Mix designs shall be submitted for cast-in-place concrete.

C. Cement for concrete shall be Portland cement, Type II/V, conforming to ASTM C150.

D. Water used in concrete shall be fresh, clean, reasonably clear, and free from oil, acid, alkali, organic matter, and any material detrimental to concrete. Minimize excess water which reduces the rated strength of concrete.

2.02 REINFORCEMENT

A. Reinforcing steel for concrete structures shall be furnished in accordance with Section 201-2 of the SSPWC, and shall conform to ASTM A615 Grade 60, unless otherwise shown. The Contractor shall submit Certificates of Compliance representative of the reinforcing steel to be used on the project.

B. Epoxy for epoxy anchored dowels shall be manufactured by HAS-V-36 anchors with HIT-HY 270 adhesive anchors, manufactured by Hilti or unless otherwise shown on plans. Threaded rod anchors shall be ASTM A307 & A36 and reinforcing steel dowels shall be ASTM A615, Grade 60.

2.03 ACCESSORY MATERIALS

A. Tie Wire: minimum gauge annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: sized and shaped for strength and support of reinforcement during concrete placement.

2.04 CURING COMPOUND

A. Curing compounds for concrete improvements shall conform to the requirements of Section 201-4 of the SSPWC, Type 1-D or Type 2. The Contractor shall submit a Certificate of Compliance for the proposed curing compound to be used.

2.05 JOINT SEALANT

A. Joint sealant shall conform to the requirements of Section 201-3 of the SSPWC.

2.06 GRAVEL, SAND, CMB

A. Aggregate shall conform to the requirements of Section 200-1.4 of the SSPWC, or approved equal. Sieve size shall be No. 2 or No. 3.

B. Sand bedding material shall conform to the requirements of Section 200-1.5 of the SSPWC, or approved equal.

C. CMB material shall conform to the requirements of Section 200-2.4 of the SSPWC, or approved equal.

2.07 CRUSHED MISCELLANEOUS BASE

A. CMB shall meet the requirements of Section 200-2.4 of the SSPWC. The Contractor shall submit a certified sieve analysis, results of California Test 202, and specific gravity testing prior to import of CMB material to the site. The gradation shall conform to "fine" in Table 200-2.4.2 (A) of the SSPWC.

PART 3 – EXECUTION

3.01 CONCRETE/REINFORCEMENT PLACEMENT

A. The Contractor shall place and finish concrete to the lines and grades indicated on the Drawings. Contractor shall verify tank seismic anchoring requirements and submit any required reinforcement or other lab modifications to Engineer for approval prior to slab construction.

B. All Concrete shall be cured in accordance with the applicable portions of Section 303-1.10 of the SSPWC.

C. Notify the City (or other appropriate regulatory agency) a minimum of 48 hours prior to commencement of concrete placement.

3.02 CONCRETE FINISHING

A. The Contractor shall finish concrete surfaces to fine broom surface finish unless otherwise detailed on the Drawings.

B. Construction joints shall be cut. Saw cuts shall not exceed 1½-inch in depth. No construction joints shall intersect the upper layer of reinforcement. The saw cut joints shall be filled with an appropriate silicone sealant manufactured specifically for this application.

3.03 GRAVEL

A. Gravel shall be spread in approximately a 3-inch layer within the graded limits of the Flare Station, as shown on the Drawings.

3.04 FILL/AGGREGATE BASE PLACEMENT AND COMPACTION

A. CMB for the roadways shall be placed in horizontal lifts not exceeding 8-inches in initial loose lift thickness; moisture conditioned to a moisture content between optimum to 3% above optimum and compacted to at least 95% relative compaction based on ASTM D1557.

B. The Engineer shall be informed if excessively soft soils are encountered to determine alternate construction methods.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 31 60 00

SECTION 31 00 00 – SITE WORK

SUBSECTION 32 00 00
MISCELLANEOUS CIVIL IMPROVEMENTS

PART 1 – GENERAL

1.01 SUMMARY DESCRIPTION

A. This section sets for the requirements for miscellaneous civil improvements including concrete drainage channels, drainage pipe and paving.

1.02 SUBMITTALS REQUIRED

A. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this Section. This submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. Corrugated HDPE Pipe Certificates of Compliance
2. Asphalt Pavement Mix Designs
3. Certificate of compliance for bedding material for piping
4. As-Built Drawings
5. Manufacturer's product data sheets for pipe supports and fittings

PART 2 – PRODUCTS

2.01 CORRUGATED HDPE PIPE

A. Corrugated HDPE Pipe shall be of the size indicated on the drawings, furnished in accordance with Section 64-2.02C of the Caltrans Standard Specifications, including fittings. Pipe shall be installed with watertight joints. The Contractor shall submit manufacturer's catalog cuts and Certificates of Compliance representative of the HDPE culvert pipe to be used on the project.

