CONTRACT DOCUMENTS

FOR THE CONSTRUCTION OF THE

NORTH SIMONTON STORMWATER EMERGENCY OUTFALL

PREPARED FOR

CITY OF KEY WEST

Volume 1 of 2

SPECIFICATIONS

For information regarding
this project, contact:

ANDREW SMYTH P.E.
6410 5th Street, Suite 2-A
Key West, FL 33040
305/294-1645

CH2MHILL®

CH2M Hill Project No. 476166
City of Key West Project No. ST 1302
City of Key West ITB No. 14-010
MARCH 2014

BID DOCUMENTS

CITY OF KEY WEST
KEY WEST, FLORIDA

BIDDING REQUIREMENTS
AND
CONTRACT DOCUMENTS

for the construction of the

NORTH SIMONTON
STORMWATER EMERGENCY OUTFALL

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CH2M HILL

Key West, Florida

March 2014

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PART 1

PROCUREMENT REQUIREMENTS

INVITATION TO BID

Sealed Bids for the City of Key West **North Simonton Stormwater Emergency Outfall**, addressed to the City of Key West, will be received at the Office of the City Clerk, City of Key West, 3126 Flagler Avenue, Key West Florida, 33040, until **3:00 p.m., local time, April 16, 2014,** and then will be publicly opened and read. Any Bids received after the time and date specified will not be considered.

Please submit two (2) originals and four (4) CD-ROMS or USB Drives with one single PDF file of the entire bid package on each CD-ROM. Bid package is to be enclosed in a sealed envelope, clearly marked on the outside "**BID FOR CONSTRUCTION OF NORTH SIMONTON STORMWATER EMERGENCY OUTFALL"** addressed and delivered to the City Clerk at the address noted above.

The Project proposes improvements to the City of Key West, Florida, drainage system to reduce flooding and pretreat stormwater runoff. The Project consists of the installation of an emergency generator with concrete platform, associated electrical and I&C, approximately 300 L.F. of 36-inch PVC outfall to the ocean, ocean outfall structure, and all related work and appurtenances.

Drawings and Specifications may be obtained from Demand Star by Onvia. Please contact Demand Star at www.demandstar.com or call 1-800-711-1712.

A **Mandatory** Pre-Bid Conference will, be held in at **10:00 a.m.** on **April 3, 2014**, at the City of Key West Old City Hall, 2nd Floor, 510 Greene Street, Key West, Florida, 33040.

Each Bid must be submitted on the prescribed form and accompanied by Bid security as prescribed in the Instructions to Bidders, payable to the City of Key West, Florida, in an amount not less than (5) five percent of the amount of the Bid. The Contractor shall be a licensed contractor by the State of Florida and submit proof of such with the Bid.

The Successful Bidder will be required to furnish the necessary additional bond(s) for the faithful performance of the Contract, as prescribed in the Bidding Documents. The Bidder will also be required to furnish documentation showing that they are in compliance with the licensing requirements of the State and the provisions of Chapter 66 Section 87 of the Code of Ordinances of the City of Key West. Compliance with these provisions is required before the Contractor can enter into the agreement contained in the Contract Documents. Specifically, Bidder shall demonstrate that they hold, as a minimum, the following licenses and certificates required by State Statute and local codes.

EACH BID MUST BE SUBMITTED ON THE PRESCRIBED FORM AND ACCOMPANIED BY BID SECURITY AS PRESCRIBED IN THE INSTRUCTIONS TO BIDDERS, PAYABLE TO THE CITY OF KEY WEST, FLORIDA, IN AN AMOUNT NOT LESS THAN FIVE (5) PERCENT OF THE AMOUNT BID.

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THE BIDDER MUST BE A LICENSED CONTRACTOR BY THE STATE OF FLORIDA AND SUBMIT PROOF OF SUCH WITH THE BID.

The Bidder shall furnish documentation showing that he is in compliance with the licensing requirements of the provisions of Chapter 66 Section 87 of the Code of Ordinances of the City of Key West; within 10 days the following the Notice of Award and the following documentation:

1. City of Key West Tax License Receipt.

All Bid bonds, contract bonds, insurance contracts, and certificates of insurance shall be either executed by or countersigned by a licensed resident agent of the Surety or Insurance Company having his place of business in the State of Florida, and in all ways complying with the insurance laws of the State of Florida. Further, the said Surety or Insurance Company shall be duly licensed and qualified to do business in the State of Florida.

Before a Contract will be awarded for the Work contemplated herein, the City will conduct such investigation as is necessary to determine the performance record and ability of the Apparent Low Bidder to perform the size and type of work specified under this Contract. Upon request, the Bidder shall submit such information as deemed necessary by the City to evaluate the Bidder's qualifications.

For information concerning the proposed work or for appointment to visit the Site of the proposed work, contact the designated Engineer by the General Services and Utilities Department of the City of Key West.

As stated above at the time of the Bid submittal the Bidder must provide satisfactory documentation of State Licenses. The Bidder shall furnish documentation showing that they are in compliance with the licensing requirements of County, and City licenses as would be required within 10 days of the Award. The Successful Bidder must also be able to satisfy the City Attorney as to such insurance coverage and legal requirements as may be demanded by the Bid in question.

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The City may reject Bids for any and/or all of the following reasons: 1) for budgetary reasons; 2) if the Bidder misstates or conceals a material fact in its Bid, 3) if the Bid does not strictly conform to the law or is non-responsive to the bid requirements; 4) if the Bid is conditional; or 5) if a change of circumstances occurs making the purpose of the Bid unnecessary to the City. The City may also waive any minor formalities or irregularities in any Bid, 6) if such rejection is in the best interest of the City. The City may also waive any minor formalities or irregularities in any Bid.

Dated this _____ day of _____, 20_____

CITY OF KEY WEST

By _____
Bob Vitas, City Manager

END OF SECTION

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STATEMENT OF NO BID #ITB 14-010

NORTH SIMONTON STORMWATER EMERGENCY OUTFALL

NOTE: IF YOU DO NOT INTEND TO BID, PLEASE RETURN THIS FORM ONLY

CITY OF KEY WEST
FINANCE DEPARTMENT
P.O. BOX 1409
KEY WEST, FLORIDA 33040
ATTN: S. SNIDER

We, the undersigned have declined to bid on the above-noted Invitation to Bid for the following reason(s):

___ Insufficient time to respond to Invitation to Bid
___ Do not offer this product
___ Our schedule will not permit us to perform
___ Unable to meet specifications
___ Specifications unclear (please explain below)
___ Remove us from your "Bidder Mailing List"
___ Other (Please specify below)

_____

_____

_____

We understand that if a “No Bid” statement is not returned, our name may be removed from the Bidder’s list of the City of Key West.

COMPANY
NAME:_____

AUTHORIZED
AGENT_____

COMPANY
ADDRESS_____

DATE:_____ TELEPHONE: _____

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INSTRUCTIONS TO BIDDERS

1. CONTRACT DOCUMENTS

1.1. Format: The Contract Documents are divided into parts, divisions, and sections for convenient organization and reference. Generally, there has been no attempt to divide the Specification sections into work performed by the various building trades, work by separate subcontractors, or work required for separate facilities in the Project.

1.2. Document Interpretation:

1.2.1. The separate sections contained within these Contract Documents are intended to be mutually cooperative and to provide all details reasonably required for the execution of the proposed work.

1.2.2. Should there be any doubt as to the meaning or intent of said Contract Documents, the Bidder should request of the Engineer, in writing (at least 6 working days prior to bid opening) an interpretation thereof. Any interpretation or change in said Contract Documents will be made only in writing, in the form of Addenda to the Documents which will be furnished to all registered holders of Contract Documents. Bidders shall submit with their Bid, or indicate receipt of, all Addenda. The Owner will not be responsible for any other explanation or interpretations of said Documents.

1.3. Drawings: Details of construction are bound separately.

2. GENERAL DESCRIPTION OF THE PROJECT

2.1. A general description of the work to be done is contained in the Invitation to Bid. The scope is specified in applicable parts of these Contract Documents.

3. QUALIFICATION OF CONTRACTORS

3.1. The prospective Bidders must meet the statutorily prescribed requirements before award of Contract by the Owner.

3.2. Bidders must hold or obtain all licenses or certificates required by federal, state, or local statutes, or regulations in order to bid and perform the work specified herein.

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4. BIDDER'S UNDERSTANDING

4.1. Each Bidder must inform himself of the conditions relating to the execution of the work, and it is assumed that he will inspect the site and make himself thoroughly familiar with all the Contract Documents. Failure to do so will not relieve the successful Bidder of his obligation to enter into a Contract and complete the contemplated work in strict accordance with the Contract Documents. It shall be the Bidder's obligation to verify for himself and to his complete satisfaction all information concerning site and subsurface conditions.

4.2. The Owner will make available to prospective Bidders upon request and at the office of the Engineer, prior to bid opening, any information that he may have as to subsurface conditions and surface topography at the Work Site.

4.3. Information derived from inspection of topographic maps, or from Drawings showing location of utilities and structures will not in any way relieve the Contractor from any risk, or from properly examining the Site and making such additional investigations as he may elect, or from properly fulfilling all the terms of the Contract Documents.

4.4. Each Bidder shall inform himself of, and the Bidder awarded a Contract shall comply with, federal, state, and local laws, statutes, and ordinances relative to the execution of the work. This requirement includes, but is not limited to, applicable regulations concerning minimum wage rates, nondiscrimination in the employment of labor, protection of public and employee safety and health, environmental protection, the protection of natural resources, fire protection, burning and nonburning requirements, permits, fees, and similar subjects.

5. TYPE OF PROPOSAL

5.1. Unit Price:

5.1.1. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.

5.1.2. The total of all Bid unit prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.

5.1.3. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

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5.1.4. Units of measure shown on Bid Form shall have the meanings as described in Section 01 29 00, Payment Procedures.

6. PREPARATION OF PROPOSALS

6.1. General:

6.1.1. All blank spaces in the Bid form must be filled in for all schedules and associated parts, as required, preferably in BLACK ink. All price information shall be clearly shown in figures where required. No changes shall be made in the phraseology of the forms. In case of discrepancy between unit prices and extended totals, unit prices shall prevail.

6.1.2. Any Bid shall be deemed informal which contains omissions, erasures, alterations, or additions of any kind, or prices uncalled for, or in which any of the prices are obviously unbalanced, or which in any manner shall fail to conform to the conditions of the published Invitation to Bid.

6.1.3. Only one Bid from any individual, firm, partnership, or corporation, under the same or different names, will be considered. Should it appear to the Owner that any Bidder is interested in more than one Bid for work contemplated, all Bids in which such Bidder is interested will be rejected.

6.2. Description of Suppliers: The manufacturer name, trade name, brand name, or catalog number used in the Specifications is for the purpose of describing and establishing equipment that has been presented for this Project. Other equipment will not be accepted.

6.3. Signature: The Bidder shall sign his Bid in the blank space provided therefore. If Bidder is a corporation, the legal name of the corporation shall be set forth above, together with the signature of the officer or officers authorized to sign Contracts on behalf of the corporation. If Bidder is a partnership, the true name of the firm shall be set forth above, together with the signature of the partner or partners authorized to sign Contracts in behalf of the partnership. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a notarized power-of-attorney must be on file with the Owner prior to opening of Bids or submitted with the Bid, otherwise the Bid will be regarded as not properly authorized.

6.4. Special Bidding Requirements:

6.4.1. The Bidder's attention is brought to the hiring practices and licenses and permits of the City of Key West.

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6.4.2. The Bidder shall submit with his Bid his experience record showing his experience and expertise in construction of generator and electrical systems, civil/site construction, and wastewater or stormwater pumping stations. The Contractor shall also be responsible for restoration work (e.g., pavement, curbing, landscape, etc.). Such experience record shall provide at least five current or recent projects of similar work, preferably within Florida or the southeastern United States. For each project the following information shall be provided:

6.4.2.1. Description and location of work.

6.4.2.2. Contract amount.

6.4.2.3. Dates work was performed.

6.4.2.4. Owner.

6.4.2.5. Name of Owner’s contact person and phone number.

6.4.2.6. Engineer.

6.4.2.7. Name of Engineer's contact person and phone number.

6.5. Attachments:

6.5.1. Bidder shall complete and submit the following forms with this Bid:

6.5.1.1. Anti Kickback Affidavit.

6.5.1.2. Public Entity Crimes.

6.5.1.3. Key West Indemnification Form.

6.5.1.4. Disclosure of Lobbying Activities.

6.5.1.5. Non-Collusion Declaration and Compliance with 49 CFR §29.

6.5.1.6. Florida Trench Safety Act Compliance.

6.5.1.7. Suspension and Debarment Certification.

6.5.1.8. Equal Benefits for Domestic Partners Affidavit.

6.5.1.9. Cone of Silence.

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6.6. Public Entity Crimes: A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list."

6.7. City of Key West License Required: Contractor is required to have a Certified or registered Electrical Contractors City of Key West license and a Certified or Registered General Contractors City of Key West license. License fees not to exceed $350.00.

6.8. Anti-Kickback Affidavit: The Bidder shall submit a signed and notarized Anti-Kickback Affidavit with Bid on the form provided herein.

6.9. Florida Trench Safety Act: The Bidders attention is directed to the enactment of the Florida Trench Safety Act which incorporates OSHA Standards 29CFRs 1926.650, Subpart P, as the state's trench excavation safety standards. The Bidder shall list separately, in the Bid, the cost of compliance with these standards on a linear footage basis and the method of compliance. The Bidder shall determine if special shoring requirements are needed. Special shoring shall be identified in the Bid. The successful Bidder is fully responsible for the design of the trench safety system and the compliance with the applicable standards for the Project.

7. STATE AND LOCAL SALES AND USE TAXES

7.1. Unless the Supplementary Conditions contains a statement that the Owner is exempt from state sales tax on materials incorporated into the work due to the qualification of the Work under this Contract, all state and local sales and use taxes, as required by the laws and statutes of the state and its political subdivisions, shall be paid by the Contractor. Prices quoted in the Bid shall include all nonexempt sales and use taxes, unless provision is made in the Bid form to separately itemize the tax.

8. SUBMISSION OF PROPOSALS

8.1. All Bids must be submitted not later than the time prescribed, at the place, and in the manner set forth in the Invitation to Bid. Bids must be made on the Bid forms provided herewith. The Bidder shall submit two (2) originals and **FOUR (4) ELECTRONIC COPIES ON DISC or USB DRIVES WITH A SINGLE PDF FILE OF THE FULL PROPOSAL** and all required bonds, attachments, and forms.

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8.2. Each Bid must be submitted in two sealed envelope one within the other, so marked as to indicate the Bidder's name and its contents without being opened, and addressed in conformance with the instructions in the Invitation to Bid.

9. MODIFICATION OR WITHDRAWAL OF PROPOSALS

9.1. Prior to the time and date designated for receipt of Bids, any Bid submitted may be withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder or by telegram. If by telegram, written confirmation over the signature of the Bidder shall be mailed and postmarked on or before the date and time set for receipt of Bids. No Bid may be withdrawn after the time scheduled for opening of Bids, unless the time specified in paragraph Award of Contract of these Instructions to Bidders shall have elapsed.

10. BID SECURITY

10.1. Bids must be accompanied by cash, a certified check, or cashier's check drawn on a bank in good standing, or a bid bond issued by a Surety authorized to issue such bonds in the state where the work is located, in the amount of 5 percent of the total amount of the Bid submitted. This bid security shall be given as a guarantee that the Bidder will not withdraw his Bid for a period of 180 days after bid opening, and that if awarded the Contract, the successful Bidder will execute the attached Contract and furnish properly executed Performance and Payment Bonds, each in the full amount of the Contract price within the time specified.

10.2. The Attorney-in-Fact who executes this bond in behalf of the Surety must attach a notarized copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the bond. Where State Statute requires, certification by a resident agent shall also be provided.

10.3. If the Bidder elects to furnish a Bid Bond, he shall use the Bid Bond form bound herewith, or one conforming substantially thereto in form and content.

11. RETURN OF BID SECURITY

11.1. Within 15 days after the award of the Contract, the Owner will return the bid securities to all Bidders who’s Bids are not to be further considered in awarding the Contract. Retained bid securities will be held until the Contract has been finally executed, after which all bid securities, other than Bidders' bonds and any guarantees which have been forfeited, will be returned to the respective Bidders whose Bids they accompanied.

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12. AWARD OF CONTRACT

12.1. The Award will be made under one Contract by the Owner on the basis of the Bid from the lowest, responsive, responsible Bidder. The Owner may award entire Bid or selected line items based on the City's best interest and available funds at time of Award.

12.2. Within 90 calendar days after the opening of Bids, the Owner will accept one of the Bids or will act in accordance with the following paragraphs. The acceptance of the Bid will be by written notice of award, mailed to the office designated in the Bid, or delivered to the Bidder's representative. In the event of failure of the lowest responsive, responsible Bidder to sign the Contract and provide an acceptable Performance Bond, Payment Bond, insurance certificate(s) and evidence of holding required licenses and certificates, the Owner may award the Contract to the next lowest responsive, responsible Bidder. Such award, if made, will be made within 105 days after the opening of Bids. Bidders will guarantee their bid price(s) for up to 105 calendar days after bid opening.

12.3. The Owner reserves the right to accept or reject any or all Bids, and to waive any informalities and irregularities in said Bids.

13. EXECUTION OF CONTRACT

13.1. The successful Bidder shall, within 10 working days after receiving Notice of Award, sign and deliver to the Owner a Contract in the form hereto attached, together with the insurance certificate examples of the bonds as required in the Contract Documents and evidence of holding required licenses and certificates. Within 10 working days after receiving the signed Contract from the successful Bidder, the Owner's authorized agent will sign the Contract. Signature by both parties constitutes execution of the Contract.

14. CONTRACT BONDS

14.1. Performance and Payment Bonds: The successful Bidder shall file with the Owner, at the time of delivery of the signed Contract, a Performance Bond and Payment Bond on the form bound herewith, each in the full amount of the Contract price in accordance with the requirements of Florida Statutes Section 255.05 or 713.23, as applicable, as security for the faithful performance of the Contract and the payment of all persons supplying labor and materials for the construction of the work, and to cover all guarantees against defective workmanship or materials, or both, during the warranty period following the date of final acceptance of the work by the Owner. The Surety furnishing this bond shall have a sound financial standing and a record of service satisfactory to the Owner, shall be authorized to do business in the State of Florida, and shall be listed on the current U.S. Department of Treasury Circular Number 570, or amendments thereto in the Federal Register, of acceptable Sureties for federal projects.

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14.2. Power-of-Attorney:

14.2.1. The Attorney-in-Fact (Resident Agent in state which work is being performed) who executes this Performance and Payment Bond in behalf of the Surety must attach a notarized copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the bond.

14.2.2. All Contracts, Performance and Payment Bonds, and respective powers-of-attorney will have the same date.

15. FAILURE TO EXECUTE CONTRACT AND FURNISH BOND

15.1. The Bidder who has a Contract awarded to him and who fails to promptly and properly execute the Contract or furnish the required Bonds shall forfeit the bid security that accompanied his bid, and the bid security shall be retained as liquidated damages by the Owner, and it is agreed that this said sum is a fair estimate of the amount of damages the Owner will sustain in case the Bidder fails to enter into a Contract or furnish the required Bonds. Bid security deposited in the form of cash, a certified check, or cashier's check shall be subject to the same requirement as a Bid Bond.

16. TIME OF COMPLETION

16.1. The time of completion of the work to be performed under this Contract is the essence of the Contract. Delays and extensions of time may be allowed in accordance with the provisions stated in the General Conditions. The time allowed for the completion of the work authorized is stated in the Bid.

17. MANDATORY PRE-BID CONFERENCE

17.1. A **mandatory** Pre-Bid Conference will be held by the City of Key West on April 3, 2014. The meeting will take place at Old City Hall, 2nd Floor, 510 Greene Street, Key West, Florida, beginning at 10:00 a.m. The City of Key West requires attendance by all prospective bidders. The purpose of the meeting will be to discuss particular requirements and answer questions of the prospective bidders relative to completing this project. Bids from bidders that do not attend this Pre-bid Conference will be considered non-responsive and not accepted for consideration of this work by the City of Key West.

END OF SECTION

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NOTE TO BIDDER: Use preferably BLACK ink for completing this Bid form.

BID FORM

To: The City of Key West

Address: 3126 Flagler Avenue, Key West, Florida 33040

Project Title: ITB #14-010005/ North Simonton Stormwater Emergency Outfall

CH2M HILL Project No.: 476166

City of Key West Project No.: ST 1302

Bidder's person to contact for additional information on this Bid:

Company Name:_____

Contact Name: _____

Telephone: _____

1. BIDDER'S DECLARATION AND UNDERSTANDING

1.1. The undersigned, hereinafter called the Bidder, declares that the only persons or parties interested in this Bid are those named herein, that this Bid is, in all respects, fair and without fraud, that it is made without collusion with any official of the Owner, and that the Bid is made without any connection or collusion with any person submitting another Bid on this Contract.

1.2. The Bidder further declares that he has carefully examined the Contract Documents for the construction of the project, that he has personally inspected the site, that he has satisfied himself as to the quantities involved, including materials and equipment, and conditions of work involved, including the fact that the description of the quantities of work and materials, as included herein, is brief and is intended only to indicate the general nature of the Work and to identify the said quantities with the detailed requirements of the Contract Documents, and that this Bid is made according to the provisions and under the terms of the Contract Documents, which Documents are hereby made a part of this Bid.

1.3. The Bidder further agrees, as evidenced by signing the Bid, that if awarded a Contract, the Florida Trench Safety Act and applicable trench safety standards will be complied with.

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2. CONTRACT EXECUTION AND BONDS

2.1. The Bidder agrees that if this Bid is accepted, he will, within 10 days, not including Sundays and legal holidays, after Notice of Award, sign the Contract in the form annexed hereto, and will at that time, deliver to the Owner examples of the Performance Bond and Payment Bond required herein, and evidence of holding required licenses and certificates, and will, to the extent of his Bid, furnish all machinery, tools, apparatus, and other means of construction and do the Work and furnish all the materials necessary to complete all work as specified or indicated in the Contract Documents.

3. CERTIFICATES OF INSURANCE

3.1. Bidder agrees to furnish the Owner, before commencing the Work under this Contract, the certificates of insurance as specified in these Documents.

4. START OF CONSTRUCTION AND CONTRACT COMPLETION TIMES

4.1. The Bidder agrees to begin work within 10 calendar days after the date of the Notice to Proceed and to achieve Substantial Completion within 247 calendar days from the date when the Contract Times commence to run as provided in paragraph 2.03.A of the General Conditions, and Work will be completed and ready for final payment and acceptance in accordance with paragraph 14.07 of the General Conditions within 270 calendar days from the date when the Contract Times commence to run. A second Substantial Completion for the outfall pipe from the 36-inch valve to the outfall structure and the outfall structure is 30 days after start of construction for the outfall pipe and outfall structure. The installation of the 36-inch outfall pipe and outfall structure cannot start until September 1st.

5. LIQUIDATED DAMAGES

5.1. In the event the Bidder is awarded the Contract, Owner and Bidder recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in paragraph Start of Construction and Contract Completion Times above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. Owner and Bidder also recognize the delays, expense, and difficulties involved in proving in a legal or other dispute resolution proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Bidder agree that as liquidated damages for delay (but not as a penalty) Bidder shall pay Owner $3,000.00 per day for each day that expires after the time specified for each substantial completion.

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5.2. After Substantial Completion, if Bidder neglects, refuses, or fails to complete the remaining Work within the Contract Times or any Owner-granted extension thereof, Bidder shall pay Owner $1,000.00 for each day that expires after the time specified in paragraph Start of Construction and Contract Completion Times, above for completion and readiness for final payment. Liquidated damages shall run concurrent.

5.3. Owner will recover such liquidated damages by deducting the amount owed from the final payment or any retainage held by Owner.

6. ADDENDA

6.1. The Bidder hereby acknowledges that he has received Addenda Nos._____, _____, _____, _____, _____, (Bidder shall insert No. of each Addendum received) and agrees that all addenda issued are hereby made part of the Contract Documents, and the Bidder further agrees that his Bid(s) includes all impacts resulting from said addenda.

7. SALES AND USE TAXES

7.1. The Bidder agrees that all federal, state, and local sales and use taxes are included in the stated Bid Prices for the Work. Cash allowances DO NOT include any sales and use tax. Equipment allowance includes taxes as shown in Equipment Suppliers' Bid.

8. PUBLIC ENTITY CRIMES

8.1. "A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, for Category Two for a period of 36 months from the date of being placed on the convicted vendor list."

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9. COMBINED UNIT PRICE AND LUMP SUM WORK

9.1. The Bidder further proposes to accept as full payment for the Work proposed herein the amounts computed under the provisions of the Contract Documents. For unit price bid items, the estimate of quantities of work to be done is tabulated in the Proposal and, although stated with as much accuracy as possible, is approximate only and is assumed solely for the basis of calculation upon which the award of Contract shall be made. For lump sum bid items, it is expressly understood that the amounts are independent of the exact quantities involved. The Bidder agrees that the amounts for both unit price and lump sum work represent a true measure of labor and materials required to perform the Work, including all allowances for overhead and profit for each type of work called for in these Contract Documents. The amounts shall be shown in both words and figures. In case of discrepancy, the amount shown in words shall govern.

10. UNIT PRICE SCHEDULE

10.1. Unit prices have been computed in accordance with paragraph 11.03.C of the General Conditions and Section 01 29 00, Payment Procedures, paragraph 1.07.B.

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

11. UNFORESEEN CONDITIONS ALLOWANCE

11.1. Bidder further agrees that the amount shown is an estimated amount to be included in the Total Base Bid for unforeseen conditions and conflicts. Bidder further acknowledges that payment will be based on actual costs as determined in conformance with the Contract Documents and as authorized by Work Change Directive. The Owner will negotiate with the Contractor how each Allowance will be spent prior to performing the work.

12. PERMIT ALLOWANCE

12.1. Bidder further acknowledges that this amount shown is an estimated amount to be included in the Total Base Bid for any Permits required by the City of Key West and any Regulatory Agency Permit(s). Bidder acknowledges that payment will be based on actual cost for the permit(s).

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13. KEYS ENERGY SERVICE ALLOWANCE

13.1. Bidder further agrees that the amount shown is an estimated amount to be included in the Total Base Bid to cover payment to Keys Energy Service for electrical service. Bidder further acknowledges that payment will be based on actual amount paid as indicated by appropriate invoice.

Unit Price Bid Schedule					
Item No.	**Description**	**Estimated Quantity**	**Unit**	**Bid Unit Price**	**Extended Bid Unit Price**
1	**General**				
1.1	Performance and Payment Bonds	1	EA		
1.2	Mobilization	1	LS		
1.3	Demobilization	1	LS		
1.4	General and Supplementary Conditions	1	LS		
1.5	MOT	1	LS		
1.6	Certified AutoCAD As-built	1	LS		
1.7	Surveyor	1	LS		
2	**Trench Excavation, Backfill and Storm Pipe**				
2.1	36-inch PVC SDR 51 Storm Pipe				
2.1.1	6 to 8 Feet Deep	300	LF		
3	Dewatering	1	LS		
4	Florida Trench Safety Act Compliance	1	LS		
5	**Pavement**				
5.1	Pavement Removal and Replacement	180	SY		
5.2	Pavement 70 Mils Thermoplastic Stripping	80	LF		
5.3	1-inch Asphalt Milling and 1-inch Asphalt Overlay	600	SY		
6	36-inch Buried V-405 Valves	1	EA		
7	Demolition	1	LS		

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Unit Price Bid Schedule					
Item No.	**Description**	**Estimated Quantity**	**Unit**	**Bid Unit Price**	**Extended Bid Unit Price**
8	Emergency Generator with Concrete Platform	1	LS		
9	Outfall Structure at Ocean	1	LS		
				Total of All Extended Bid Unit Prices	$_____

Unforeseen Conditions Allowance $120,000

Permit Allowance $30,000

Keys Energy Allowance $2,000

The Bidder agrees to accept as full payment for the Work proposed under this Project, as herein specified and as shown on the Drawings, the following Total Base Bid amount:

_____Dollars

(Amount written in words has precedence)

and _____Cents **TOTAL BASE BID**$_____

14. SUBCONTRACTORS

14.1. The Bidder further proposes that the following subcontracting firms or businesses will be awarded subcontracts for the following portions of the Work in the event that the Bidder is awarded the Contract:

_____
Name

_____ _____ _____
Street City State Zip

_____
Name

_____ _____ _____
Street City State Zip

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_____
Name

_____ _____ _____
Street City State Zip

_____
Name

_____ _____ _____
Street City State Zip

Surety

_____whose address is

_____ _____ _____
Street City State Zip

Bidder

The name of the Bidder submitting this Bid is _____

_____ doing business at

_____ _____ _____
Street City State Zip

which is the address to which all communications concerned with this Bid and with the Contract shall be sent.

The names of the principal officers of the corporation submitting this Bid, or of the partnership, or of all persons interested in this Bid as principals are as follows:

_____ _____

_____ _____

_____ _____

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If Sole Proprietor or Partnership

IN WITNESS hereto the undersigned has set his (its) hand this _____day of _____, 20_____.

_____
Signature of Bidder

_____
Title

If Corporation

IN WITNESS WHEREOF the undersigned corporation has caused this instrument to be executed and its seal affixed by its duly authorized officers this __ day of _____, 20__.

(SEAL)

_____
Name of Corporation

By: _____

Title: _____

Attest: _____
Secretary

END OF SECTION

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FLORIDA BID BOND

BOND NO._____

AMOUNT: $_____

KNOW ALL MEN BY THESE PRESENTS, that _____

_____

hereinafter called the Contractor (Principal), and _____

_____

a corporation duly organized and existing under and by virtue of the laws of the State of Florida, hereinafter called the Surety, and authorized to transact business within the State of Florida, as Surety, are held and firmly bound unto The City of Key West as Owner.

(Obligee), in the sum of: _____

_____DOLLARS ($_____), for the payment for which we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS BOND IS SUCH THAT:

WHEREAS, the Principal is herewith submitting his or its Bid Proposal for Construction of the North Simonton Stormwater Emergency Outfall, Key West, Florida, said Bid Proposal, by reference thereto, being hereby made a part hereof.

WHEREAS, the Principal contemplates submitting or has submitted a bid to the Obligee for the furnishing of all labor, materials (except those to be specifically furnished by the Owner), equipment, machinery, tools, apparatus, means of transportation for, and the performance of the work covered in the Proposal and the detailed Drawings and Specifications, entitled:

NORTH SIMONTON STORMWATER EMERGENCY OUTFALL

WHEREAS, it was a condition precedent to the submission of said bid that a cashier's check, certified check, or bid bond in the amount of 5 percent of the base bid be submitted with said bid as a guarantee that the Bidder would, if awarded the Contract, enter into a written Contract with the Owner for the performance of said Contract, within 10 working days after written notice having been given of the award of the Contract.

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NOW, THEREFORE, the conditions of this obligation are such that if the Principal within 10 consecutive calendar days after written notice of such acceptance, enters into a written Contract with the Obligee and furnishes the Performance and Payment Bonds, each in an amount equal to 100 percent of the awarded base bid, satisfactory to the Owner, then this obligation shall be void; otherwise the sum herein stated shall be due and payable to the Obligee and the Surety herein agrees to pay said sum immediately upon demand of the Obligee in good and lawful money of the United States of America, as liquidated damages for failure thereof of said Principal.

Signed and sealed this _____ day of _____, 20_____.

_____
Principal

By: _____

_____
Surety

By: _____
Attorney-In-Fact

END OF SECTION

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ANTI-KICKBACK AFFIDAVIT

STATE OF FLORIDA)
: SS
COUNTY OF MONROE)

I, the undersigned hereby duly sworn, depose and say that no portion of the sum herein bid will be paid to any employees of the City of Key West as a commission, kickback, reward or gift, directly or indirectly by me or any member of my firm or by an officer of the corporation.

By: _____

_____

Sworn and subscribed before me this
____ day of _____, 20___

_____
NOTARY PUBLIC, State of Florida
at Large

My Commission Expires: _____

END OF SECTION

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SWORN STATEMENT UNDER SECTION 287.133(3)(A)
FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES

THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICER AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement is submitted with Bid or Proposal for North Simonton Stormwater Emergency Outfall, City of Key West, Florida

2. This sworn statement is submitted by _____
(name of entity submitting sworn statement)

whose business address is _____

_____ and (if applicable) its Federal Employer

Identification Number (FEIN) is _____

(If the entity has no FEIN, include the Social Security Number of the individual signing this

sworn statement _____

3. My name is _____
(please print name of individual signing)

and my relationship to the entity named above is _____

4. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or with the United States, including but not limited to, any bid or contract for goods or services to be provided to any public or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, material misrepresentation.

5. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), Florida Statutes, means a finding of guilt or a conviction of a public entity crime, with or without an adjudication guilt, in any federal or state trial court of record relating to charges brought by indictment information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

6. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), Florida Statutes, means

   1. A predecessor or successor of a person convicted of a public entity crime; or

   2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

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7. I understand that a “person” as defined in Paragraph 287.133(1)(8), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with public entity. The term “person” includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

8. Based on information and belief, the statement which I have marked below is true in relation to the entity submitting this sworn statement. (Please indicate which statement applies).

____Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, nor any affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND (Please indicate which additional statement applies.)

_____There has been a proceeding concerning the conviction before a hearing of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer did not place the person or affiliate on the convicted vendor list. (Please attach a copy of the final order.)

_____The person or affiliate was placed on the convicted vendor list. There has been a subsequent proceeding before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer determined that it was in the public interest to remove the person or affiliate from the convicted vendor list. (Please attach a copy of the final order.)

_____The person or affiliate has not been put on the convicted vendor list. (Please describe any action taken by or pending with the Department of General Services.)

_____
(signature)

_____
(date)

STATE OF_____

COUNTY OF_____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

_____who, after first being sworn by me, affixed his/her
(name of individual signing)

signature in the space provided above on this ____ of _____, 20____.

My commission expires:

_____
NOTARY PUBLIC

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CITY OF KEY WEST INDEMNIFICATION FORM

The Contractor shall indemnify and hold harmless the City of Key West, its officers, and employees, from liabilities, damages, losses and costs, including, but not limited to reasonable attorney's fees, to the extent caused by the negligence, recklessness or intentional wrongful misconduct of Contractor and persons employed or utilized by Contractor in the performance of this agreement. Except as specifically provided herein, this agreement does not require Contractor to indemnify the City of Key West, its employees, officers, directors, or agents from any liability, damage, loss, claim, action or proceeding.

These indemnifications shall survive the term of this agreement. In the event that any action or proceeding is brought against the City of Key West by reason of such claim or demand, Contractor shall, upon written notice from the City of Key West, resist and defend such action or proceeding by counsel satisfactory to the City of Key West.

The indemnification provided above shall obligate Contractor to defend at its own expense to and through appellate, supplemental or bankruptcy proceeding, or to provide for such defense, at the City of Key West's option, any and all claims of liability and all suits and actions of every name and description covered above which may be brought against the City of Key West whether performed by Contractor, or persons employed or utilized by Contractor.

The Contractor's obligation under this provision shall not be limited in any way by the agreed upon Contract Price as shown in this agreement, or the Contractor's limit of or lack of sufficient insurance protection.

CONTRACTOR: _____ SEAL:

_____
Address

_____
Signature

_____
Print Name

_____
Title

DATE: _____

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EQUAL BENEFITS FOR DOMESTIC PARTNERS AFFIDAVIT

STATE OF FLORIDA)
: SS
COUNTY OF _____)

I, the undersigned hereby duly sworn, depose and say that the firm of _____ provides benefits to domestic partners of its employees on the same basis as it provides benefits to employees' spouses per City of Key West Ordinance Sec. 2-799.

By: _____

Sworn and subscribed before me this

_____ day of _____, 20___.

_____
NOTARY PUBLIC, State of Florida at Large

My Commission Expires: _____

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City Ordinance Sec. 2-799
Requirements for City Contractors to Provide Equal Benefits for Domestic Partners

(a) Definitions. For purposes of this section only, the following definitions shall apply:

(1) ***Benefits*** means the following plan, program or policy provided or offered by a contractor to its employees as part of the employer's total compensation package: sick leave, bereavement leave, family medical leave, and health benefits.

(2) ***Bid*** shall mean a competitive bid procedure established by the city through the issuance of an invitation to bid, request for proposals, request for qualifications, or request for letters of interest.

(3) ***Cash equivalent*** means the amount of money paid to an employee with a domestic partner in lieu of providing benefits to the employee's domestic partner. The cash equivalent is equal to the employer's direct expense of providing benefits to an employee for his or her spouse.

The cash equivalents of the following benefits apply:

a. For bereavement leave, cash payment for the number of days that would be allowed as paid time off for the death of a spouse. Cash payment would be in the form of the wages of the domestic partner employee for the number of days allowed.

b. For health benefits, the cost to the contractor of the contractor's share of the single monthly premiums that are being paid for the domestic partner employee, to be paid on a regular basis while the domestic partner employee maintains such insurance in force for himself or herself.

c. For family medical leave, cash payment for the number of days that would be allowed as time off for an employee to care for a spouse who has a serious health condition. Cash payment would be in the form of the wages of the domestic partner employee for the number of days allowed.

(4) ***Contract*** means any written agreement, purchase order, standing order or similar instrument entered into pursuant to the award of a bid whereby the city is committed to expend or does expend funds in return for work, labor, professional services, consulting services, supplies, equipment, materials, construction, construction related services or any combination of the foregoing.

(5) ***Contractor*** means any person or persons, sole proprietorship, partnership, joint venture, corporation, or other form of doing business, that is awarded a bid and enters into a covered contract with the city, and which maintains five (5) or more full-time employees.

(6) ***Covered contract*** means a contract between the city and a contractor awarded subsequent to the date when this section becomes effective valued at over twenty thousand dollars ($20,000).

(7) ***Domestic partner*** shall mean any two adults of the same or different sex, who have registered as domestic partners with a governmental body pursuant to state

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or local law authorizing such registration, or with an internal registry maintained by the employer of at least one of the domestic partners. A contractor may institute an internal registry to allow for the provision of equal benefits to employees with domestic partner who do not register their partnerships pursuant to a governmental body authorizing such registration, or who are located in a jurisdiction where no such governmental domestic partnership registry exists. A contractor that institutes such registry shall not impose criteria for registration that are more stringent than those required for domestic partnership registration by the City of Key West pursuant to Chapter 38, Article V of the Key West Code of Ordinances.

(8) ***Equal benefits*** mean the equality of benefits between employees with spouses and employees with domestic partners, and/or between spouses of employees and domestic partners of employees.

(b) Equal benefits requirements.

(1) Except where otherwise exempt or prohibited by law, a Contractor awarded a covered contract pursuant to a bid process shall provide benefits to domestic partners of its employees on the same basis as it provides benefits to employees' spouses.

(2) All bid requests for covered contracts which are issued on or after the effective date of this section shall include the requirement to provide equal benefits in the procurement specifications in accordance with this section.

(3) The city shall not enter into any covered contract unless the contractor certifies that such contractor does not discriminate in the provision of benefits between employees with domestic partners and employees with spouses and/or between the domestic partners and spouses of such employees.

(4) Such certification shall be in writing and shall be signed by an authorized officer of the contractor and delivered, along with a description of the contractor's employee benefits plan, to the city's procurement director prior to entering into such covered contract.

(5) The city manager or his/her designee shall reject a contractor's certification of compliance if he/she determines that such contractor discriminates in the provision of benefits or if the city manager or designee determines that the certification was created, or is being used for the purpose of evading the requirements of this section.

(6) The contractor shall provide the city manager or his/her designee, access to its records for the purpose of audits and/or investigations to ascertain compliance with the provisions of this section, and upon request shall provide evidence that the contractor is in compliance with the provisions of this section upon each new bid, contract renewal, or when the city manager has received a complaint or has reason to believe the contractor may not be in compliance with the provisions of this section. This shall include but not be limited to providing the city manager or

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his/her designee with certified copies of all of the contractor's records pertaining to its benefits policies and its employment policies and practices.

(7) The contractor may not set up or use its contracting entity for the purpose of evading the requirements imposed by this section.

(c) Mandatory contract provisions pertaining to equal benefits. Unless otherwise exempt, every covered contract shall contain language that obligates the contractor to comply with the applicable provisions of this section. The language shall include provisions for the following:

(1) During the performance of the covered contract, the contractor certifies and represents that it will comply with this section.
(2) The failure of the contractor to comply with this section will be deemed to be a material breach of the covered contract.
(3) If the contractor fails to comply with this section, the city may terminate the covered contract and all monies due or to become due under the covered contract may be retained by the city. The city may also pursue any and all other remedies at law or in equity for any breach.
(4) If the city manager or his designee determines that a contractor has set up or used its contracting entity for the purpose of evading the requirements of this section, the city may terminate the covered contract.

(d) Enforcement. If the contractor fails to comply with the provisions of this section:

(1) The failure to comply may be deemed to be a material breach of the covered contract; or
(2) The city may terminate the covered contract; or
(3) Monies due or to become due under the covered contract may be retained by the city until compliance is achieved; or
(4) The city may also pursue any and all other remedies at law or in equity for any breach;
(5) Failure to comply with this section may also subject contractor to the procedures set forth in Division 5 of this article, entitled "Debarment of contractors from city work."

(e) Exceptions and waivers.

The provisions of this section shall not apply where:

(1) The contractor does not provide benefits to employees' spouses.
(2) The contractor is a religious organization, association, society or any non-profit charitable or educational institution or organization operated, supervised or controlled by or in conjunction with a religious organization, association or society.
(3) The contractor is a governmental entity.

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(4) The sale or lease of city property.

(5) The provision of this section would violate grant requirement, the laws, rules or regulations of federal or state law (for example, The acquisition services procured pursuant to Chapter 287.055, Florida Statutes known as the "Consultants' Competitive Negotiation Act").

(6) Provided that the contractor does not discriminate in the provision of benefits, a contractor may also comply with this section by providing an employee with the cash equivalent of such benefits, if the city manager or his/her designee determines that either:

a. The contractor has made a reasonable yet unsuccessful effort to provide equal benefits. The contractor shall provide the city manager or his/her designee with sufficient proof of such inability to provide such benefit or benefits which shall include the measures taken to provide such benefits or benefits and the cash equivalent proposed, along with its certificate of compliance, as is required under this section.