2.02 BEDDING MATERIAL FOR PIPING

A. Bedding material for piping shall conform to the requirements of Section 68-2.02F(3) of the Caltrans Standard Specifications for Class 2 Permeable Material.

2.03 ASPHALT PAVING

A. Asphalt used for paving shall be Type A and conform with Section 39-2.02 of the Caltrans Standard Specifications.

B. Asphalt mix designs shall be submitted for the Engineers review and approval.

2.04 AGGREGATE BASE

A. Aggregate Base shall conform to the requirements of Class 2 Aggregate Base in Section 26-1.02B of the Caltrans Specifications.

PART 3 – EXECUTION

3.01 CORRUGATED HDPE AND CSP PIPE

A. The pipe shall be installed in accordance with the manufacturer's recommendations and Section 64-2.03 of the Caltrans Standard Specifications.

3.02 PIPE INSTALLATION

A. Trench Excavation

1. No excavation which exceeds five (5) feet in depth shall begin until the Contractor has submitted and received approval of Trench Excavation Safety Plan in accordance with Section 7-1.02K(6)(b) of the Caltrans Standard Specifications.
2. Minimum trench width excavation shall be the outside diameter of the pipe plus eighteen (18) inches. Maximum trench width shall not exceed the manufacturer's recommendations.

B. Pipe Installation

1. Subgrade for the pipe shall be graded to provide for a uniform bearing along the entire length of the pipe and shall be free or rocks or projections which may damage the pipe. The subgrade shall be firm and unyielding. Areas which have been over excavated shall be recompacted to a minimum density of 90 percent of the maximum dry density as determined by ASTM D1557.

3. Where the pipe is installed with the crown of the pipe above the ground surface or within 6 inches below the ground surface, the pipe shall be anchored with a soil pile with a minimum volume of

one cubic yard at 20-foot intervals along the length of the pipe.

4. Please review CQA requirements outlined in Attachment A.

2. Bedding, Backfill, and Compaction

1. Bedding material shall be placed and compacted to a depth equal to the top of the pipe. Compaction shall be accomplished with hand-operated equipment, or with equipment which will not exceed the loading requirements recommended by the manufacturer. The material shall be placed in loose lifts not to exceed eight (8) inches, and compacted to a minimum density of 90 percent of the maximum dry density as determined by ASTM D1557.

3. Joints, Fittings, and Leakage Test

1. Joints and fittings shall be installed to provide for watertight joints in accordance with approved manufacturer's recommendations. Performance testing for watertight joints shall conform to the provisions of Section 61-2 of the Caltrans Standard Specifications.

3.03 ASPHALT PAVEMENT

A. The Contractor shall place and compact asphalt paving to the lines and grades indicated on the Drawings. HMA and tack coat shall be placed in accordance with Section 39-2.01C of the Caltrans Standard Specifications.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 32 00 00

SECTION 31 00 00 – SITE WORK

SUBSECTION 32 30 00
LANDFILL GAS FLARE STATION IMPROVEMENTS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work related to the LFG flare station equipment, and control system equipment shall consist of furnish and installing miscellaneous piping, safety apparatuses, related appurtenances, and installing all equipment provided by the Flare Manufacturer, in accordance with details as indicated on the Drawings and as specified herein.

1.02 GENERAL REQUIREMENTS

A. All component items of equipment shall be the product of a manufacturer experienced in the design, construction, and operation of equipment for the purpose required. The manufacturer shall have an established record of successfully operating such equipment it has manufactured or produced.

B. The Contractor shall furnish and install all piping, fittings, supports, controls, and accessories, as shown on the Construction Drawings that are not provided by the equipment manufacturer to obtain a complete and operable flare station.

C. All equipment shall be designed, fabricated, and assembled in accordance with the best modern engineering and shop practice. Individual parts shall be manufactured to standard sizes and gauges so that repair parts, furnished at any time, can be installed in the field.

D. All mechanisms and components shall be engineered to withstand the stresses which may occur during operation or for any other stresses which may occur during fabrication, transportation, installation, operation, seismic, and weather events.

E. Equipment and materials shall include all production line improvements made by the delivery or contract date. All equipment shall comply with applicable requirements of the standards of AISC, AGA, ASME, AWS, NFPA, and UL as of the bid submittal date. The equipment shall be furnished factory assembled to the extent possible and ready for installation.