(7) The city commission waives compliance of this section in the best interest of the city, including but not limited to the following circumstances:

a. The covered contract is necessary to respond to an emergency.
b. Where only one bid response is received.
c. Where more than one bid response is received, but the bids demonstrate that none of the bidders can comply with the requirements of this section.

(f) City's authority to cancel contract. Nothing in this section shall be construed to limit the city's authority to cancel or terminate a contract, deny or withdraw approval to perform a subcontract or provide supplies, issue a non-responsibility finding, issue a non-responsiveness finding, deny a person or entity prequalification, or otherwise deny a person or entity city business.

(g) Timing of application. This section shall be applicable only to covered contracts awarded pursuant to bids which are after the date when this section becomes effective.

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CITY OF KEY WEST BUSINESS LICENSE TAX RECEIPT

1. A City of Key West Business License Tax Receipt is required for this Project. Contractor must be general contractor or building contractor or engineering contractor. Fee not to exceed $309.75.

2. A City of Key West Business License Tax Receipt also is required as for sub-contracting landscaping contractor, engineering services, and professional surveying.

3. A Business License Tax Application can be found on the City's web site.

http://www.keywestcity.com/egov/docs/1162843921181.htm

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Business License Tax Application

City of Key West
City Hall Annex
PO Box 1409
Key West, FL 33041

Date Applied _____

License # _____

Phone 305-809-3955
Fax 305-809-3978

Business Type: _____

Business Name: _____

Business Location: _____

Business Owner: _____

State Licensed Qualifier (if applicable): _____

Mailing Address: _____

EIN / SS # _____Phone # _____

_____ _____ _____
Applicant name (printed) Applicant signature Date

State of Florida
County of Monroe
The foregoing instrument was acknowledged before me this _____ day of _____, 20___, by _____.

_____ (stamp or seal). Personally known ____
Signature of Notary Public Produced id _____.

____ Sales Tax number 3106 Flagler Ave 292-6735 City utility acct _____
____ Commercial garbage Waste Mgmt 296-8297 _____
____ Lease or deed
____ State License DBPR 850-487-1395 / Dept Ag 305-470-6900
____ Home occupation application
____ Fictitious Name registration Previous use _____
____ Corporate or LLC registration
____ Liability / Worker's Comp Zoning _____
____ Fire Inspector 292-8179
____ CO / final inspection on any permits Category _____ Fee $_____
____ Monroe County or local licensing

Licensed in accordance with Chapter 66, Key West Code of Ordinances

_____ Approved _____ Denied / Reason _____

_____ _____
Licensing Official Date

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CONE OF SILENCE AFFIDAVIT

STATE OF _____)
: SS
COUNTY OF _____)

I the undersigned hereby duly sworn depose and say that all owner(s), partners, officers, directors, employees and agents representing the firm of _____ have read and understand the limitations and procedures regarding communications concerning City of Key West issued competitive solicitations pursuant to City of Key West Ordinance Section 2-773 Cone of Silence (attached).

Sworn and subscribed before me this

_____ day of _____, 20___.

_____
NOTARY PUBLIC, State of _____ at Large

My Commission Expires: _____

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Sec. 2-773. Cone of Silence

(a) Definitions. For purposes of this section, reference to one gender shall include the other, use of the plural shall include the singular, and use of the singular shall include the plural. The following definitions apply unless the context in which the word or phrase is used requires a different definition:

1) *Competitive Solicitation* means a formal process by the City of Key West relating to the acquisition of goods or services, which process is intended to provide an equal and open opportunity to qualified persons and entities to be selected to provide the goods or services. Completive Solicitation shall include request for proposals ("RFP"), request for qualifications ("RFQ"), request for letters of interest ("RFLI"), invitation to bid ("ITB") or any other advertised solicitation.

2) *Cone of Silence* means a period of time during which there is a prohibition on communication regarding a particular Competitive Solicitation.

3) *Evaluation or Selection Committee* means a group of persons appointed or designated by the City to evaluate, rank, select, or make a recommendation regarding a Vendor or the Vendor's response to the Competitive Solicitation. A member of such a committee shall be deemed a city official for the purposes of subsection (c) below.

4) *Vendor* means a person or entity that has entered into or that desires to enter into a contract with the City of Key West or that seeks an award from the City to provide goods, perform a service, render an opinion or advice, or make a recommendation related to a Competitive Solicitation for compensation or other consideration.

5) *Vendor's Representative* means an owner, individual, employee, partner, officer, or member of the board of directors of a Vendor, or a consultant, lobbyist, or actual or potential subcontractor or sub consultant who acts at the behest of a Vendor in communicating regarding a Competitive Solicitation.

(b) Prohibited Communications: A Cone of Silence shall be in effect during the course of a Competitive Solicitation and prohibit:

1) Any communication regarding a particular Competitive Solicitation between a potential Vendor or Vendor's Representative and the City's administrative staff including, but not limited to, the city manager and his or her staff;

2) Any communication regarding a particular Competitive Solicitation between a potential Vendor or Vendor's Representative and the Mayor, City Commissioners, or their respective staff;

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3) Any communication regarding a particular Competitive Solicitation between a potential Vendor or Vendor's Representative and any member of a City evaluation and/or selection committee therefore; and
4) Any communication regarding a particular Competitive Solicitation between the Mayor, City Commissioners, or their respective staff, and a member of a City evaluation and/or selection committee therefore.

(c) Permitted Communications: Notwithstanding the foregoing, nothing contained herein shall prohibit:

1) Communication between members of the public who are not Vendors or a Vendor's representative and any city employee, official or member of the City Commission;

2) Communications in writing at any time with any city employee, official or member of the City Commission, unless specifically prohibited by the applicable Competitive Solicitation.

(A) However, any written communication must be filed with the City Clerk. Any City employee, official or member of the City Commission receiving or making any written communication must immediately file it with the City Clerk.

(B) The City Clerk shall include all written communication as part of the agenda item when publishing information related to a particular Competitive Solicitation.

3) Oral communications at duly noticed pre-bid conferences;

4) Oral presentations before publically noticed evaluation and/or selection committees;

5) Contract discussions during any duly noticed public meeting;

6) Public presentations made to the City Commission or advisory body thereof during any duly noticed public meeting;

7) Contract negotiations with city staff following the award of a Competitive Solicitation by the City Commission; or

8) Purchases exempt from the competitive process pursuant to section 2-797 of these Code of Ordinances.

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(d) Procedure

1) The Cone of Silence shall be imposed upon each Competitive Solicitation at the time of Public Notice of such solicitation as provided by section 2-826 of this Code. Public notice of the Cone of Silence shall be included in the notice of the Competitive Solicitation. The city manager shall issue a written notice of the release of each Competitive Solicitation to the affected departments, with a copy thereof to each Commission member, and shall include in any public solicitation for goods and services a statement disclosing the requirements of this ordinance.

2) The Cone of Silence shall terminate at the time the City Commission or other authorized body makes final award or gives final approval of a contract, rejects all bids or responses to the Competitive Solicitation, or takes other action which ends the Competitive Solicitation.

3) Any City employee, official or member of the City Commission that is approached concerning a Competitive Solicitation while the Cone of Silence is in effect shall notify such individual of the prohibitions contained in this section. While the Cone of Silence is in effect, any City employee, official or member of the City Commission who is the recipient of any oral communication by a potential Vendor or Vendor's Representative in violation of this section shall create a written record of the event. The record shall indicate the date of such communication, the persons with whom such communication occurred, and a general summation of the communication.

(e) Violations/penalties and procedures.

1) A sworn complaint alleging a violation of this ordinance may be filed with the City Attorney's office. In each such instance, an initial investigation shall be performed to determine the existence of a violation. If a violation is found to exist, the penalties and process shall be as provided in section 1-15 of this Code.

2) In addition to the penalties described herein and otherwise provided by law, a violation of this ordinance shall render the Competitive Solicitation void at the discretion of the City Commission.

3) Any person who violates a provision of this section shall be prohibited from serving on a City of Key West advisory board, evaluation and/or selection committee.

4) In addition to any other penalty provided by law, violation of any provision of this ordinance by a City of Key West employee shall subject said employee to disciplinary action up to and including dismissal.

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5) If a Vendor is determined to have violated the provisions of this section on two more occasions it shall constitute evidence under City Code section 2-834 that the Vendor is not properly qualified to carry out the obligations or to complete the work contemplated by any new Competitive Solicitation. The City's Purchasing Agent shall also commence any available debarment from city work proceeding that may be available upon a finding of two or more violations by a Vendor of this section.

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BIDDER'S CHECKLIST

(Note: The purpose of this checklist is to serve as a reminder of major items to be addressed in submitting a Bid and is not intended to be all inclusive. It does not alleviate the Bidder from the responsibility of becoming familiar with all aspects of the Contract Documents and proper completion and submission of their Bid.)

1. All Contract Documents thoroughly read and understood. [ ]
2. All blank spaces in Bid Form filled in, using black ink. [ ]
3. Total and unit prices added correctly. [ ]
4. Addenda acknowledged. [ ]
5. Subcontractors are named as indicated in the Bid Form. [ ]
6. Experience record included. [ ]
7. Bid signed by authorized officer. [ ]
8. Bid Bond completed and executed, including power-of-attorney dated the same date as Bid Bond. [ ]
9. Bidder familiar with federal, state, and local laws, ordinances, rules and regulations affecting performance of the work. [ ]
10. Bidder, if successful, able to obtain and/or demonstrate possession of required licenses and certificates within (10) ten calendar days after receiving a Notice of Award. [ ]
11. Bid submitted intact with the volume containing the Bidding Requirements, Contract Forms, and Conditions of the Contract and six copies. [ ]
12. Bid Documents submitted in sealed envelope and addressed and labeled in conformance with the instructions in the Invitation to Bid. [ ]
13. Bidder must provide satisfactory documentation of State Licenses. [ ]

END OF SECTION

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DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure.)

1. Type of Federal Action:	**2. Status of Federal Action:**	**3. Report Type:**
☐ a. contract b. grant c. cooperative agreement d. loan e. loan guarantee f. loan insurance	☐ a. bid/offer/application b. initial award c. post-award	☐ a. initial filing b. material change **For Material Change Only:** year_____ quarter_____ date of last report_____

4. Name and Address of Reporting Entity:	**5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime:**
☐ Prime ☐ Subawardee Tier _____, *if known:* **Congressional District,** *if known:*	**Congressional District,** *if known:*
6. Federal Department/Agency:	**7. Federal Program Name/Description:** CFDA Number, *if applicable:* _____
8. Federal Action Number, *if known:*	**9. Award Amount,** *if known:* **$**

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10. a. Name and Address of Lobbying Entity *(if individual, last name, first name, MI):*	**b. Individuals Performing Services** *(including address if different from No. 10a) (last name, first name, MI):*
(attach Continuation Sheet(s) SF-LLLA, if necessary)	
11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.	**Signature:** _____ **Print Name:** _____ **Title:** _____ **Telephone No.:** _____ **Date:** _____
Federal Use Only:	Authorized for Local Reproduction Standard Form – LLL (Rev 7 – 97)

FORM DEP 55-221 (01/01)

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INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. **Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.**

2. **Identify the status of the covered Federal action.**

3. **Identify the appropriate classification of this report. If this is a follow up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by the reporting entity for this covered Federal action.**

4. **Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.**

5. **If the organization filing the report in item 4 checks "Subawardee", then enter the full name, address, city, state and zip code of the prime Federal recipient. Include Congressional District, if known.**

6. **Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.**

7. **Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.**

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8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."

9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.

10. (a) Enter the full name, address, city, state and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.

(b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).

11. The certifying official shall sign and date the form, print his/her name, title and telephone number.

According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB Control Number. The valid OMB control number for this information collection is OMB No. 0348-0046. Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, D.C. 20503.

Form DEP 55-221 (01/01)

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NON-COLLUSION DECLARATION AND COMPLIANCE WITH 49 CFR §29.

ITEM/SEGMENT NO.:_____
F.A.P. NO.:
PARCEL NO.:
COUNTY OF:
BID LETTING OF:_____ ,_____

I, _____, hereby
(NAME)
declare that I am_____ of_____
(TITLE) (FIRM)
Of_____
(CITY AND STATE)
and that I am the person responsible within my firm for the final decision as to the price(s) and amount of this Bid on this State Project.

I further declare that:

1. The prices(s) and amount of this bid have been arrived at independently, without consultation, communication or agreement, for the purpose of restricting competition with any other contractor, bidder or potential bidder.

2. Neither the price(s) nor the amount of this bid have been disclosed to any other firm or person who is a bidder or potential bidder on this project, and will not be so disclosed prior to the bid opening.

3. No attempt has been made or will be made to solicit, cause or induce any other firm or person to refrain from bidding on this project, or to submit a bid higher than the bid of this firm, or any intentionally high or non-competitive bid or other form of complementary bid.

4. The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary bid.

5. My firm has not offered or entered into a subcontract or agreement regarding the purchase of materials or services from any firm or person, or offered, promised or paid cash or anything of value to any firm or person, whether in connection with this or any other project, in consideration for an agreement or promise by any firm or person to refrain from bidding or to submit a complementary bid on this project.

6. My firm has not accepted or been promised any subcontract or agreement regarding the sale of materials or services to any firm or person, and has not been promised or paid cash or anything of value by any firm or person, whether in connection with this or any other project, in consideration for my firm's submitting a complementary bid, or agreeing to do so, on this project.

7. I have made a diligent inquiry of all members, officers, employees, and agents of my firm with responsibilities relating to the preparation, approval or submission of my firm's bid on this project and have been advised by each of them that he or she has not participated in any communication, consultation, discussion, agreement, collusion, act or other conduct inconsistent with any of the statements and representations made in this Declaration.

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8. As required by Section 337.165, Florida Statutes, the firm has fully informed the Department of Transportation in writing of all convictions of the firm, its affiliates (as defined in Section 337.165(l)(a), Florida Statutes), and all directors, officers, and employees of the firm and its affiliates for violation of state or federal antitrust laws with respect to a public contract or for violation of any state or federal law involving fraud, bribery, collusion, conspiracy or material misrepresentation with respect to a public contract. This includes disclosure of the names of current employees of the firm or affiliates who were convicted of contract crimes while in the employ of another company.

9. I certify that, except as noted below, neither my firm nor any person associated therewith in the capacity of owner, partner, director, officer, principal, investigator, project director, manager, auditor, and/or position involving the administration of Federal funds:

(a) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions, as defined in 49 CFR §29.110(a), by any Federal department or agency;

(b) has within a three-year period preceding this certification been convicted of or had a civil judgment rendered against him or her for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a Federal, State or local government transaction or public contract; violation of Federal or State antitrust statutes; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property;

(c) is presently indicted for or otherwise criminally or civilly charged by a Federal, State or local governmental entity with commission of any of the offenses enumerated in paragraph 9(b) of this certification; and

(d) has within a three-year period preceding this certification had one or more Federal, State or local government public transactions terminated for cause or default..

10. I(We), certify that I(We), shall not knowingly enter into any transaction with any subcontractor, material supplier, or vendor who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this contract by any Federal Agency unless authorized by the Department.

Where I am unable to declare or certify as to any of the statements contained in the above stated paragraphs numbered (1) through (10), I have provided an explanation in the "Exceptions" portion below or by attached separate sheet.

EXCEPTIONS:

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

Providing false information may result in criminal prosecution and/or administrative sanctions.)

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

CONTRACTOR: (Seal)

BY:_____ WITNESS:_____
NAME AND TITLE PRINTED

BY:_____ WITNESS:_____
SIGNATURE

Executed on this_____ day of_____, _____

FAILURE TO FULLY COMPLETE AND EXECUTE THIS DOCUMENT MAY RESULT IN THE BID BEING DECLARED NONRESPONSIVE

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FLORIDA TRENCH SAFETY ACT COMPLIANCE
Trench Excavation Safety System and Shoring

CERTIFICATION

All excavation, trenching, and related sheeting, bracing, etc. on this project shall conform to the requirements of the Florida Trench Safety Act (90-96, CS/SB 2626), which incorporates by reference, OSHA's excavation safety standards, 29 CFR 1926.650 Subpart P including all subsequent revisions or updates to the these standards.

By submission of this bid and subsequent execution of this Contract, the undersigned certifies compliance with the above mentioned standards and further stipulates that all costs associated with this compliance are detailed below as well as included in their lump sum bid amount.

Summary of Costs:

Trench Safety Measure	Units	Quantity	Unit Cost	Extended Cost
A._____	_____	_____	_____	_____
B._____	_____	_____	_____	_____

_____
Signature

_____
Date

STATE OF _____

COUNTY OF _____

PERSONALLY APPEARED BEFORE ME, the undersigned authority,

_____, who, after first being sworn by me affixed his /her signature in the space,

provided above on the _____ day of _____, 20___.

_____
Notary Public (Seal)

MY COMMISSION EXPIRES:_____

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SUSPENSION AND DEBARMENT CERTIFICATION

CERTIFICATION REGARDING DEBARMENTS, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION-LOWER TIER FEDERALLY FUNDED TRANSACTIONS

1. The undersigned hereby certifies that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. The undersigned also certifies that it and its principals:
(a) Have not within a three-year period preceding this certification been convicted of or had a civil judgment rendered
against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.
(b) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 2.(a) of this Certification; and
(c) Have not within a three-year period preceding this certification had one or more public transactions (Federal, State or local) terminated for cause or default.

3. Where the undersigned is unable to certify to any of the statements in this certification, an explanation shall be attached to this certification.

Dated this day of, 20 .
By_____
Authorized Signature/Contractor

_____
Typed Name/Title

_____
Contractor's Firm Name

_____
Street Address

_____
Building, Suite Number

_____
City/State/Zip Code

_____
Area Code/Telephone Number

476166

00 44 04

PART 2

CONTRACTING REQUIREMENTS

AGREEMENT

This Agreement, made and entered into this _____ day of _____, 20___.

by and between the City of Key West, hereinafter called the "Owner," and _____ hereinafter called the "Contractor".

WITNESSETH:

The Contractor, in consideration of the sum to be paid him by the Owner and of the covenants and agreements herein contained, hereby agrees at his own proper cost and expense to do all the work and furnish all the materials, tools, labor, and all appliances, machinery, and appurtenances for Construction of the North Simonton Stormwater Emergency Outfall, to the extent of the Bid made by the Contractor, dated the _____ day of _____, 20___, all in full compliance with the Contract Documents referred to herein.

The BIDDING REQUIREMENTS, including the signed copy of the Bid, the CONTRACT FORMS, the CONDITIONS OF THE CONTRACT, the SPECIFICATIONS, and the DRAWINGS, for "North Simonton Stormwater Emergency Outfall," dated _____, 20___, are hereby referred to and by reference made a part of this Contract as fully and completely as if the same were fully set forth herein and are mutually cooperative therewith.

In consideration of the performance of the Work as set forth in these Contract Documents, the Owner agrees to pay to the Contractor the amount bid in the Bid as adjusted in accordance with the Contract Documents, or as otherwise herein provided, and to make such payments in the manner and at the times provided in the Contract Documents.

The Contractor agrees to complete the work within the time specified and to accept as full payment hereunder the amounts computed as determined by the Contract Documents and based on the said Bid.

The Contractor agrees to remedy all defects appearing in the work or developing in the materials furnished and the workmanship performed under this Contract during the warranty period after the date of final acceptance of the work by the Owner, and further agrees to indemnify and save the Owner harmless from any costs encountered in remedying such defects.

It is agreed that the Project, based upon the Bid, shall be substantially complete within 240 consecutive calendar days from the date the Notice to Proceed is issued, and will be totally completed and ready for final payment and acceptance within 270 consecutive calendar days from the date the Notice to Proceed is issued. It is also agreed that the outfall pipe and outfall structure will be Substantially Complete within 30 calendar days starting September 1, 2014.

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Liquidated Damages: The Contractor recognizes that time is of the essence and that the Owner will suffer financial loss if the Work is not completed within the times specified in paragraph above, plus any extensions thereof allowed in accordance with Article 12, of the General Conditions.

Owner and Contractor also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by the Owner, if the Work is not completed on time. Accordingly, instead of requiring any such proof, the Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay the Owner ($3,000.00) for each day that expires after the time specified for each substantial completion. After Substantial Completion if Contractor shall neglect, refuse or fail to complete the remaining Work within the contract time or any proper extension thereof granted by the Owner, Contractor shall pay the Owner ($1,000.00) for each day that expires after the time specified for completion and readiness for final payment. Liquidated damages shall run concurrent.

IN WITNESS WHEREOF, we, the parties hereto, each herewith subscribe the same this _____ day of _____, A.D., 20_____.

CITY OF KEY WEST

By:_____

Title: _____

_____

Contractor:

By:_____

Title: _____

Approved as to Form

_____

Attorney for Owner

END OF SECTION

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PERFORMANCE BOND

BOND NO. _____
AMOUNT: $_____

KNOW ALL MEN BY THESE PRESENTS, that in accordance with Florida Statutes Section 255.05, _____with offices at _____ hereinafter called the Contractor (Principal), and _____

with offices at _____

a corporation duly organized and existing under and by virtue of the laws of the State of Florida, hereinafter called the Surety, and authorized to transact business within the State of Florida, as Surety, are held and firmly bound unto **CITY OF KEY WEST,** represented by its _____, hereinafter called the City (Obligee), in the sum of:

_____ DOLLARS ($), lawful money of the United States of America, for the payment of which, well and truly be made to the City, the Contractor and the Surety bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents as follows:

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

WHEREAS, the Contractor has executed and entered into the North Simonton Stormwater Emergency Outfall (ITB #14-010) Contract hereto attached, with the City, dated _____, 20____, to furnish at their own cost, charges, and expense all the necessary materials, equipment, and/or labor in strict and express accordance with said Contract and the Contract Documents as defined therein, all of which is made a part of said Contract by certain terms and conditions in said Contract more particularly mentioned, which Contract, consisting of the various Contract Documents is made a part of this Bond as fully and completely as if said Contract Documents were set forth herein;

NOW THEREFORE, the conditions of this obligation are such that if the above bounden Contractor:

1. Shall in all respects comply with the terms and conditions of said Contract and his obligation there under, including the Contract Documents (which include the plans, drawings, specifications, and conditions as prepared by the City, invitation to bid, instructions to bidders, the Contractor's bid as accepted by the above City, the bid and contract performance and payment bonds, and all addenda, if any, issued prior to the opening of bids), being made a part of this bond by reference, at the times and in the manner prescribed in the contract; and

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2. Promptly makes payments to all claimants, as defined in Section 255.05(1), Florida Statutes, supplying Principal with labor, materials, or supplies, used directly or indirectly by Principal in the prosecution of the work provided for in the contract; and

3. Pays City all losses, costs, expenses, damages, attorney's fees, including appellate proceedings, injury or loss of whatever kind and however arising including, without limitation, delay damages to which said City may be subject by reason of any wrongdoing, misconduct, want of care or skill, negligence, failure of performance, breach, failure to petition within the prescribed time, or default, including patent infringements, on the part of said Contractor, his agents or employees, in the execution or performance of said Contract; and

4. Performs the guarantee of all work and materials furnished under the contract for the time specified in the contract, then this obligation shall be void; otherwise, to remain in full force and effect for the term of said Contract.

AND, the said Surety for value received, hereby stipulates and agrees that no change involving any extension of time, or addition to the terms of the Contract Documents, or to the work to be performed, or materials to be furnished there under shall affect said obligation of said Surety on this Bond, and the said Surety does hereby waive notice of any such changes, extension of time, alterations, or additions of the terms of the Contract Documents, or to the Work.

Any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2), Florida Statutes.

IN WITNESS WHEREOF, the above parties bonded together have executed this instrument this _____ day of _____, 20____, the name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative, pursuant to authority of its governing body.

CONTRACTOR

_____

By: _____ (SEAL)

_____

ATTEST

_____

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SURETY

By: _____ (SEAL)

_____

ATTEST

END OF SECTION

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PAYMENT BOND

BOND NO. _____

AMOUNT: $ _____

KNOW ALL MEN BY THESE PRESENTS, that in accordance with Florida Statutes Section 255.05,_____

with offices at_____hereinafter called the Contractor, (Principal), and _____

with offices at _____

a corporation duly organized and existing under and by virtue of the laws of the State of _____, hereinafter called the Surety, and authorized to transact business within the State of Florida, as Surety, are held and firmly bound City of Key West**,** represented by its _____, hereinafter called the City (Obligee), in the sum of: DOLLARS ($), lawful money of the United States of America, for the payment of which, well and truly be made to the City, and the Contractor and the Surety bind themselves and each of their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents as follows:

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT:

WHEREAS, the Contractor has executed and entered into a certain Contract for the North Simonton Stormwater Emergency Outfall (ITB #14-010) attached hereto, with the City, dated _____, 20_____, to furnish at their own cost, charges, and expense the necessary materials, equipment, and/or labor in strict and express accordance with said Contract and the plans, drawings (if any), and specifications prepared by the City, all of which is made a part of said Contract by certain terms and conditions in said Contract more particularly mentioned, which Contract, consisting of the various Contract Documents specifically mentioned herein and relative hereto, is made a part of this Bond as fully and completely as if said Contract Documents were set forth herein.

NOW THEREFORE, the conditions of this obligation are such that if the above bounden Contractor shall in all respects comply with the terms and conditions of said Contract and his obligation thereunder, including the Contract Documents (which include the plans, drawings, specifications, and conditions prepared by the City, invitation to bid, instructions to bidders, the Contractor's bid as accepted by the City, the bid and contract and payment bonds, and all addenda, if any, issued prior to the opening of bids), and further that if said Contractor shall promptly make payments to all persons supplying materials, equipment, and/or labor, used directly or indirectly by said Contractor or subcontractors in the prosecution of the work for said contract is accordance with Florida Statutes, Section 255.05 or Section 713.23, then this obligation shall be void; otherwise

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to remain in full force and effect for the term of said contract, including and all guarantee periods as specifically mentioned in said Contract Documents.

AND, the said Surety for value received, hereby stipulates and agrees that no change involving any extension of time, or addition to the terms of the Contract or to the work to be performed, or materials to be furnished thereunder, or in the Contract Documents and specifications accompanying the said contract shall affect said obligation of said Surety on this Bond, and the said Surety does hereby waive notice of any such changes, extension of time, alternations, or additions of the terms of the Contract, or to the work, to the Contract Documents, or to the specifications.

Claimant shall give written notice to the Contractor and the Surety as required by Section 255.05 or Section 713.23, Florida Statutes. Any action instituted against the Contractor or Surety under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2) or Section 713.23, Florida Statutes.

IN WITNESS WHEREOF, the above parties bounded together have executed this instrument this _____ day of _____, 20____, the name and corporate seal of each corporate party being hereto affixed and those presents duly signed by its undersigned representative, pursuant to authority of its governing body.

CONTRACTOR

By:_____ (SEAL)

_____
ATTEST

SURETY

_____

By: _____(SEAL)

_____
ATTEST

END OF SECTION

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City of Key West
P.O. Box 1409
Key West, FL 33041

Notice of Award

Date

Project Number: ST 14010

Owner City of Key West
Company City of Key West
Address Office of the City Clerk
Address City of Key West P.O. Box 1409
Key West, Fl 33041-1409

Project Name: **North Simonton Stormwater Emergency Outfall**

Dear:

At a meeting of the City of Key West Commission held on**_____,** 20**__.COMPANY NAME** was awarded the contract for **North Simonton Stormwater Emergency Outfall**. The total Contract amount shall not exceed $ _____.

Enclosed please find three copies of the Contract Documents for your execution. Please complete the necessary pages, affixing signatures, notary and / or corporate seals, etc. where necessary and return to this office by **DATE**. Also, you need to be mobilized on **DATE**, and remit a bill to the City of Key West by **DATE**.

The Certificate of Insurance must be attached to the documents; one original and two copies are acceptable.

Powers – of – Attorney must be submitted in each bond document, an original and two copies are permissible.

A copy of your City of Key West Business License Tax Receipt, must be attached, (subcontractors City Of Key West Business License Tax Receipt) and one copy in PDF on disc.

Sincerely,

Jay Gewin
Utilities Manager
cc: Cheri Smith, City Clerk
Project File

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CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: North Simonton Stormwater Emergency Outfall

Project No. ST 14010

DATE OF ISSUANCE _____

_____

CITY _____

CITY'S CONTRACT NO._____

CONTRACTOR _____ ENGINEER _____

_____

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

TO: _____
CITY

And To _____
CONTRACTOR

_____

The Work to which this Certificate applies has been inspected by authorized representatives of City, Contractor, and Engineer and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

_____
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does no alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by Contractor within ____ days of the above date of Substantial Completion.

EJCDC No. 1910-8-D (1990 Edition)
Prepared by the Engineers Joint Contract Documents Committee and endorsed by the Associated General Contractors of America

END OF SECTION

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CERTIFICATE OF FINAL COMPLETION

Project: North Simonton Stormwater Emergency Outfall

Project No. ST 14010

Date of Issuance:_____

City_____

Contractor _____ Engineer_____

This Certificate of Completion applies to all Work under the Contract Documents. _____

The Work to which this Certificate applies has been inspected by authorized representatives of City and Engineer, and that Work is hereby declared to be complete in accordance with the Contract Documents on

_____
DATE OF COMPLETION

Executed by ENGINEER on _____ , (Date)

_____
ENGINEER

By:_____
(Authorized Signature)

CONTRACTOR accepts this Certificate of Completion on _____, (DATE)

_____
CONTRACTOR

By:_____

CITY accepts this Certificate of Completion on _____, (DATE)

_____
CITY

By:_____
(Authorized Signature)

END OF SECTION

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NOTICE TO PROCEED

Date: _____, 20___ Project No: ST 14010_____

Contractor: _____

Address: _____

_____

Project North Simonton Stormwater Emergency Outfall

Project No. ST 14010

You are hereby notified to commence work on _____, 20_____ for the North Simonton Stormwater Emergency Outfall and all related work, as designated by the City in accordance with the Contract made with the City of Key West on the _____day of _____, 20____. The amount of time to complete the work is two hundred seventy (270) consecutive calendar days and should be fully completed on or before_____.

Sincerely,

_____
Project Manager

Receipt of this NOTICE TO PROCEED is hereby acknowledged this, the _____ day of _____, 20_____.

CONTRACTOR: _____

By: _____

TITLE: _____ DATE: _____

Please return one (1) copy of this notice to:

CH2M HILL
6410 5th Street
Suite 2A
Key West, FL 33040

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PAYMENT APPLICATION AND CERTIFICATE

Date: _____

Application No.: _____ of _____ Sheet: _____ of _____

Period From: _____ to _____, 20_____.

Project: North Simonton Stormwater Emergency Outfall

Project No.: ST 14010

Contractor: _____

Original Contract Sum $ _____

Contract Modifications Approved in Previous Applications

Additions $ _____ Deductions: $ _____

Contract Modifications Approved this Period (List Contract Modifications Nos. ____)

Additions $ _____ Deductions: $ _____

1. Net Change by Contract Modifications (sum of lines 2 and 3) $ _____
2. Revised Contract Amount (Sum of Lines 1 and 4) $ _____
3. Total Value of Work to Date (Estimate Attached) $ _____
4. Percent Project Complete (Line 6 / Line 5 x 100) = _____%
5. Total Materials on Hand (Listing Attached) $ _____
6. Subtotal-Work Completed and Stored (Sum of Lines 6 and 8) $ _____
7. Total Retainage (_____% x Line 9) $ _____
8. Total Earned to Date, Less Retainage (Line 9 less Line 10) $ _____
9. Less Previous Certificates for Payments (item 11 from Previous Application) $ _____
10. Current Payment Due (Line 11 less Line 12) $ _____
11. Amount paid to Subcontractors Previous Pay Application $ _____

The undersigned Contractor certifies that the Work covered by this Application for Payment has been completed in accordance with the Contract Documents that the current payment shown herein is now due, and that title for all Work, materials, and equipment covered in this Application will pass to the City free and clear of all liens at the time of payment.

_____ _____ _____

Contractor By Date

I hereby acknowledge that the material and labor involved on the above estimate is correct to the best of my knowledge, information and belief, and payment on same is due Contractor.

_____ _____

Project Manager Date

END OF SECTION

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CONSTRUCTION COMPLIANCE CERTIFICATION WITH SPECIFICATIONS AND PLANS

CITY OF KEY WEST

Construction Compliance Certification with Specifications and Plans

Project: North Simonton Stormwater Emergency Outfall
Project Number: ST 14010
PO Number

Date
Monthly ☐
Final ☐

Prime Contractor for the above-referenced Contract hereby verifies, based on personnel knowledge or reasonable investigation and good faith belief, all Quality Control functions and Quality Control sampling and test results are in substantial compliance with the pertinent specification requirements for this Project. This represents work completed between _____ and _____.
Exceptions are listed below (add additional sheets as required).

Item No.:
Exception:

A false statement or omission made in connection with the Certification is sufficient cause for suspension, revocation, or denial of qualification to Bid, and a determination of non-responsibility, and may subject the person and/or entity making the false statement to any civil and criminal penalties available pursuant to applicable State and Federal Law.

Contractor: _____ Date: _____

State of Florida
County of:

Sworn to and subscribed before me this _____ day of _____, 20____

By: _____
(print name of person signing certification)

Notary Public

Commission Expires:

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CERTIFICATE OF FINAL PAYMENT

Date: _____
Page: 1 of 2

Payment Application No.: _____

Period From: _____ to _____

Project: North Simonton Stormwater Emergency Outfall

Project No.: ST 14010

Contractor: _____

I hereby acknowledge that this Contract has been completed in substantial compliance with the items of the Agreement, Specifications, and Plans, As-Builts, Work Change Directives, and Field Orders. I, therefore, request acceptance of the Work and processing of this final estimate as showing the total amount of money due in compliance with the terms of the Contract.

I, _____, certify to the Owner that the Contractor met the Grant requirements provided in the Contract Documents.

Contractor: _____

Address: _____

_____

With the acceptance of this final payment, we, the Contractor, release the Owner and the Engineer and their agents, from all claims and liability to us, the Contractor, for all things done or furnished in connection with the Work, and every act of the Owner and others relating to, or arising, out of the Work.

_____ _____
Signature Date

_____
Title

Sworn and subscribed before me this _____ day of _____, 20____

NOTARY PUBLIC, State of Florida at Large

My Commission Expires:

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Accepted By:

_____ _____

Project Manager Date

Owner:

By: _____ _____

Date

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CERTIFIED PAYROLL MISCELLANEOUS FORMS AND INSTRUCTION

Wage and Hour Record — *Form WH-347* — 700-010-69

Contractor's Name — Address — Construction

Payroll Number: — For Week Ending — Contract # — FIN # — Project and Location — 05/06

(1) Employee Name / Address / Social Security Number	(2) Exemptions / Race & Gender	(3) Work Classification	Straight / Over Time	(4) Day and Date							(5) Total Hours	(6) Pay Rate	(7) Project Gross / Weekly Gross	(8) Deductions: FICA	Withholding tax			Total from attached deduction sheet	Total Deductions	(9) Net Wages Paid for week
			O								0.00	0.00	0.00							
			S								0.00								$0.00	$ -
			O								0.00	0.00	0.00							
			S								0.00								$0.00	$ -
			O								0.00	0.00	0.00							
			S								0.00								$0.00	$ -
			O								0.00	0.00	0.00							
			S								0.00								$0.00	$ -
			O								0.00	0.00	0.00							
			S								0.00								$0.00	$ -
			O								0.00	0.00	0.00							
			S								0.00								$0.00	$ -
			O								0.00	0.00	0.00							
			S								0.00								$0.00	$ -
			O								0.00	0.00	0.00							
			S								0.00								$0.00	$ -
			O								0.00	0.00	0.00							
			S								0.00								$0.00	$ -
			O								0.00	0.00	0.00							
			S								0.00								$0.00	$ -
			O								0.00	0.00	0.00							
			S								0.00								$0.00	$ -

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Contractor's Name | Address | 700-010-69 Construction 05/06

Payroll Number: | For Week Ending | Contract #

FIN # | Project and Location

Employee Name	*Type of Deduction*	*Type of Deduction*	*Type of Deduction*	*Type of Deduction*	*Type of Deduction*	*Type of Deduction*	*Type of Deduction*	*Type of Deduction*	*Type of Deduction*	*Type of Deduction*	*Type of Deduction*	**Total Amount**
												$0.00
												$0.00
												$0.00
												$0.00
												$0.00
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How To Correctly Fill Out a WH-347 Payroll Form.

The completion of the WH-347 Payroll Form is optional; contractors may utilize their own payroll system as long as it conforms to the WH-347 Payroll Form and contains all the necessary information.

Check one.

Fill out completely.

Payrolls must be numbered sequentially and should be based on the weeks worked under a contract. Write the word "Final" on the last payroll submitted.

Please include the lowest state project number as listed on the contract/proposal cover sheet.

Payroll Report

Fed ID # XX-XXXXXXX

Name of Contractor __ or Subcontractor __: Charlie Doe Constructio

Project and Location: Roadway and County

Address and Telephone #: 395 John Ireland Boulvard St. Paul, MN 55155 (XXX) XXX-XXXX

For Period Ending: 7/7/00

Payroll Number: 8

Project or Contract #: S. P. Number

(1) Employee Name, Address City, State, Zip Code and Social Security Number	(2) # Of Exemptions	(3) Labor Code and Classification	(4) OT or ST	(5) Day and Date S 1	M 2	T 3	W 4	T 5	F 6	S 7	(6) Total Hours This Job	(7) Hourly Rate Of Pay	(8) Gross Amount Earned This Job	(9) Gross Amount Earned This Period	(10) Deductions FICA	Federal With holding Tax	State With holding Tax	Medi Care	Other	Total Deductions	(11) Total Net Wages Paid for The Period
Connie Doe Address City, State, Zip Code Social Security Number	2	203 3+Cu/Yd Truck Hee	O	2	2	2	2				8	15.32									
			S	8	8	8	8				32	10.21	449.32	633.5	39.25	85.00	38.00	9.25		171.43	461.58
			O																		
			S																		

Hours Worked Each Day

Enter the federal I.D. number.

The contractor must list each worker's name, address and social security number. Only wokers that perform work under the contract must be listed. Please note, working formen, owners and family members must be included on the payroll.

Indicate the days and dates of the pay period.

Specify the numeric job code located in the contract wage decision and/or the corresponding job title.

Specify the total overtime and straight time hours worked on the Project.

Specify the total gross earnings for the pay period. This would include earnings outside of the contract.

Specify the gross earnings regarding the hours worked under the contract.

Specify the net amount paid to the employee for the pay period.

Must accurately reflect overtime and straight time hours worked under the contract.

Minnesota State Statue 177.42 and 177.44, Subdivision 1:
The prevailing hours of labor may not be more than 8 hours per day or more than 40 hours per week. All hours in excess of the prevailing hours of labor must be paid at 1.5 times the contract basic hourly rate.

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How To Report: Time and wages if an employee performs multiple work duties under a contract and an employee that only performs work under a contract and does not have other work hours outside of the contract work.

Payroll Report

Name of Contractor ___ or Subcontractor ___: **Charlie Doe Construction**

Project and Location: **Roadway and County**

Address and Telephone #: **395 John Ireland Boulvard St. Paul, MN 55155 (XXX) XXX-XXXX**

For Period Ending: **7/7/00**

Payroll Number: **8**

Project or Contract #: **S. P. Number**

(1) Employee Name, Address City, State, Zip Code and Social Security Number	(2) # Of Exemptions	(3) Labor Code and Classification	(4) OT or ST	(5) Day and Date S 1	M 2	T 3	W 4	T 5	F 6	S 7	(6) Total Hours This Job	(7) Hourly Rate Of Pay	(8) Gross Amount Earned This Job	(9) Gross Amount Earned This Period	(10) Deductions FICA	Federal With holding Tax	State With holding Tax	*Medi Care*	*Union Dues* Other	Total Deductions	(11) Total Net Wages Paid for The Period
				Hours Worked Each Day																	
Connie Doe		**404**	O																		
Address		**Carpenter**																			
City, State, Zip Code																					
Social Security Number	**2**		S		**8**		**4**		**3**		**32**	**8.92**	**312.64**	**348.37**	**20.37**	**53.20**	**7.14**	**3.57**	**3.20**	**87.48**	**260.84**
Connie Doe		**101**	O																		
		General Laborer																			
			S				**4**				**4**	**6.80**									
Robert Austin		**404**	O																		
Address		**Carpenter**																			
City, State, Zip Code																					
Social Security Number	**1**		S		**8**	**8**	**8**	**8**	**8**		**40**	**8.92**	**356.80**	**356.80**	**20.87**	**54.50**	**7.14**	**3.57**	**3.20**	**82.28**	**267.52**

Connie Doe performed multiple job duties under the contract.

Break the job duties apart by utilizing two or more lines on the payroll report to distinguish the different job classifications.

Combine the two classifications when recording the gross amount earned for this project and total gross amount earned for pay period.

Robert Austin only worked on the project during the pay period and did not work any non-project hours.

The gross amount earned for the project and the total gross amount earned for the pay period should be the same.

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How To Report: A registered apprentice performing work under a contract.

Payroll Report

Name of Contractor ___ or Subcontractor X
Charlie Doe Construction

Project and Location
Roadway and County

Address and Telephone #
395 John Ireland Boulvard St. Paul, MN 55155 (XXX) XXX-XXXX

For Period Ending **7/7/00**

Payroll Number **8**

Project or Contract # **S. P. Number**

(1) Employee Name, Address City, State, Zip Code and Social Security Number	(2) # Of Exemptions	(3) Labor Code and Classification	(4) OT or ST	(5) Day and Date S 1	M 2	T 3	W 4	T 5	F 6	S 7	(6) Total Hours This Job	(7) Hourly Rate Of Pay	(8) Gross Amount Earned This Job	(9) Gross Amount Earned This Period	(10) Deductions FICA	Federal With holding Tax	State With holding Tax	Pen-sion	Union Dues Other	Total Deductions	(11) Total Net Wages Paid for The Period
				Hours Worked Each Day																	
Joe Smith	2	Apprentice Carpenter # XXXXXX 1st 6mos. @ 40%	O																		
			S		8	8			4		20	3.57	71.40	142.00	7.68	12.60	9.00	1.31	4.20	34.79	108.01
Jane Johnson	3	404 Carpenter	O																		
			S		8	8			8		24	13.38	321.12	548.00	34.00	72.00	9.00	6.41	4.20	125.61	422.39

Apprentice
Carpenter
I.D.# XXXXXX
1st 6 mos. @ 40%

Joe Smith is a registered apprentice carpenter. This must be stated on the payroll.