1.03 SUBMITTALS REQUIRED

A. If the proposed equipment requires an arrangement differing from that indicated on the Drawings and as specified, the Contractor shall be responsible for preparing and submitting for review detailed structural, mechanical, electrical, P&ID drawings, equipment lists, materials of construction, operating instructions, and written explanation for the new

arrangement, showing all the necessary changes and all special features of proposed equipment. The Contractor shall make such changes, if approved by the Engineer, at no additional cost to the City.

B. Materials List: Contractor shall submit three (3) copies of a complete list of all materials and equipment proposed to be furnished and installed under this portion of the work, giving the manufacturer's name, catalog number, and catalog cut for each item where applicable.

C. Manufacturer's Recommendations: Accompanying the materials list, submit three (3) copies of the manufacturer's current recommended method of installation for materials provided.

D. Submit warranties.

E. The Contractor shall thoroughly review the Specifications and identify all required project submittals. The submittals listed below are intended as a general summary of the submittal items contained in this section. The submittal list does not release the Contractor from the responsibility of identifying and providing all information requested.

1. SS Pipe and Fittings

2. Black Iron Pipe and Fittings

3. HDPE Pipe and Fittings

4. Galvanized Carbon Steel Pipe and Fittings

5. Piping Pressure Test Results

PART 2 - PRODUCTS

2.01 COMBUSTION AIR BLOWER

A. Combustion air blower anchoring shall be as specified by the Construction Drawings.

2.02 GENERATOR

A. the Contractor shall provide a generator to connect to switch gear if PG&E power is not available at the time of startup.

PART 3 – EXECUTION

3.01 GENERAL

A. All work shall be performed in accordance with the Construction Drawings.

B. The area around the flare station shall be free draining away from the equipment, as shown on the Construction Drawings.

C. Prior to making connections, all lines shall be purged of debris and thoroughly cleaned. All pipe shall be connected using good engineering practice.

D. The excavation and disposal of excavated material, related to the construction of the flare station, shall conform to all applicable requirements of these Specifications and be the responsibility of the Contractor.

E. The pipes, fittings, valves, and all connections shall be as shown on the Construction Drawings.

F. Prior to installation, protect stored valves and appurtenances from damage due to exposure to sunlight, heat, dirt, debris, freezing and thawing, vandalism, etc.

G. Clean all debris, dirt, gravel, etc., from inside of piping before installing.

H. Erect and support valves, instrumentation, and piping in respective positions free from distortion and strain on appurtenances during handling and installation. Inspect material for defects in workmanship and material. Clean out debris and foreign material from valve openings and seats, test operating mechanisms to check proper functioning after cleaning, and check nuts and bolts for tightness. Repair valves and other equipment which do not operate easily or are otherwise defective. Recheck bolt tightness and adjust prior to startup.

I. During installation, set plumb and support valves, instrumentation, and piping adequately in conformance with instructions of manufacturer.

J. Prior to acceptance, the following verifications shall be made:

1. Verify all connections have been pressure-tested in accordance with these Specifications.

2. Verify the pipes and connections are clean and free of debris.

3. As-built elevations shall be recorded by the Contractor and submitted to the Engineer by the Contractor prior to project acceptance. Adjustments to the location of the pump station may be required. These adjustments

will be made at no additional cost to the City. Any adjustments made by the Contractor shall require proposed coordinates.

K. Flare stack, combustion air blower, and blower skid installation shall not commence until after complete curing of the concrete. See Section 31 60 00.

3.01 BLOWERS

A. Blowers shall be laser aligned during installation and startup.

3.01 EQUIPMENT INSTALLATION

A. All equipment and components of the flare station shall be installed in accordance with the individual manufacturer's installation instructions, and the design intent, as represented on the Construction Drawings. Any proposed deviations or adjustments to the design, due to field, or other conditions, shall immediately be brought to the attention of the Engineer. The Contractor shall not revise, adjust, modify, or otherwise change the designed configuration without the approval of the Engineer. Equipment anchoring shall be as specified by the manufacturer.

3.02 TESTING

A. Testing of the equipment, instrumentations, and valving shall be in accordance with the manufacturer's recommendations.

3.04 DRAWINGS AND DATA

A. Complete as-built fabrication, assembly, support and installation drawings, showing fabrication details, detailed specifications, materials used, parts devices and other accessories forming a part of the equipment furnished, shall be submitted for inclusion in the Operations and Maintenance Manual.

PART 4 – PAYMENT

A. Payment for all items in this section will include costs for furnishing labor, materials, equipment, and incidentals required to complete the work in accordance with the Drawings and these Specifications. Separate payment for this work shall not be made. Payment will be included within the various line items in the Bid Schedule and in Subsection 01 29 00. Quantities installed beyond the limits indicated or shown on the Drawings will not be compensated unless previously authorized by the Engineer.

END OF SUBSECTION 32 30 00