Specify the apprentice I. D. number that was issued by the United States Department of Labor or the Minnesota Department Of Labor and Industry, Division of Apprenticeship.

Must include the current pay scale or provide a copy of the apprenticeship agreement.

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U.S. Department of Labor
Employment Standards Administration
Wage and Hour Division

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/esa/whd/forms/wh347instr.htm)

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

U.S. Wage and Hour Division

Rev. Dec. 2008

OMB No.: 1215-0149
Expires: 12/31/2011

NAME OF CONTRACTOR ☐ OR SUBCONTRACTOR ☐

ADDRESS

PAYROLL NO.

FOR WEEK ENDING

PROJECT AND LOCATION

PROJECT OR CONTRACT NO.

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT. OR ST.	(4) DAY AND DATE / HOURS WORKED EACH DAY							(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS: FICA	WITH-HOLDING TAX			OTHER	TOTAL DEDUCTIONS	(9) NET WAGES PAID FOR WEEK
			O																	
			S																	
			O																	
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that is will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, ESA, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

(over)

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Date _____

I, _____ _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the
(Contractor or Subcontractor)

_____; that during the payroll period commencing on the
(Building or Work)

_____ day of _____, _____, and ending the _____ day of _____, _____,

all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Start. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

_____

_____

_____

_____

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ – in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ – Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

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Instructions For Completing Payroll Form, WH-347

WH-347 (PDF)
OMB Control No. 1215-0149, Expires 12/31/2011.
Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

General: Form WH-347has been made available for the convenience of contractors and subcontractors required by their Federal or Federally-aided construction-type contracts and subcontracts to submit weekly payrolls. Properly filled out, this form will satisfy the requirements of Regulations, Parts 3 and 5 (29 C.F.R., Subtitle A), as to payrolls submitted in connection with contracts subject to the Davis-Bacon and related Acts.

While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) requires contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) Regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Under the Davis-Bacon and related Acts, the contractor is required to pay not less than prevailing wage, including fringe benefits, as predetermined by the Department of Labor. The contractor's obligation to pay fringe benefits may be met either by payment of the fringe benefits to bona fide benefit plans, funds or programs or by making payments to the covered workers (laborers and mechanics) as cash in lieu of fringe benefits.

This payroll provides for the contractor to show on the face of the payroll all monies to each worker, whether as basic rates or as cash in lieu of fringe benefits, and provides for the contractor's representation in the statement of compliance on the payroll (as shown on page 2) that he/she is paying for fringe benefits required by the contract and not paid as cash in lieu of fringe benefits. Detailed instructions concerning the preparation of the payroll follow:

Contractor or Subcontractor: Fill in your firm's name and check appropriate box.

Address: Fill in your firm's address.

Payroll No.: Beginning with the number "1", list the payroll number for the submission.

For Week Ending: List the workweek ending date.

Project and Location: Self-explanatory.

Project or Contract No.: Self-explanatory.

Column 1 - Name and Individual Identifying Number of Worker: Enter each worker's full name and an individual identifying number (e.g., last four digits of worker's social security number) on each weekly payroll submitted.

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Column 2 - No. of Withholding Exemptions: This column is merely inserted for the employer's convenience and is not a requirement of Regulations, Part 3 and 5.

Column 3 - Work Classifications: List classification descriptive of work actually performed by each laborer or mechanic. Consult classification and minimum wage schedule set forth in contract specifications. If additional classifications are deemed necessary, see Contracting Officer or Agency representative. An individual may be shown as having worked in more than one classification provided an accurate breakdown or hours worked in each classification is maintained and shown on the submitted payroll by use of separate entries.

Column 4 - Hours worked: List the day and date and straight time and overtime hours worked in the applicable boxes. On all contracts subject to the Contract Work Hours Standard Act, enter hours worked in excess of 40 hours a week as "overtime".

Column 5 - Total: Self-explanatory

Column 6 - Rate of Pay (Including Fringe Benefits): In the "straight time" box for each worker, list the actual hourly rate paid for straight time worked, plus cash paid in lieu of fringe benefits paid. When recording the straight time hourly rate, any cash paid in lieu of fringe benefits may be shown separately from the basic rate. For example, "$12.25/.40" would reflect a $12.25 base hourly rate plus $0.40 for fringe benefits. This is of assistance in correctly computing overtime. See "Fringe Benefits" below. When overtime is worked, show the overtime hourly rate paid plus any cash in lieu of fringe benefits paid in the "overtime" box for each worker; otherwise, you may skip this box. See "Fringe Benefits" below. Payment of not less than time and one-half the basic or regular rate paid is required for overtime under the Contract Work Hours Standard Act of 1962 if the prime contract exceeds $100,000. In addition to paying no less than the predetermined rate for the classification which an individual works, the contractor must pay amounts predetermined as fringe benefits in the wage decision made part of the contract to approved fringe benefit plans, funds or programs or shall pay as cash in lieu of fringe benefits. See "FRINGE BENEFITS" below.

Column 7 - Gross Amount Earned: Enter gross amount earned on this project. If part of a worker's weekly wage was earned on projects other than the project described on this payroll, enter in column 7 first the amount earned on the Federal or Federally assisted project and then the gross amount earned during the week on all projects, thus "$163.00/$420.00" would reflect the earnings of a worker who earned $163.00 on a Federally assisted construction project during a week in which $420.00 was earned on all work.

Column 8 - Deductions: Five columns are provided for showing deductions made. If more than five deduction are involved, use the first four columns and show the balance deductions under "Other" column; show actual total under "Total Deductions" column; and in the attachment to the payroll describe the deduction(s) contained in the "Other" column. All deductions must be in accordance with the provisions of the Copeland Act Regulations, 29 C.F.R., Part 3. If an individual worked on other jobs in addition to this project, show actual deductions from his/her weekly gross wage, and indicate that deductions are based on his gross wages.

Column 9 - Net Wages Paid for Week: Self-explanatory.

Totals - Space has been left at the bottom of the columns so that totals may be shown if the contractor so desires.

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Statement Required by Regulations, Parts 3 and 5: While the "statement of compliance" need not be notarized, the statement (on page 2 of the payroll form) is subject to the penalties provided by 18 U.S.C. § 1001, namely, a fine, possible imprisonment of not more than 5 years, or both. Accordingly, the party signing this statement should have knowledge of the facts represented as true.

Items 1and 2: Space has been provided between items (1) and (2) of the statement for describing any deductions made. If all deductions made are adequately described in the "Deductions" column above, state "*See* Deductions column in this payroll." *See* "FRINGE BENEFITS" below for instructions concerning filling out paragraph 4 of the statement.

Item 4 FRINGE BENEFITS - Contractors who pay all required fringe benefits: If paying all fringe benefits to approved plans, funds, or programs in amounts not less than were determined in the applicable wage decision of the Secretary of Labor, show the basic cash hourly rate and overtime rate paid to each worker on the face of the payroll and check paragraph 4(a) of the statement on page 2 of the WH-347 payroll form to indicate the payment. Note any exceptions in section 4(c).

Contractors who pay no fringe benefits: If not paying all fringe benefits to approved plans, funds, or programs in amounts of at least those that were determined in the applicable wage decision of the Secretary of Labor, pay any remaining fringe benefit amount to each laborer and mechanic and insert in the "straight time" of the "Rate of Pay" column of the payroll an amount not less than the predetermined rate for each classification plus the amount of fringe benefits determined for each classification in the application wage decision. Inasmuch as it is not necessary to pay time and a half on cash paid in lieu of fringe benefits, the overtime rate shall be not less than the sum of the basic predetermined rate, plus the half time premium on basic or regular rate, plus the required cash in lieu of fringe benefits at the straight time rate. In addition, check paragraph 4(b) of the statement on page 2 the payroll form to indicate the payment of fringe benefits in cash directly to the workers. Note any exceptions in section 4(c).

Use of Section 4(c), Exceptions

Any contractor who is making payment to approved plans, funds, or programs in amounts less than the wage determination requires is obliged to pay the deficiency directly to the covered worker as cash in lieu of fringe benefits. Enter any exceptions to section 4(a) or 4(b) in section 4(c). Enter in the Exception column the craft, and enter in the Explanation column the hourly amount paid each worker as cash in lieu of fringe benefits and the hourly amount paid to plans, funds, or programs as fringe benefits. The contractor must pay an amount not less than the predetermined rate plus cash in lieu of fringe benefits as shown in section 4(c) to each such individual for all hours worked (unless otherwise provided by applicable wage determination) on the Federal or Federally assisted project. Enter the rate paid and amount of cash paid in lieu of fringe benefits per hour in column 6 on the payroll. See paragraph on "Contractors who pay no fringe benefits" for computation of overtime rate.

Public Burden Statement: We estimate that it will take an average of 55 minutes to complete this collection of information, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection of information, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, ESA, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W.,Washington, D.C. 20210.

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IX. Executive Order 13175, Indian Tribal Governments

The Department has reviewed this rule under the terms of Executive Order 13175 and determined it did not have "tribal implications." The rule does not have "substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the federal government and Indian tribes." As a result, no tribal summary impact statement has been prepared.

X. Effects on Families

The Department certifies that this rule will not adversely affect the well-being of families, as discussed under section 654 of the Treasury and General Government Appropriations Act, 1999.

XI. Executive Order 13045, Protection of Children

The Department has reviewed this rule under the terms of Executive Order 13045 and determined this action is not subject to E.O. 13045 because it is not economically significant as defined in E.O. 12866 and it does not impact the environmental health or safety risks of children.

XII. Environmental Impact Assessment

The Department has reviewed this rule in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4321 *et seq.*, the regulations of the Council of Environmental Quality, 40 CFR part 1500 *et seq.*, and the Departmental NEPA procedures, 29 CFR part 11, and determined that this rule will not have a significant impact on the quality of the human environment. There is, thus, no corresponding environmental assessment or an environmental impact statement.

XIII. Executive Order 13211, Energy Supply

The Department has determined that this rule is not subject to Executive Order 13211. It will not have a significant adverse effect on the supply, distribution or use of energy.

XIV. Executive Order 12630, Constitutionally Protected Property Rights

The Department has determined that this rule is not subject to Executive Order 12630 because it does not involve implementation of a policy "that has taking implications" or that could impose limitations on private property use.

XV. Executive Order 12988, Civil Justice Reform Analysis

The Department drafted and reviewed this final rule in accordance with Executive Order 12988 and determined that the rule will not unduly burden the federal court system. The rule was: (1) Reviewed to eliminate drafting errors and ambiguities; (2) written to minimize litigation; and (3) written to provide a clear legal standard for affected conduct and to promote burden reduction.

XVI. Dates of Applicability

The revisions to § 5.5(a)(3)(ii)(A) and (B)(1) of Part 5 shall be applicable only as to contracts entered into pursuant to invitations for bids issued or negotiations concluded on or after the effective date of this rule, which is January 18, 2009.

List of Subjects

29 CFR Part 3

Government contracts, Labor, Paperwork, Law enforcement.

29 CFR Part 5

Government contracts, Labor, Paperwork, Law enforcement.

Signed at Washington, DC, this 11th day of December 2008.

Victoria A. Lipnic,

Assistant Secretary, Employment Standards Administration.

Alexander J. Passantino,

Acting Administrator, Wage and Hour Division.

■ For the reasons set forth above, Title 29, Subtitle A of the Code of Federal Regulations is amended by amending parts 3 and 5 as follows:

PART 3—CONTRACTORS AND SUBCONTRACTORS ON PUBLIC BUILDING OR PUBLIC WORK FINANCED IN WHOLE OR IN PART BY LOANS OR GRANTS FROM THE UNITED STATES

■ 1. The authority citation for Part 3 is revised to read as follows:

Authority: R.S. 161, sec. 2, 48 Stat. 848; Reorg. Plan No. 14 of 1950, 64 Stat. 1267; 5 U.S.C. 301; 40 U.S.C. 3145; Secretary's Order 01–2008; and Employment Standards Order No. 2001–01.

■ 2. Amend § 3.3 by revising paragraph (b) to read as follows:

§ 3.3 Weekly statement with respect to payment of wages.

* * * * *

(b) Each contractor or subcontractor engaged in the construction, prosecution, completion, or repair of any public building or public work, or building or work financed in whole or in part by loans or grants from the United States, shall furnish each week a statement with respect to the wages paid each of its employees engaged on work covered by this part 3 and part 5 of this title during the preceding weekly payroll period. This statement shall be executed by the contractor or subcontractor or by an authorized officer or employee of the contractor or subcontractor who supervises the payment of wages, and shall be on the back of Form WH 347, "Payroll (For Contractors Optional Use)" or on any form with identical wording. Copies of Form WH 347 may be obtained from the Government contracting or sponsoring agency or from the Wage and Hour Division Web site at *http://www.dol.gov/esa/whd/forms/wh347instr.htm* or its successor site.

* * * * *

PART 5—LABOR STANDARDS PROVISIONS APPLICABLE TO CONTRACTS COVERING FEDERALLY FINANCED AND ASSISTED CONSTRUCTION (ALSO LABOR STANDARDS PROVISIONS APPLICABLE TO NONCONSTRUCTION CONTRACTS SUBJECT TO THE CONTRACT WORK HOURS AND SAFETY STANDARDS ACT)

■ 3. The authority citation for part 5 is revised to read as follows:

Authority: 5 U.S.C. 301; R.S. 161, 64 Stat. 1267; Reorganization Plan No. 14 of 1950, 5 U.S.C. appendix; 40 U.S.C. 3141 *et seq.*; 40 U.S.C. 3145; 40 U.S.C. 3148; 40 U.S.C. 3701 *et seq.*; and the laws listed in 5.1(a) of this part; Secretary's Order 01–2008; and Employment Standards Order No. 2001–01.

■ 4. Amend § 5.5 paragraphs (a)(3)(ii)(A) and (a)(3)(ii)(B)(*1*) by revising to read as follows:

§ 5.5 Contract provisions and related matters.

(a) * * *

(3) * * * (ii)(A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency). The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually

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identifying number for each employee (*e.g.*, the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at *http://www.dol.gov/esa/whd/forms/wh347instr.htm* or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency), the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).

(B) * * *

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

* * * * *

[FR Doc. E8–29886 Filed 12–18–08; 8:45 am]

BILLING CODE 4510–27–P

DEPARTMENT OF HOMELAND SECURITY

Coast Guard

33 CFR Parts 147 and 165

[USCG–2008–0181]

Quarterly Listings; Anchorages, Safety Zones, Security Zones, Special Local Regulations, Regulated Navigation Areas, and Drawbridge Operation Regulations; Correction

AGENCY: Coast Guard, DHS.

ACTION: Notice of expired temporary rules issued; correction.

SUMMARY: The Coast Guard published a document in the **Federal Register** of October 14, 2008, concerning expired temporary rules. The document contained an incorrect contact telephone number, an incorrect table entry, and an omission.

FOR FURTHER INFORMATION CONTACT: For questions on this notice contact Ms. Lesley Mose, Office of Regulations and Administrative Law, telephone (202) 372–3863. For questions on viewing, or on submitting material to the docket, contact Ms. Angie Ames, Program Manager, Docket Operations, telephone 202–366–5115.

Correction

In the **Federal Register** of October 14, 2008, in FR Doc. E8–23956, on page 60629, in the second column under **FOR FURTHER INFORMATION CONTACT**, correct the Office of Regulations and Administrative Law telephone number to read "202–372–3863"; on the same page, in the table, remove the entry for Docket No. USCG–2008–0102; and on page 60630, in the table insert the entry for Docket No. USCG–2008–0402 reading "Boca Grande, FL, Safety Zones (Parts 147 and 165), 6/7/2008" in numerical order.

Dated: December 9, 2008.

S.G. Venckus,

Chief, Office of Regulations and Administrative Law.

[FR Doc. E8–29736 Filed 12–18–08; 8:45 am]

BILLING CODE 4910–15–P

POSTAL REGULATORY COMMISSION

39 CFR Part 3020

[Docket Nos. MC2009–8 and CP2009–9; Order No. 147]

Administrative Practice and Procedure, Postal Service

AGENCY: Postal Regulatory Commission.

ACTION: Final rule.

SUMMARY: The Commission is adding a new international mail product to the Competitive Product List. This product is a contract between the United States Postal Service and Canada Post for inbound competitive services. It modifies and extends an existing agreement. The Commission's action is consistent with changes to applicable federal law and regulations and with a recent Postal Service request. Republication of the lists of market dominant and competitive products is also consistent with requirements in the law.

DATES: Effective December 19, 2008.

ADDRESSES: Submit comments electronically via the Commission's Filing Online system at *http://www.prc.gov.*

FOR FURTHER INFORMATION CONTACT: Stephen L. Sharfman, General Counsel, 202–789–6820 and *stephen.sharfman@prc.gov.*

SUPPLEMENTARY INFORMATION: *Regulatory History,* 73 FR 70681 (November 21, 2008).

The Postal Service seeks to add a new product identified as Canada Post-United States Postal Service Contractual Bilateral Agreement for Inbound Competitive Services (MC2009–8 and CP2009–9) to the Competitive Product List. For the reasons discussed below, the Commission approves the Request.

I. Background

On November 13, 2008, the Postal Service filed a formal request pursuant to 39 U.S.C. 3642 and 39 CFR 3020.30 *et seq.* to add the Canada Post-United States Postal Service Contractual Bilateral Agreement for Inbound Competitive Services (Bilateral Agreement) to the Competitive Product List.[1] The Postal Service asserts that the Contractual Bilateral Agreement is a competitive product "not of general applicability" within the meaning of 39 U.S.C. 3632(b)(3). This Request has been assigned Docket No. MC2009–8.

The Postal Service contemporaneously filed notice, pursuant to 39 U.S.C. 3632(b)(3) and 39 CFR 3015.5, that the Governors have established prices and classifications not of general applicability for inbound competitive services as reflected in the Bilateral Agreement. More specifically, the Bilateral Agreement, which has been assigned Docket No. CP2009–9, governs the exchange of Inbound Surface Parcel Post from Canada.

In support of its Request, the Postal Service filed a redacted version of the Governors' Decision establishing prices for the Bilateral Agreement. Attached to the Governors' Decision are proposed Mail Classification Schedule language; a redacted version of management's analysis of the Bilateral Agreement; certification of compliance with 39 U.S.C. 3633(a); certification of the Governors' vote;[2] and a Statement of Supporting Justification as required by 39 CFR 3020.32.[3] In addition, the Postal

[1] Request of United States Postal Service to Add Canada Post-United States Postal Service Contractual Bilateral Agreement for Inbound Competitive Services to the Competitive Product List, and Notice of Filing (Under Seal) the Enabling Governors' Decision and Agreement, November 13, 2008 (Request).

[2] *See* Attachment 1 to the Request.

[3] *See* Attachment 2 to the Request.

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

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1015 15th Street N.W., Washington, DC 20005
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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

30. *PCBs*—Polychlorinated biphenyls.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

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

B. *Intent of Certain Terms or Adjectives:*

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

C. *Day:*

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

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D. *Defective:*

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

a. does not conform to the Contract Documents; or

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

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

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

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

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

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

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

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

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

2.02 *Copies of Documents*

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

2.03 *Commencement of Contract Times; Notice to Proceed*

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

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

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

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

2. a preliminary Schedule of Submittals; and

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

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

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

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

2.07 *Initial Acceptance of Schedules*

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

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

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

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

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

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

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

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

3.02 *Reference Standards*

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

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

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees,

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

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

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

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

B. *Resolving Discrepancies:*

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

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

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

3.04 *Amending and Supplementing Contract Documents*

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

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

1. A Field Order;

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

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

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

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

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

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3.06 *Electronic Data*

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

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

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

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

4.01 *Availability of Lands*

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

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

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

4.02 *Subsurface and Physical Conditions*

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

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

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

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

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

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

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

4.03 *Differing Subsurface or Physical Conditions*

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

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

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

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

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

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

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

C. *Possible Price and Times Adjustments:*

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

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

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

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

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

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

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

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

4.04 *Underground Facilities*

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

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

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

a. reviewing and checking all such information and data;

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

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

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

B. *Not Shown or Indicated:*

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

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

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

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

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

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

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

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

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

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous

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

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

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

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

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

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

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

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

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

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authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

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

5.02 *Licensed Sureties and Insurers*

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

5.03 *Certificates of Insurance*

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

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

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

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

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

5.04 *Contractor's Insurance*

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

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

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

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

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

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

b. by any other person for any other reason;

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

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

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

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of

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whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

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

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

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

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

6. include completed operations coverage:

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

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

5.05 *Owner's Liability Insurance*

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

5.06 *Property Insurance*

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

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

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

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

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

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

6. include testing and startup; and

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

B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the

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

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

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

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

5.07 *Waiver of Rights*

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

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

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

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

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

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of

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Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

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

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

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

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

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

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

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

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

6.02 *Labor; Working Hours*

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

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

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water,

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sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

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

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

6.04 *Progress Schedule*

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

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

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

6.05 *Substitutes and "Or-Equals"*

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

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

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

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

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

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

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

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

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

2. *Substitute Items*:

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

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

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

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

1) shall certify that the proposed substitute item will:

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

b) be similar in substance to that specified, and

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

2) will state:

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

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

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

3) will identify:

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

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

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

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

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

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

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

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

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6.06 *Concerning Subcontractors, Suppliers, and Others*

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

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

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

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

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

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

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

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

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

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

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

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

6.08 *Permits*

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

6.09 *Laws and Regulations*

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

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

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

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

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

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

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

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members,

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partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

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

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

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

6.12 *Record Documents*

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

6.13 *Safety and Protection*

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

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

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

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

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

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

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

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

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

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

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

6.17 *Shop Drawings and Samples*

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

1. *Shop Drawings:*

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

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

2. *Samples:*

a. Submit number of Samples specified in the Specifications.

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

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

C. *Submittal Procedures*:

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

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

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

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

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and

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procedures of construction, and safety precautions and programs incident thereto.

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

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

D. *Engineer's Review:*

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

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

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

E. *Resubmittal Procedures:*

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

6.18 *Continuing the Work*

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

6.19 *Contractor's General Warranty and Guarantee*

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

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

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

2. normal wear and tear under normal usage.

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

1. observations by Engineer;

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

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

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

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

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

7. any correction of defective Work by Owner.

6.20 *Indemnification*

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

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

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

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

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

6.21 *Delegation of Professional Design Services*

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

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

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

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

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

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ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

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

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

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

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

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

7.02 *Coordination*

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

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

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

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

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

7.03 *Legal Relationships*

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

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

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

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

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

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8.03 *Furnish Data*

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

8.04 *Pay When Due*

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

8.05 *Lands and Easements; Reports and Tests*

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

8.06 *Insurance*

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

8.07 *Change Orders*

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

8.08 *Inspections, Tests, and Approvals*

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

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements*

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

8.12 *Compliance with Safety Program*

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

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

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

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but

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without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

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

9.04 *Authorized Variations in Work*

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

9.05 *Rejecting Defective Work*

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

9.06 *Shop Drawings, Change Orders and Payments*

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

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

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

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

9.07 *Determinations for Unit Price Work*

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

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

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

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

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

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

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

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

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

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

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

9.10 *Compliance with Safety Program*

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

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

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

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

10.02 *Unauthorized Changes in the Work*

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

10.03 *Execution of Change Orders*

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

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

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

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

10.04 *Notification to Surety*

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

10.05 *Claims*

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

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

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

1. deny the Claim in whole or in part;

2. approve the Claim; or

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

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

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

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

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

11.01 *Cost of the Work*

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

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include,

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

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

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

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

5. Supplemental costs including the following:

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

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

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

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

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

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

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

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

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

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

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

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

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

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

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

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

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

11.02 *Allowances*

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

B. *Cash Allowances:*

1. Contractor agrees that:

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

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

C. *Contingency Allowance:*

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

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

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the

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estimated quantity of each item as indicated in the Agreement.

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

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

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

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

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

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

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

12.01 *Change of Contract Price*

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

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

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

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

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

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

1. a mutually acceptable fixed fee; or

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

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

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

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

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

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

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

12.02 *Change of Contract Times*

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

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

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

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

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

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

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

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

13.01 *Notice of Defects*

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

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

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

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

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

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

3. as otherwise specifically provided in the Contract Documents.

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

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

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

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

13.04 *Uncovering Work*

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

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

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

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

13.05 *Owner May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

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

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise

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impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

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

1. repair such defective land or areas; or

2. correct such defective Work; or

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

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

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

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

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

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

13.08 *Acceptance of Defective Work*

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

13.09 *Owner May Correct Defective Work*

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

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all

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materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

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

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

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

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

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

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

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

B. *Review of Applications:*

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

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

a. the Work has progressed to the point indicated;

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

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

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

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

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

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

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

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

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

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

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

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

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

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

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

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

C. *Payment Becomes Due:*

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

D. *Reduction in Payment:*

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

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

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

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

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

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to

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Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.

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

14.03 *Contractor's Warranty of Title*

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

14.04 *Substantial Completion*

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

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

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

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

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

14.05 *Partial Utilization*

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

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

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

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify

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Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

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

14.06 *Final Inspection*

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

14.07 *Final Payment*

A. *Application for Payment:*

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

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

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

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

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

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

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

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

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

C. *Payment Becomes Due:*

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

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of

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Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

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

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

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

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

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

15.02 *Owner May Terminate for Cause*

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

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

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

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

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

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

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

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

3. complete the Work as Owner may deem expedient.

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

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

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

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

15.03 *Owner May Terminate For Convenience*

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

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

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

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

4. reasonable expenses directly attributable to termination.

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

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

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

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

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

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

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become

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final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

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

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

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

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

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

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

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

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

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SUPPLEMENTARY CONDITIONS

REVISIONS AND ADDITIONS TO THE GENERAL CONDITIONS

The General Conditions are hereby revised as follows:

ARTICLE 1.01.A.19 “Engineer”

Add the following:

Wherever in these Documents the word “Engineer” appears, it shall be understood to mean CH2M HILL and their authorized representatives, acting either directly or indirectly as authorized agents of the Owner.

ARTICLE 1.01.A.30 “Owner”

Add the following:

Wherever in these Documents the word “Owner” appears, it shall be understood to mean the City of Key West whose address is 525 Angela Street, Key West, Florida 33040.

SC-1.01.A.43. Supplement paragraph 1.01.A.43 of the General Conditions as follows:

Substantial Completion is further defined as (i) that degree of completion of the Project’s operating facilities or systems sufficient to provide Owner the full time, uninterrupted, and continuous beneficial operation of the Work; and (ii) all required functional, performance and acceptance or startup testing has been successfully demonstrated for all components, devices, equipment, and instrumentation and control to the satisfaction of Engineer in accordance with the requirements of the Specifications.

SC-1.01.A.51. Add a new paragraph immediately following paragraph 1.01.A.50 of the General Conditions as follows:

1.01.A.51. *Specialist*—The term Specialist refers to a person, partnership, firm, or corporation of established reputation (or if newly organized, whose personnel have previously established a reputation in the same field), which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the Contract Documents, or otherwise performing Work required by the Contract Documents. Where the Specifications require the installation by a Specialist, that term shall also be deemed to mean either the manufacturer of the item, a person, partnership, firm, or corporation licensed by the manufacturer, or a person, partnership, firm, or corporation who will perform the Work under the manufacturer’s direct supervision.

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SC-2.03.A. Delete the third sentence of paragraph 2.03.A *Commencement of Contract Times: Notice to Proceed* of the General Conditions in its entirety.

ARTICLE 4.05 “REFERENCE POINTS”

Add the following:

It will be the Contractor’s responsibility to layout the work and to transfer elevations from benchmarks. Where new construction connects to existing facilities, the Contractor shall check and establish the exact location prior to construction of the facilities.

The Contractor shall furnish all surveys, labor, and equipment, including setting all alignment and gradient, grade stakes, batter boards, and everything necessary to lay out his work. The Contractor shall be responsible for maintaining and re-establishing at his expense, all control points. After completion of his construction, he shall reset all permanent monuments at their original locations and elevations.

All layout work may be checked by the Engineer, and the Contractor shall furnish all necessary labor, equipment, and materials, and shall cooperate and assist the Engineer in making such checks.

The dimensions for lines and elevations for grades of the structures, appurtenances, and utilities will be shown on Drawings, together with other pertinent information required for laying out the work. If site conditions vary from those indicated, the Contractor shall notify the Engineer immediately, who will make any minor adjustment as required.

ARTICLE 5.04 “CONTRACTOR’S LIABILITY INSURANCE”

Contractor is to secure, pay for, and file with the City of Key West, prior to commencing any work under the Contract, all certificates for workers’ compensation, public liability, and property damage liability insurance, and such other insurance coverages as may be required by specifications and addenda thereto, in at least the following minimum amounts with specification amounts to prevail if greater than minimum amounts indicated. Notwithstanding any other provision of the Contract, the Contractor shall provide the minimum limits of liability insurance coverage as follows:

Auto Liability	$1,000,000	Combined Single Limit
General Liability	$2,000,000	Aggregate (Per Project)
	$2,000,000	Products Aggregate
	$1,000,000	Any One Occurrence
	$1,000,000	Personal Injury
	$ 300,000	Fire Damage/Legal
Additional Umbrella Liability	$2,000,000	Occurrence/Aggregate

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Contractor shall furnish an original Certificate of Insurance indicating, and such policy providing coverage to, City of Key West named as an additional insured on a PRIMARY and NON CONTRIBUTORY basis utilizing an ISO standard endorsement at least as broad as CG 2010 (11/85) or its equivalent, (combination of CG 20 10 07 04 and CG 20 37 07 04, providing coverage for completed operations, is acceptable) including a waiver of subrogation clause in favor of City of Key West on all policies. Contractor will maintain the General Liability and Umbrella Liability insurance coverages summarized above with coverage continuing in full force including the additional insured endorsement until at least 3 years beyond completion and delivery of the work contracted herein.

Notwithstanding any other provision of the Contract, the Contractor shall maintain complete workers' compensation coverage for each and every employee, principal, officer, representative, or agent of the Contractor who is performing any labor, services, or material under the Contract. Further, Contractor shall additionally maintain the following minimum limits of coverage:

Bodily Injury Each Accident	$1,000,000
Body Injury by Disease Each Employee	$1,000,000
Body Injury by Disease Policy Limit	$1,000,000

If the work is being done on or near a navigable waterway, Contractor's workers compensation policy shall be endorsed to provide USL&H Act (WC 00 01 06 A) and Jones Act (WC 00 02 01 A) coverage if specified by the City of Key West. Contractor shall provide the City of Key West with a Certificate of Insurance verifying compliance with the workman's compensation coverage as set forth herein and shall provide as often as required by the City of Key West such certification which shall also show the insurance company, policy number, effective and expiration date, and the limits of workman's compensation coverage under each policy.

Contractor's Insurance policies shall be endorsed to give 30 days written notice to the City of Key West in the event of cancellation or material change, using form CG 02 24, or its equivalent.

Certificates of Insurance submitted to the City of Key West will not be accepted without copies of the endorsements being requested. This includes additional insured endorsements, cancellation/material change notice endorsements, and waivers of subrogation. Copies of USL&H Act and Jones Act endorsements will also be required if necessary. PLEASE ADVISE YOUR INSURANCE AGENT ACCORDINGLY.

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Contractor will comply with any and all safety regulations required by any agency or regulatory body including but not limited to OSHA. Contractor will notify City of Key West immediately by telephone at (305) xxx-xxxx any accident or injury to anyone that occurs on the jobsite and is related to any of the work being performed by the Contractor.

Forms are attached to the end of the Supplementary Conditions as a Supplement.

ARTICLE 5.04 “CONTRACTOR’S LIABILITY INSURANCE”

Include the City of Key West and CH2M HILL as additional insureds.

6.03. Add the following new paragraphs immediately after Paragraph 6.03.C:

6.03.E. Grant Requirements:

6.03.E.1. The Contractor shall assist the grants administrator in meeting the reporting requirements set forth in Section 1512 and all other applicable provisions of the American Recovery and Reinvestment Act of 2009 (ARRA), also referred to as the Recovery Act, by providing information requested by the grants administrator in a timely manner. Other applicable provisions include, but are not limited to, Section 1605 Buy America and Section 1606 Davis-Bacon Prevailing Wage Rates.

ARTICLE 6.08 “PERMITS”

Add the following:

PERMIT FOR WORK WITHIN LOCAL RIGHTS-OF-WAY

The Contractor shall obtain from the City of Key West or Monroe County, as appropriate, the necessary permits for work within the rights-of-way. The Contractor shall abide by all regulations and conditions, including maintenance of traffic.

The Owner will obtain the utility installation permit for any improvements to be constructed within Florida Department of Transportation rights-of-way. The Contractor shall abide by all regulations and conditions of this permit including maintenance of traffic, restoration, etc.

PUBLIC WORKS COMPLIANCE ACT

GENERAL

If the Contract amount exceeds $25,000, the Contractor shall abide by the requirements of the State Public Works Compliance Act, Section 446.101 Florida Statutes. The Act generally requires the Contractor to:

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Participate in registered training programs with the State of Florida.

Hire for the duration of the Contract, a ratio of at least one registered apprentice or trainee to every five journeymen working on the project.

Prior to the commencement of the work, submit a letter of intent to the Bureau of Apprenticeship and to others as required by the Act.

Prepare and submit quarterly to the Bureau of Apprenticeship, records of employment on report form BAP-500.

ADMINISTRATION

Administration of the apprenticeship program for this Contract will be under the designated area field office of the Bureau of Apprenticeship.

DEWATERING PERMIT

A dewatering permit may be required from the South Florida Water Management District (SFWMD). The Contractor is responsible for verifying and obtaining that permit and paying fees required. The City has applied for and will obtain an Environmental Resource Permit from the SFWMD.

ARTICLE 6.09 “LAWS AND REGULATIONS”

Add the following:

The Contractor shall comply with the City of Key West Noise Ordinance and Florida Statute; Title X: Chapter 119: Section 0701.

ARTICLE 6.09 “LAWS AND REGULATIONS”

Add the following subarticles:

Within 10 days of Notice of Award, the successful Bidder must represent that he holds all applicable state, county, and City of Key West licenses and permits required to do business as a contractor with respect to the work described in the Contract Documents.

Further, the successful Bidder must, within 10 days of Notice of Award, furnish documentation showing that, as a minimum, he has complied with the provisions of Chapter 91 of the Code of Ordinances of the City of Key West in order to enter into the Agreement contained in the Contract Documents.

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Specifically, within 10 days after Notice of Award, the successful Bidder must demonstrate that he holds, as a minimum, the following licenses and certificates:

A. All licenses or certificates required by federal, state, or local statutes or regulations.

B. Holds a valid business tax license issued by the City of Key West.

FOLLOWING ARTICLE 6.09 “LAWS AND REGULATIONS”

Add the following Article:

HISTORIC PRESERVATION

The Contractor shall comply with Florida’s Archives and Historic Act (Florida Statutes, Chapter 267) and the regulations of the local historic preservation board as applicable and protect against the potential loss or destruction of significant historical or archaeological data, sites, and properties in connection with the project.

ARTICLE 6.13 “SAFETY AND PROTECTION”

Add the following Subarticle:

OCCUPATIONAL SAFETY AND HEALTH

The Contractor shall observe and comply with all applicable local, state, and federal occupational safety and health regulations during the prosecution of work under this Contract. In addition, full compliance by the Contractor with the U.S. Department of Labor’s Occupational Safety and Health Standards, as established in Public Law 91-596, will be required under the terms of this Contract.

ARTICLE 6.20 “INDEMNIFICATION”

Add the following:

The obligation of the Contractor under this Article shall be limited to the contractual liability as specified in the Supplementary Conditions, Article Insurance and Liability.

ARTICLE 11.02 “ALLOWANCES’

11.02.C Delete “Contingency” and Insert “Unforeseen Conditions”.

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11.02.C.1 Delete “Contingency” and Insert “Unforeseen Conditions”.

ARTICLE 13.03 “TESTS AND INSPECTIONS”

SC-13.03.B Delete 13.03.B in its entirety and insert the following:

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

SC-13.03.D. Supplement paragraph 13.03.D of the General Conditions as follows:

Tests required by Contract Documents to be performed by Contractor that require test certificates be submitted to Owner or Engineer for acceptance shall be made by an independent testing laboratory or agency licensed or certified in accordance with Laws and Regulations and applicable state and local statutes. In the event state license or certification is not required, testing laboratories or agencies shall meet following applicable requirements:

13.03.D.1. “Recommended Requirements for Independent Laboratory Qualification,” published by the American Council of Independent Laboratories.

13.03.D.2. Basic requirements of ASTM E329, “Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction” as applicable.

13.03.D.3. Calibrate testing equipment at reasonable intervals by devices of accuracy traceable to either the National Bureau of Standards or accepted values of natural physical constants.

13.07 Correction Period

13.07.A. Change the first sentence from “If within one year after the date of Substantial Completion…” TO “If within five years after the date of Substantial Completion…”

13.07.D. Change the sentence from “…will be extended for an additional period of one year after such corrections or removal…” TO “…will be extended for an additional period of five years after such correction or removal…”

13.07.F. Correction Period/Warranty shall be offered without conditions and shall include repair/replacement in a timely manner to minimize disruption and to Owner’s satisfaction. The equipment and/or work shall be fully warranted for the service and conditions that the contract implies and includes all cost for shipping and a

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manufacturer's representative to certify installation. All records on the equipment required will be those normally maintained by Owner.

ARTICLE 14 "PAYMENTS TO CONTRACTOR AND COMPLETION"

Add the following to the end of Subarticle 14.02.B.1:

Add the following subarticles:

14.02.B1.1 The Owner will deduct from the estimate, and retain as part security, 10 percent of the amount earned for work satisfactorily completed. A deduction and retainage of 10 percent will be made on the estimated amount earned for approved items of material delivered to and properly stored at the jobsite but not incorporated into the work.

14.02.B1.2 After deducting the retainage and the amount of all previous partial payments made to the Contractor from the amount earned, the amount due will be made payable to the Contractor. Recommendations for payment received by the Owner less than 40 days prior to the scheduled day for payment will not be processed or paid until the following month.

ARTICLE 17 "MISCELLANEOUS"

Add the following new Article 18, Federal Grant Requirements to the end of Subarticle 17.5:

"ARTICLE 18 FEDERAL GRANT REQUIREMENTS"

This Project is funded in part by federal grant money. The Contractor shall comply with the federal grant requirements.

18.1 Access to Records: Authorized representatives of the Owner, the Florida Department of Environmental Protection, other state agencies associated with the grant and the United States Agency responsible for this grant shall have access to, for the purpose of inspection, any books, documents, papers, and records of the Contractor that are pertinent to this Agreement/Contract. The Contractor shall retain all books, documents, papers, and records pertinent to this Agreement/Contract for a period of three years after receiving and accepting final payment under his Agreement/Contract.

18.2 Access to Work Sites: Authorized representatives of the Owner, the Florida Department of Environmental Protection (FDEP), other state agencies associated with this grant, and the United States Agency responsible for this grant shall have access to the Work site(s) at any reasonable time. The Contractor shall cooperate (including making available working copies of

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documents and supplementary materials) during Work site inspections conducted by the Owner and state and federal agencies.

18.3 Debarment and Suspension (Executive Order 12549):

18.3.1 If the price of this Agreement/Contract equals or exceeds $25,000, the Owner shall not award this Agreement/Contract, nor permit any lower-tier goods or services (including construction) subcontract with a price equaling or exceeding $25,000 to be awarded, to any party that is debarred or suspended or is otherwise excluded from, or ineligible for participation in, Federal assistance programs under Executive Order 12549 (Debarment and Suspension).

18.3.2 The attention of all bidders or prospective contractors (including the Contractor) is directed to the certification/clause entitled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," which has been extracted from Appendix B to 40 CFR Part 32 and included as Appendix A to these Supplementary Conditions. The certification/clause entitled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," is applicable to this Agreement/Contract if the price of this Agreement/Contract equals or exceeds $25,000.

18.3.3 If bidders or prospective contractors (including the Contractor), or any prospective subcontractors at any tier, intend to let any lower-tier goods or services (including construction) subcontracts for any portion of the Work, they shall physically include the certification/clause entitled Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions, which is included as Appendix A to these Supplementary Conditions, in all lower-tier goods and services (including construction) subcontracts with a price equaling or exceeding $25,000 and in all solicitations for such subcontracts.

18.4 Minority Owned Business Enterprise: Utilization of minority and Women-Owned firms and enterprises is encouraged."

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION – LOWER TIER COVERED TRANSACTIONS

Note: This certification/clause has been extracted from Appendix B to 40 CFR Part 32 and is applicable to all goods and services (including construction) contracts and subcontracts with a price equaling or exceeding $25,000 and in all solicitations for such contracts and subcontracts.

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Instructions for Certification:

1. By signing and submitting this Proposal, the prospective lower tier participant is providing the certification set out below.

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to the person to which this Proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms “covered transaction,” “debarred,” “suspended,” “ineligible,” “lower tier covered transaction,” “participant,” “person,” “primary covered transaction,” “principal,” “proposal,” and “voluntarily excluded,” as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this Proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant agrees by submitting this Proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant further agrees by submitting this Proposal that it will include this clause titled “Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions,” without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

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8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

SUPPLEMENTS

A. The supplements listed below, following "END OF SECTION," are part of this specification.

1. Attachment A: Executive Order 11246 – Equal Employment Opportunity.
2. Attachment B: Program Statutes and Regulations.
3. Attachment C: Convict Produced Material – U.S. Code, Title 23 Chapter 1 § 114.
4. Attachment D: Certification Compliance with Equal Employment Opportunity (EEO) Provisions on Federal Aid Contracts.
5. Attachment E: Certification Disbursement of Previous Periodic Payment to Subcontractors.
6. Attachment F: Title VI and Related Statues Nondiscrimination Agreement.
7. Attachment G: Certification of Sublet Work.
8. Attachment H: Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion.
9. Attachment I: Construction Compliance with Specifications and Plans.
10. Attachment J: Certificate of Liability Insurance.
11. Attachment K: Additional Insured-Owner's, Lessees or Contractors-Scheduled Person or Organization.
12. Attachment L: Additional Insured-Owner's, Lessees or Contractors-Completed Operations.
13. Attachment M: Earlier Notice of Cancellation Provided by Us.
14. Attachment N: Waiver of Transfer of Rights of Recovery Against Others to Us.
15. Attachment O: Waiver of Our Right to Recover from Others Endorsement.

END OF SECTION

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Attachment A

Executive Order 11246 - Equal Employment Opportunity

SOURCE: The provisions of Executive Order 11246 of Sept. 24, 1965, appear at 30 FR 12319, 12935, 3 CFR, 1964-1965 Comp., p.339, unless otherwise noted.

Under and by virtue of the authority vested in me as President of the United States by the Constitution and statutes of the United States, it is ordered as follows:

Part I - Nondiscrimination in Government Employment

[Part I superseded by EO 11478 of Aug. 8, 1969, 34 FR 12985, 3 CFR, 1966-1970 Comp., p. 803]

Part II - Nondiscrimination in Employment by Government Contractors and Subcontractors

Subpart A - Duties of the Secretary of Labor

SEC. 201. The Secretary of Labor shall be responsible for the administration and enforcement of Parts II and III of this Order. The Secretary shall adopt such rules and regulations and issue such orders as are deemed necessary and appropriate to achieve the purposes of Parts II and III of this Order.

[Sec. 201 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, l978 Comp., p. 230]

Subpart B - Contractors' Agreements

SEC. 202. Except in contracts exempted in accordance with Section 204 of this Order, all Government contracting agencies shall include in every Government contract hereafter entered into the following provisions:

"During the performance of this contract, the contractor agrees as follows:

"(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

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"(2) The contractor will, in all solicitations or advancements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.

"(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

"(4) The contractor will comply with afl provisions of Executive Order No. 11246 of Sept. 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

"(5) The contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

"(6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of Sept. 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

"(7) The contractor will include the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor win take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as
a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the contractor may request the United States to enter into such litigation to protect the interests of the United States." [Sec. 202 amended by EO 11375 of Oct. 13, 1967, 32 FR 14303, 3 CFR, 1966-1970 Comp., p. 684, EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

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SEC. 203. Each contractor having a contract containing the provisions prescribed in Section 202 shall file, and shall cause each of his subcontractors to file, Compliance Reports with the contracting agency or the Secretary of Labor as may be directed. Compliance Reports shall be filed within such times and shall contain such information as to the practices, policies, programs, and employment policies, programs, and employment statistics of the contractor and each subcontractor, and shall be in such form, as the Secretary of Labor may prescribe.

(b) Bidders or prospective contractors or subcontractors may be required to state whether they have participated in any previous contract subject to the provisions of this Order, or any preceding similar Executive order, and in that event to submit, on behalf of themselves and their proposed subcontractors, Compliance Reports prior to or as an initial part of their bid or negotiation of a contract.

(c) Whenever the contractor or subcontractor has a collective bargaining agreement or other contract or understanding with a labor union or an agency referring workers or providing or supervising apprenticeship or training for such workers, the Compliance Report shall include such information as to such labor union's or agency's practices and policies affecting compliance as the Secretary of Labor may prescribe: Provided, That to the extent such information is within the exclusive possession of a labor union or an agency referring workers or providing or supervising apprenticeship or training and such labor union or agency shall refuse to furnish such information to the contractor, the contractor shall so certify to the Secretary of Labor as part of its Compliance Report and shall set forth what efforts he has made to obtain such information.

(d) The Secretary of Labor may direct that any bidder or prospective contractor or subcontractor shall submit, as part of his Compliance Report, a statement in writing, signed by an authorized officer or agent on behalf of any labor union or any agency referring workers or providing or supervising apprenticeship or other training, with which the bidder or prospective contractor deals, with

supporting information, to the effect that the signer's practices and policies do not discriminate on the grounds of race, color, religion, sex or national origin, and that the signer either will affirmatively cooperate in the implementation of the policy and provisions of this Order or that it consents and agrees that recruitment, employment, and the terms and conditions of employment under the proposed contract shall be in accordance with the purposes and provisions of the order. In the event that the union, or the agency shall refuse to execute such a statement, the Compliance Report shall so certify and set forth what efforts have been made to secure such a statement and such additional factual material as the Secretary of Labor may require.

[Sec. 203 amended by EO 11375 of Oct. 13, 1967, 32 FR 14303, 3 CFR, 1966-1970 Comp., p. 684; EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

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SEC. 204. The Secretary of Labor may, when he/she deems that special circumstances in the national interest so require, exempt a contracting agency from the requirement of including any or all of the provisions of Section 202 of this Order in any specific contract, subcontract, or purchase order. The Secretary of Labor may, by rule or regulation, also exempt certain classes of contracts, subcontracts, or purchase orders (1) whenever work is to be or has been performed outside the United States and no recruitment of workers within the limits of the United States is involved;
(2) for standard commercial supplies or raw materials; (3) involving less than specified amounts of money or specified numbers of workers; or (4) to the extent that they involve subcontracts below a specified tier. The Secretary of Labor may also provide, by rule, regulation, or order, for the exemption of facilities of a contractor which are in all respects separate and distinct from activities of the contractor related to the performance of the contract: Provided, That such an exemption will not interfere with or impede the effectuation of the purposes of this Order: And provided further, That in the absence of such an exemption, all facilities shall be covered by the provisions of this Order.

Subpart C - Powers and Duties of the Secretary of Labor and the Contracting Agencies

SEC. 205. The Secretary of Labor shall be responsible for securing compliance by all Government contractors and subcontractors with this Order and any implementing rules or regulations. All contracting agencies shall comply with the terms of this Order and any implementing rules, regulations, or orders of the Secretary of Labor. Contracting agencies shall cooperate with the Secretary of Labor and shall furnish such information and assistance as the Secretary may require.
[Sec. 205 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 206. The Secretary of Labor may investigate the employment practices of any Government contractor or subcontractor to determine whether or not the contractual provisions specified in Section 202 of this Order have been violated. Such investigation shall be conducted in accordance with the procedures established by the Secretary of Labor.

(b) The Secretary of Labor may receive and investigate complaints by employees or prospective employees of a Government contractor or subcontractor which allege discrimination contrary to the contractual provisions specified in Section 202 of this Order.

[Sec. 206 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 207. The Secretary of Labor shall use his/her best efforts, directly and through interested Federal, State, and local agencies, contractors, and all other available instrumentalities to cause any labor union engaged in work under Government contracts or any agency referring workers or providing or supervising apprenticeship or training for or in the course of such work to cooperate in the implementation of the purposes of this Order. The Secretary of Labor shall, in appropriate cases, notify the Equal Employment Opportunity Commission, the Department of Justice, or other appropriate Federal agencies whenever it has reason to believe that the practices of any such labor organization or agency violate Title VI or Title VII of the Civil Rights Act of 1964 or other provision of Federal law.

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[Sec. 207 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 208. The Secretary of Labor, or any agency, officer, or employee in the executive branch of the Government designated by rule, regulation, or order of the Secretary, may hold such hearings, public or private, as the Secretary may deem advisable for compliance, enforcement, or educational purposes.

(b) The Secretary of Labor may hold, or cause to be held, hearings in accordance with Subsection of this Section prior to imposing, ordering, or recommending the imposition of penalties and sanctions under this Order. No order for debarment of any contractor from further Government contracts under Section 209(6) shall be made without affording the contractor an opportunity for a hearing.

Subpart D - Sanctions and Penalties

SEC. 209. In accordance with such rules, regulations, or orders as the Secretary of Labor may issue or adopt, the Secretary may:

(1) Publish, or cause to be published, the names of contractors or unions which it has concluded have complied or have failed to comply with the provisions of this Order or of the rules, regulations, and orders of the Secretary of Labor.
(2) Recommend to the Department of Justice that, in cases in which there is substantial or material violation or the threat of substantial or material violation of the contractual provisions set forth in Section 202 of this Order, appropriate proceedings be brought to enforce those provisions, including the enjoining, within the limitations of applicable law, of organizations, individuals, or groups who prevent directly or indirectly, or seek to prevent directly or indirectly, compliance with the provisions of this Order.
(3) Recommend to the Equal Employment Opportunity Commission or the Department of Justice that appropriate proceedings be instituted under Title VII of the Civil Rights Act of 1964.
(4) Recommend to the Department of Justice that criminal proceedings be brought for the furnishing of false information to any contracting agency or to the Secretary of Labor as the case may be.
(5) After consulting with the contracting agency, direct the contracting agency to cancel, terminate, suspend, or cause to be cancelled, terminated, or suspended, any contract, or any portion or portions thereof, for failure of the contractor or subcontractor to comply with equal employment opportunity provisions of the contract. Contracts may be cancelled, terminated, or suspended absolutely or continuance of contracts may be conditioned upon a program for future compliance approved by the Secretary of Labor.
(6) Provide that any contracting agency shall refrain from entering into further contracts, or extensions or other modifications of existing contracts, with any noncomplying contractor, until such contractor has satisfied the Secretary of Labor that such contractor has established and will carry out
personnel and employment policies in compliance with the provisions of this Order.

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(b) Pursuant to rules and regulations prescribed by the Secretary of Labor, the Secretary shall make reasonable efforts, within a reasonable time limitation, to secure compliance with the contract provisions of this Order by methods of conference, conciliation, mediation, and persuasion before proceedings shall be instituted under subsection (a)(2) of this Section, or before a contract shall be cancelled or terminated in whole or in part under subsection (a)(5) of this Section.

[Sec. 209 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 210. Whenever the Secretary of Labor makes a determination under Section 209, the Secretary shall promptly notify the appropriate agency. The agency shall take the action directed by the Secretary and shall report the results of the action it has taken to the Secretary of Labor within such time as the Secretary shall specify. If the contracting agency fails to take the action

directed within thirty days, the Secretary may take the action directly.

[Sec. 210 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p 230]

SEC. 211. If the Secretary shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless the bidder or prospective contractor has satisfactorily complied with the provisions of this Order or submits a program for compliance acceptable to the Secretary of Labor.

[Sec. 211 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 212. When a contract has been cancelled or terminated under Section 209(a)(5) or a contractor has been debarred from further Government contracts under Section 209(a)(6) of this Order, because of noncompliance with the contract provisions specified in Section 202 of this Order, the Secretary of Labor shall promptly notify the Comptroller General of the United States.

[Sec. 212 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

Subpart E - Certificates of Merit

SEC. 213. The Secretary of Labor may provide for issuance of a United States Government Certificate of Merit to employers or labor unions, or other agencies which are or may hereafter be engaged in work under Government contracts, if the Secretary is satisfied that the personnel and
employment practices of the employer, or that the personnel, training, apprenticeship, membership, grievance and representation, upgrading, and other practices and policies of the labor union or other agency conform to the purposes and provisions of this Order.

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SEC. 214. Any Certificate of Merit may at any time be suspended or revoked by the Secretary of Labor if the holder thereof, in the judgment of the Secretary, has failed to comply with the provisions of this Order.

SEC. 215. The Secretary of Labor may provide for the exemption of any employer, labor union, or other agency from any reporting requirements imposed under or pursuant to this Order if such employer, labor union, or other agency has been awarded a Certificate of Merit which has not been suspended or revoked.

Part III - Nondiscrimination Provisions in Federally Assisted Construction Contracts

SEC. 301. Each executive department and agency, which administers a program involving Federal financial assistance shall require as a condition for the approval of any grant, contract, loan, insurance, or guarantee thereunder, which may involve a construction contract, that the applicant for Federal assistance undertake and agree to incorporate, or cause to be

incorporated, into all construction contracts paid for in whole or in part with funds obtained fromthe Federal Government or borrowed on the credit of the Federal Government pursuant to such grant, contract, loan, insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, the provisions prescribed for Government contracts by Section 202 of this Order or such modification thereof, preserving in substance the contractor's obligations thereunder, as may be approved by the Secretary of Labor, together with such additional provisions as the Secretary deems appropriate to establish and protect the interestof the United States in the enforcement of those obligations. Each such applicant shall also undertake and agree (1) to assist and cooperate actively with the Secretary of Labor in obtaining the compliance of contractors and subcontractors with those contract provisions and with the rules, regulations and relevant orders of the Secretary, (2) to obtain and to furnish to the Secretary of Labor such information as the Secretary may require for the supervision of such compliance, (3) to carry out sanctions and penalties for violation of such obligations imposed upon contractors and subcontractors by the Secretary of Labor pursuant to Part II, Subpart D, of this Order, and (4) to
refrain from entering into any contract subject to this Order, or extension or other modification of such a contract with a contractor debarred from Government contracts under Part II, Subpart D, of this Order.

[Sec. 301 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 302. "Construction contract" as used in this Order means any contract for the construction, rehabilitation, alteration, conversion, extension, or repair of buildings, highways, or other improvements to real property.

> (b) The provisions of Part II of this Order shall apply to such construction contracts, and for purposes of such application the administering department or agency shall be considered the contracting agency referred to therein.

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(c) The term "applicant" as used in this Order means an applicant for Federal assistance or, as determined by agency regulation, other program participant, with respect to whom an application for any grant, contract, loan, insurance, or guarantee is not finally acted upon prior to the effective date of this Part, and it includes such an applicant after he/she becomes a recipient of such Federal assistance.

SEC. 303. The Secretary of Labor shall be responsible for obtaining the compliance of such applicants with their undertakings under this Order. Each administering department and agency is directed to cooperate with the Secretary of Labor and to furnish the Secretary such information and assistance as the Secretary may require in the performance of the Secretary's functions under this Order.

(b) In the event an applicant fails and refuses to comply with the applicant's undertakings pursuant to this Order, the Secretary of Labor may, after consulting with the administering department or agency, take any or all of the following actions: (1) direct any administering department or agency to cancel, terminate, or suspend in whole or in part the agreement, contract or other arrangement with such applicant with respect to which the failure or refusal occurred; (2) direct any administering department or agency to refrain from extending any further assistance to the applicant under the program with respect to which the failure or refusal occurred until satisfactory assurance of future compliance has been received by the Secretary of Labor from such applicant; and (3) refer the case to the Department of Justice or the Equal Employment Opportunity Commission for appropriate law enforcement or other proceedings.

(c) In no case shall action be taken with respect to an applicant pursuant to clause (1) or (2) of subsection (b) without notice and opportunity for hearing.

[Sec. 303 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

SEC. 304. Any executive department or agency which imposes by rule, regulation, or order requirements of nondiscrimination in employment, other than requirements imposed pursuant to this Order, may delegate to the Secretary of Labor by agreement such responsibilities with respect to compliance standards, reports, and procedures as would tend to bring the administration of such requirements into conformity with the administration of requirements imposed under this Order: Provided, That actions to effect compliance by recipients of Federal financial assistance with requirements imposed pursuant to Title VI of the Civil Rights Act of 1964 shall be taken in conformity with the procedures and limitations prescribed in Section 602 thereof and the regulations of the administering department or agency issued thereunder.

Part IV - Miscellaneous

SEC. 401. The Secretary of Labor may delegate to any officer, agency, or employee in the Executive branch of the Government, any function or duty of the Secretary under Parts II and III of this Order.

[Sec. 401 amended by EO 12086 of Oct. 5, l978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

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SEC. 402. The Secretary of Labor shall provide administrative support for the execution of the program known as the "Plans for Progress."

SEC. 403. Executive Orders Nos. 10590 (January 19, 1955), 10722 (August 5, 1957), 10925 (March 6, 1961), 11114 (June 22, 1963), and 11162 (July 28, 1964), are hereby superseded and the President's Committee on Equal Employment Opportunity established by Executive Order No. 10925 is hereby abolished. All records and property in the custody of the Committee shall be transferred to the Office of Personnel Management and the Secretary of Labor, as appropriate.

(b) Nothing in this Order shall be deemed to relieve any person of any obligation assumed or imposed under or pursuant to any Executive Order superseded by this Order. All rules, regulations, orders, instructions, designations, and other directives issued by the President's Committee on Equal Employment Opportunity and those issued by the heads of various departments or agencies under or pursuant to any of the Executive orders superseded by this Order, shall, to the extent that they are not inconsistent with this Order, remain in full force and effect unless and until revoked or superseded by appropriate authority. References in such directives to provisions of the superseded orders shall be deemed to be references to the comparable provisions of this Order.

[Sec. 403 amended by EO 12107 of Dec. 28, 1978, 44 FR 1055, 3 CFR, 1978 Comp., p, 264]

SEC. 404. The General Services Administration shall take appropriate action to revise the standard Government contract forms to accord with the provisions of this Order and of the rules and regulations of the Secretary of Labor.

SEC. 405. This Order shall become effective thirty days after the date of this Order.

End of Attachment A

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ATTACHMENT B
Program Statutes and Regulations

The parties to this Agreement and the Hazard Mitigation Grant Program (HMGP) are generally governed by the following statutes and regulations:

(1) The Robert T. Stafford Disaster Relief and Emergency Assistance Act;

(2) 44 CFR Parts 7, 9, 10, 13, 14, 17, 18, 25, 206, 220, and 221, and any other applicable FEMA policy memoranda and guidance documents;

(3) State of Florida Administrative Plan for the Hazard Mitigation Grant Program;

(4) Hazard Mitigation Long-term Recovery Guidance; and

(5) All applicable laws and regulations delineated in Attachment C of this Agreement

In addition to the above statues and regulations, the Recipient must comply with the following:

The Recipient shall fully perform the approved hazard mitigation project, as described in the Application and Attachment A (Budget and Scope of Work) attached to this Agreement, in accordance with the approved scope of work indicated therein, the estimate of costs indicated therein, the allocation of funds indicated therein, and the terms and conditions of this Agreement. Recipient shall not deviate from the approved project and the terms and conditions of this Agreement. Recipient shall comply with any and all applicable codes and standards in performing work funded under this Agreement, and shall provide any appropriate maintenance and security for the project.

Any development permit issued by, or development activity undertaken by, the Recipient and any land use permitted by or engaged in by the Recipient, shall be consistent with the local comprehensive plan and land development regulations prepared and adopted pursuant to Chapter 163, Part II, Florida Statutes. Funds shall be expended for, and development activities and land uses authorized for, only those uses which are permitted under the comprehensive plan and land development regulations. The Recipient shall be responsible for ensuring that any development permit issued and any development activity or land use undertaken is, where applicable, also authorized by the Water Management District, the Florida Department of Environmental Protection, the Florida Department of Health, the Florida Game and Fish Commission, and any federal, state, or local environmental or land use permitting authority, where required. Recipient agrees that any repair or construction shall be in accordance with applicable standards of safety, decency, and sanitation, and in conformity with applicable codes, specifications and standards.

Recipient will provide and maintain competent and adequate engineering supervision at the construction site to ensure that the completed work conforms with the approved plans and specifications and will furnish progress reports and such other information to HMGP as may be required.

If the hazard mitigation project described in Attachment A includes an acquisition or relocation project, then Recipient shall ensure that, as a condition of funding under this Agreement, the owner of the affected real property shall record in the public records of the county where it is located the following covenants and restrictions, which shall run with and apply to any property acquired, accepted, or from which a structure will be removed pursuant to the project:

1. The property will be dedicated and maintained in perpetuity for a use that is compatible with open space, recreational, or wetlands management practices;

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2. No new structure will be erected on property other than:
   (a) a public facility that is open on all sides and functionally related to a designated open space;
   (b) a restroom; or
3. A structure that the Director of the Federal Emergency Management Agency approves in writing before the commencement of the construction of the structure;
4. After the date of the acquisition or relocation no application for disaster assistance for any purpose will be made to any Federal entity and no disaster assistance will be provided for the property by any Federal source; and
5. If any of these covenants and restrictions is violated by the owner or by some third party with the knowledge of the owner, fee simple title to the Property described herein shall be conveyed to the Board of Trustees of the Internal Improvement Trust Fund of the State of Florida without further notice to the owner, its successors and assigns, and the owner, its successors and assigns shall forfeit all right, title and interest in and to the property.

HMGP Contract Manager will evaluate requests for cost overruns and submit to the Regional Director written determination of cost overrun eligibility. Cost overruns shall meet Federal regulations set forth in 44CFR 206.438(b).

The National Environmental Policy Act (NEPA) stipulates that additions or amendments to a HMGP Recipient Scope of Work (SOW) shall be reviewed by all State and Federal agencies participating in the NEPA process. You are reminded that no construction may occur in this phase, that a full environmental review must be completed prior to funding Phase II.

As a reminder, the Recipient must obtain prior approval from the State, before implementing changes to the approved project Scope of Work (SOW). Per the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments:

1. For construction projects, the grantee must “obtain prior written approval for any budget revision which result in a need for additional funds” (44 CFR 13 (c));
2. A change in the scope of work must be approved by FEMA in advance regardless of the budget implications; and
3. The Recipient must notify the State as soon as significant developments become known, such as delays or adverse conditions that might raise costs or delay completion, or favorable conditions allowing lower cost or earlier completion. Any extensions of the period of performance must be submitted to FEMA 60 days prior to the project expiration date.

STATEMENT OF ASSURANCES

The Recipient assures that it will comply with the following statues and regulations, to the extent applicable:

1) 53 Federal Register 8034
2) Federal Acquisition Regulations 31.2 and 0931.2
3) Section 1352, Title 31, US Code
4) OMB Circulars A-21, A-87, A-110, A-122
5) Chapter 473, Florida Statutes
6) Chapter 215, Florida Statutes
7) Section 768.28, Florida Statutes
8) Chapter 119, Florida Statutes

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9) Section 216.181(6), Florida Statutes
10) Cash Management Improvement Act Of 1990
11) American with Disabilities Act
12) Section 112.061, Florida Statutes
13) Immigration and Nationality Act
14) Section 286.011, Florida Statutes
15) E.O. 12372 and Uniform Administrative Requirements for Grants and Cooperative Agreements 28 CFR, Part 66, Common rule,
16) Uniform Relocation Assistance and Real Property Acquisitions Act of 1970
17) Title I of the Omnibus Crime Control and Safe Streets Act of 1968,
18) Juvenile Justice and Delinquency Prevention Act, or the Victims of Crime Act
19) 28 CFR applicable to grants and cooperative agreements
20) Omnibus Crime Control and Safe Streets Act of 1968, as amended,
21) 42 USC 3789(d), or Victims of Crime Act (as appropriate);
22) Section 504 of the Rehabilitation Act of 1973, as amended;
23) Subtitle A, Title II of the Americans with Disabilities Act (ADA) (1990);
24) 28 CFR Part 42, Subparts C,D,E, and G
25) Department of Justice regulations on disability discrimination, 28 CFR Part 35 and Part 39.

To the extent the following provisions apply to this Agreement, the Recipient certifies that:

(a) It possesses legal authority to enter into this Agreement, and to carry out the proposed program;

(b) Its governing body has duly adopted or passed as an official act a resolution, motion or similar action authorizing the execution of the hazard mitigation agreement with the Division of Emergency Management (DEM), including all understandings and assurances contained in it, and directing and authorizing the Recipient's chief administrative officer or designee to act in connection with the application and to provide such additional information as may be required;

(c) No member of or delegate to the Congress of the United States, and no Resident Commissioner, shall receive any share or part of this Agreement or any benefit. No member, officer, or employee of the Recipient or its designees or agents, no member of the governing body of the locality in which the program is situated, and no other public official of the locality or localities who exercises any functions or responsibilities with respect to the program during his tenure or for one year after, shall have any interest, direct or indirect, in any contract or subcontract, or the proceeds, for work be performed in connection with the program assisted under this Agreement. The Recipient shall incorporate, in all contracts or subcontracts a provision prohibiting any interest pursuant to the purpose state above;

(d) All Recipient contracts for which the State Legislature is in any part a funding source, shall contain language to provide for termination with reasonable costs to be paid by the Recipient for eligible contract work completed prior to the date the notice of suspension of funding was received by the Recipient. Any cost incurred after a notice of suspension or termination is received by the Recipient may not be funded with funds provided under this Agreement unless previously approved in writing by the Division. All Recipient contracts shall contain provisions for termination for cause or convenience and shall provide for the method of payment in such event;

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(e) It will comply with:

(1) Contract Work Hours and Safety Standards Act of 1962, 40 U.S.C. 327 et seq., requiring that mechanics and laborers (including watchmen and guards) employed on federally assisted contracts be paid wages of not less than one and one-half times their basic wage rates for all hours worked in excess of forty hours in a work week; and

(2) Federal Fair Labor Standards Act, 29 U.S.C. Section 201 et seq., requiring that covered employees be paid at least the minimum prescribed wage, and also that they be paid one and one-half times their basic wage rates for all hours worked in excess of the prescribed work-week.

(f) It will comply with:

(1) Title VI of the Civil Rights Act of 1964 (P.L. 88-352), and the regulations issued pursuant thereto, which provides that no person in the United States shall on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Recipient receives Federal financial assistance and will immediately take any measures necessary to effectuate this assurance. If any real property or structure thereon is provided or improved with the aid of Federal financial assistance extended to the Recipient, this assurance shall obligate the Recipient, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the Federal financial assistance is extended, or for another purpose involving the provision of similar services or benefits;

(2) Any prohibition against discrimination on the basis of age under the Age Discrimination Act of 1975, as amended (42 U.S.C.: 6101-6107) which prohibits discrimination on the basis of age or with respect to otherwise qualified handicapped individuals as provided in Section 504 of the Rehabilitation Act of 1973;

(3) Executive Order 11246 as amended by Executive Orders 11375 and 12086, and the regulations issued pursuant thereto, which provide that no person shall be discriminated against on the basis of race, color, religion, sex or national origin in all phases of employment during the performance of federal or federally assisted construction contracts; affirmative action to insure fair treatment in employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff/termination, rates of pay or other forms of compensation; and election for training and apprenticeship;

(g) It will establish safeguards to prohibit employees from using positions for a purpose that is or gives the appearance of being motivated by a desire for private gain for themselves or others, particularly those with whom they have family, business, or other ties pursuant to Section 112.313 and Section 112.3135, FS;

(h) It will comply with the Anti-Kickback Act of 1986, 41 U.S.C. Section 51 which outlaws and prescribes penalties for "kickbacks" of wages in federally financed or assisted construction activities;

(i) It will comply with the provisions of 18 USC 594, 598, 600-605 (further known as the Hatch Act) which limits the political activities of employees;

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(j) It will comply with the flood insurance purchase and other requirements of the Flood Disaster Protection Act of 1973 as amended, 42 USC 4002-4107, including requirements regarding the purchase of flood insurance in communities where such insurance is available as a condition for the receipt of any Federal financial assistance for construction or acquisition purposes for use in any area having special flood hazards. The phrase "Federal financial assistance" includes any form of loan, grant, guaranty, insurance payment, rebate, subsidy, disaster assistance loan or grant, or any other form of direct or indirect Federal assistance;

(k) It will require every building or facility (other than a privately owned residential structure) designed, constructed, or altered with funds provided under this Agreement to comply with the "Uniform Federal Accessibility Standards," (AS) which is Appendix A to 41 CFR Section 101-19.6 for general type buildings and Appendix A to 24 CFR Part 40 for residential structures. The Recipient will be responsible for conducting inspections to ensure compliance with these specifications by the contractor;

(l) It will, in connection with its performance of environmental assessments under the National Environmental Policy Act of 1969, comply with Section 106 of the National Historic Preservation Act of 1966 (U.S.C. 470), Executive Order 11593, 24 CFR Part 800, and the Preservation of

Archaeological and Historical Data Act of 1966 (16 U.S.C. 469a-1, et seq.) by:

(1) Consulting with the State Historic Preservation Office to identify properties listed in or eligible for inclusion in the National Register of Historic Places that are subject to adverse effects (see 36 CFR Section 800.8) by the proposed activity; and

(2) Complying with all requirements established by the State to avoid or mitigate adverse effects upon such properties.

(3) Abiding by the terms and conditions of the **"Programmatic Agreement Among the Federal Emergency Management Agency, the Florida State Historic Preservation Office, the Florida Division of Emergency Management and the Advisory Council on Historic Preservation, (PA)"** which addresses roles and responsibilities of Federal and State entities in implementing Section 106 of the National Historic Preservation Act (NHPA), 16 U.S.C. 470f, and implementing regulations in 36 CFR part 800.

(4) When any of Recipient's projects funded under this Agreement may affect a historic property, as defined in 36 CFR 800. (2)(e), the Federal Emergency Management Agency (FEMA) may require Recipient to review the eligible scope of work in consultation with the State Historic Preservation Office (SHPO) and suggest methods of repair or construction that will conform with the recommended approaches set out in the **Secretary of Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings 1992 (Standards),** the **Secretary of the Interior's Guidelines for Archeological Documentation (Guidelines)** (48 Federal Register 44734-37), or any other applicable Secretary of Interior standards. If FEMA determines that the eligible scope of work will not conform with the **Standards**, Recipient agrees to participate in consultations to develop, and, after execution by all parties, to abide by, a written agreement that establishes mitigation and recondition measures, including but not limited to, impacts to archeological sites, and the

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salvage, storage, and reuse of any significant architectural features that may otherwise be demolished.

(5) Recipient agrees to notify FEMA and the Division if any project funded under this Agreement will involve ground disturbing activities, including, but not limited to: subsurface disturbance; removal of trees; excavation for footings and foundations; and installation of utilities (such as water, sewer, storm drains, electrical, gas, leach lines and septic tanks) except where these activities are restricted solely to areas previously disturbed by the installation, replacement or maintenance of such utilities. FEMA will request the SHPO's opinion on the potential that archeological properties may be present and be affected by such activities. The SHPO will advise Recipient on any feasible steps to be accomplished to avoid any National Register eligible archeological property or will make recommendations for the development of a treatment plan for the recovery of archeological data from the property.

If Recipient is unable to avoid the archeological property, develop, in consultation with the SHPO, a treatment plan consistent with the **Guidelines** and take into account the Advisory Council on Historic Preservation (Council) publication "Treatment of Archeological Properties". Recipient shall forward information regarding the treatment plan to FEMA, the SHPO and the Council for review. If the SHPO and the Council do not object within 15 calendar days of receipt of the treatment plan, FEMA may direct Recipient to implement the treatment plan. If either the Council or the SHPO object, Recipient shall not proceed with the project until the objection is resolved.

(6) Recipient shall notify the Division and FEMA as soon as practicable: (a) of any changes in the approved scope of work for a National Register eligible or listed property; (b) of all changes to a project that may result in a supplemental DSR or modify an HMGP project for a National Register eligible or listed property; (c) if it appears that a project funded under this Agreement will affect a previously unidentified property that may be eligible for inclusion in the National Register or affect a known historic property in an unanticipated manner. Recipient acknowledges that FEMA may require Recipient to stop construction in the vicinity of the discovery of a previously unidentified property that may be eligible for inclusion in the National Register or upon learning that construction may affect a known historic property in an unanticipated manner. Recipient further acknowledges that FEMA may require Recipient to take all reasonable measures to avoid or minimize harm to such property until FEMA concludes consultation with the SHPO. Recipient also acknowledges that FEMA will require, and Recipient shall comply with, modifications to the project scope of work necessary to implement recommendations to address the project and the property.

(7) Recipient acknowledges that, unless FEMA specifically stipulates otherwise, it shall not receive funding for projects when, with intent to avoid the requirements of the PA or the NHPA, Recipient intentionally and significantly adversely affects a historic property, or having the legal power to prevent it, allowed such significant adverse affect to occur.

(m) It will comply with Title IX of the Education Amendments of 1972, as amended (20 U.S.C.: 1681-1683 and 1685 - 1686) which prohibits discrimination on the basis of sex;

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(n) It will comply with the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970, (42 U.S.C. 4521-45-94) relating to nondiscrimination on the basis of alcohol abuse or alcoholism;

(o) It will comply with 523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. 290 dd-3 and 290 ee-3), as amended, relating to confidentiality of alcohol and drug abuse patient records;

(p) It will comply with Lead-Based Paint Poison Prevention Act (42 U.S.C.: 4821 et seq.) which prohibits the use of lead based paint in construction of rehabilitation or residential structures;

(q) It will comply with the Energy Policy and Conservation Act (P.L. 94-163; 42 U.S.C. 6201-6422), and the provisions of the state Energy Conservation Plan adopted pursuant thereto;

(r) It will comply with the Laboratory Animal Welfare Act of 1966, 7 U.S.C. 2131-2159, pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by an award of assistance under this agreement;

(s) It will comply with Title VIII of the Civil Rights Act of 1968, 42 U.S.C. 2000c and 42 3601-3619, as amended, relating to non-discrimination in the sale, rental, or financing of housing, and Title VI of the Civil Rights Act of 1964 (P.L. 88-352), which prohibits discrimination on the basis of race, color or nation origin;

(t) It will comply with the Clean Air Act of 1955, as amended, 42 U.S.C. 7401-7642;

(u) It will comply with the Clean Water Act of 1977, as amended, 42 U.S.C. 7419-7626;

(v) It will comply with the Endangered Species Act of 1973, 16 U.S.C. 1531-1544;

(w) It will comply with the Intergovernmental Personnel Act of 1970, 42 U.S.C. 4728-4763;

(x) It will assist the awarding agency in assuring compliance with the National Historic Preservation Act of 1966, as amended, 16 U.S.C. 270;

(y) It will comply with environmental standards which may be prescribed pursuant to the National Environmental Policy Act of 1969, 42 U.S.C. 4321-4347;

(z) It will assist the awarding agency in assuring compliance with the Preservation of Archeological and Historical Preservation Act of 1966, 16 U.S.C. 469a, et seq;

(aa) It will comply with the Rehabilitation Act of 1973, Section 504, 29 U.S.C. 794, regarding non-discrimination;

(bb) It will comply with the environmental standards which may be prescribed pursuant to the Safe Drinking Water Act of 1974, 42 U.S.C. 300f-300j, regarding the protection of underground water sources;

(cc) It will comply with the requirements of Titles II and III of the Uniform Relocation Assistance and Property Acquisition Policies Act of 1970, 42 U.S.C. 4621-4638, which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally assisted programs;

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(dd) It will comply with the Wild and Scenic Rivers Act of 1968, 16 U.S.C. 1271-1287, related to protecting components or potential components of the national wild and scenic rivers system;

(ee) It will comply with the following Executive Orders: EO 11514 (NEPA); EO 11738 (violating facilities); EO 11988 (Floodplain Management); EO 11990 (Wetlands); and EO 12898 (Environmental Justice);

(ff) It will comply with the Coastal Barrier Resources Act of 1977, 16 U.S.C. 3510;

(gg) It will assure project consistency with the approved State program developed under the Coastal Zone Management Act of 1972, 16 U.S.C. 1451-1464; and

(hh) It will comply with the Fish and Wildlife Coordination Act of 1958; 16 U.S.C. 661-666.

(ii) With respect to demolition activities, it will:

1. Create and make available documentation sufficient to demonstrate that the Recipient and its demolition contractor have sufficient manpower and equipment to comply with the obligations as outlined in this Agreement.
2. Return the property to its natural state as though no improvements had ever been contained thereon.
3. Furnish documentation of all qualified personnel, licenses and all equipment necessary to inspect buildings located in Recipient's jurisdiction to detect the presence of asbestos and lead in accordance with requirements of the U.S. Environmental Protection Agency, the Florida Department of Environmental Protection and the County Health Department.
4. Provide documentation of the inspection results for each structure to indicate:
   a. Safety Hazards Present
   b. Health Hazards Present
   c. Hazardous Materials Present
5. Provide supervision over contractors or employees employed by Recipient to remove asbestos and lead from demolished or otherwise applicable structures.
6. Leave the demolished site clean, level and free of debris.
7. Notify the Division promptly of any unusual existing condition which hampers the contractors work.
8. Obtain all required permits.
9. Provide addresses and marked maps for each site where water wells and septic tanks are to be closed along with the number of wells and septic tanks located on each site. Provide documentation of closures.
10. Comply with mandatory standards and policies relating to energy efficiency which are contained in the State energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Public Law 94-163).
11. Comply with all applicable standards, orders, or requirements issued under Section 112 and 306 of the Clean Air Act (42 U.S.C. 1857 (h), Section 508 of the Clean Water Act (33 U.S. 1368), Executive Order 11738, and the U.S. Environmental Protection Agency regulations (40 CFR Part 15 and 61). This clause shall be added to any subcontracts.
12. Provide documentation of public notices for demolition activities.

END OF ATTACHMENT B

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Attachment C

CONVICT PRODUCED MATERIAL
U.S. Code, Title 23 Chapter 1 § 114

(b) Convict Labor and Convict Produced Materials.—

(1) Limitation on convict labor.— Convict labor shall not be used in construction of highways or portions of highways located on a Federal-aid system unless it is labor performed by convicts who are on parole, supervised release, or probation.

(2) Limitation on convict produced materials.— Materials produced after July 1, 1991, by convict labor may only be used in such construction—

(A) if such materials are produced by convicts who are on parole, supervised release, or probation from a prison; or

(B) if such materials are produced by convicts in a qualified prison facility and the amount of such materials produced in such facility for use in such construction during any 12-month period does not exceed the amount of such materials produced in such facility for use in such construction during the 12-month period ending July 1, 1987.

(3) Qualified prison facility defined.— As used in this subsection, "qualified prison facility" means any prison facility in which convicts, during the 12-month period ending July 1, 1987, produced materials for use in construction of highways or portions of highways located on a Federal-aid system.

End of Attachment C

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Attachment D (this document reduced do not use for monthly submittal)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

Form 700-011-13
CONSTRUCTION
06/05

CERTIFICATION
COMPLIANCE WITH EQUAL EMPLOYMENT OPPORTUNITY (EEO) PROVISIONS ON FEDERAL AID CONTRACTS

DATE _____

FIN PROJECT I.D. _____ CONTRACT NO. _____

_____

_____

_____

_____, prime contractor

for the above referenced contract, hereby certifies that this company and all of it's subcontractors have made every Good Faith Effort to comply with the EEO provisions of FHWA Form-1273 (Section II. Nondiscrimination and Section III. Nonsegregated facilities) on this contract.

Exception:
The following subcontractor(s) have been found to be in noncompliance with the provisions stated above. Attached is notification sent to the respective subcontractor(s) explaining their noncompliance with these provisions.

Subcontractor Name	Subcontractor Name
Street Address	Street Address
City/State/Zip	City/State/Zip

State of Florida
County of _____
Sworn to and subscribed before me this _____ day
of _____, _____, by _____
(Print name of person signing Certication)

A false statement or omission made in connection with this certification is sufficient cause for suspension, revocation, or denial of qualification to bid, and a determination of nonresponsibility, and may subject the person and/or entity making the false statement to any and all civil and criminal penalties available pursuant to applicable Federal and State law.

_____
Notary Public

_____
Commission Expires

Personally Known ☐ OR Produced Identification ☐

Type of Identification Produced _____

_____
Contractor

_____
By

_____
Title

Instructions:

1. Attach copy of any notifications of noncompliance sent to each applicable subcontractor.
2. List the subcontractors found not in compliance at the time of this certification.
3. A separate certification is required for each contract.
4. To be signed by an officer or director of the Contractor with the authority to bind the Contractor and notarized.
5. To avoid delay in payment, certification must be submitted to the Project Engineer no later than the Friday before the monthly estimate cutoff date (generally the 3rd Sunday of the month).

This form is to be completed monthly and submitted with your monthly pay application.
See FDOT website for blank form: http://www.dot.state.fl.us/proceduraldocuments/

End of Attachment D

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Attachment E (this document reduced do not use for monthly submittal)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

700-010-38
CONSTRUCTION
03/03

CERTIFICATION
DISBURSEMENT OF PREVIOUS PERIODIC PAYMENT TO SUBCONTRACTORS

(As required by Florida Transportation Code, Section 337.11, Subsection (10)(a), F.S.)

DATE _____

FIN PROJ. I.D. _____ CONTRACT NO. _____

_____ TO RELEASE MONTHLY PAYMENT FOR _____

_____

_____

_____, prime contractor for the above referenced contract, hereby certifies that all subcontractors, except for those noted below, having interest in this contract have received their pro rata share of all previous periodic payments made to date by the Department for all work, materials and equipment furnished under the contract. The term "subcontractor", as used herein, shall also include persons or firms furnishing materials, services or equipment incorporated into the work or stockpiled in the vicinity of the project for which partial payment has been made by the Department and work done under equipment-rental agreements.

EXCEPTION:
The following subcontractors have not been paid and a copy of the notification sent to each, explaining the good cause why payment has not been made, is attached to this form:

_____ Subcontractor name	_____ Subcontractor name
Street Address	_____ Street Address
_____ City State Zip	_____ City State Zip

State of Florida
County of _____
Sworn to and subscribed before me this _____ day
of _____, _____, by _____
(Print name of person signing Certification)

A false statement or omission made in connection with this certification is sufficient cause for suspension, revocation, or denial of qualification to bid, and a determination of non-responsibility, and may subject the person and/or entity making the false statement to any and all civil and criminal penalties available pursuant to applicable Federal and State Law.

Notary Public

_____
Commission Expires

Personally Known _____ OR Produced Identification

Type of Identification Produced _____

Contractor

By

Title

Instructions:

1. Attach copy of the notification good cause sent to each applicable subcontractor.
2. List the subcontractors which have not been paid the proportionate share of payments received by the contractor and the date listed as exception.
3. A separate certification is required for each contract.
4. To be signed by an officer or director of the Contractor with the authority to bind the Contractor and notarized.
5. To avoid delay in payment, certification must be submitted to the Project Engineer no later than the Friday before the monthly estimate cutoff date (generally the 3rd Sunday of the month).

This form is to be completed monthly and submitted with your monthly pay application.
See FDOT website for blank form: http://www.dot.state.fl.us/proceduraldocuments/

End of Attachment E

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ATTACHMENT F

TITLE VI AND RELATED STATUTES NONDISCRIMINATION AGREEMENT

Bidders shall meet the following requirements for the grant; All prime contractor contracts with subcontractor(s) must be in writing and must physically contain form FHWA 1273 and minimum wage rates; just referring to them is not acceptable. Additionally all subcontracts $10,000 and over are required to comply with Title VI programs, and must contain the statement:

The sub recipient or contractor, in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-7 and Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non discrimination in Federally-assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises as defined at 49 CFR Part 26 will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, sex, age, disability in consideration for an award.

End of Attachment F

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700-010-36
CONSTRUCTION
10/07

CERTIFICATION OF SUBLET WORK

To: The City of Key West

Date:
Request No.:
FAP No.:
Fin. Proj. ID:
Cont. No.:
County:

Total Contract Amount
Total Work

General Info
Prime Contractor
F.E.I.D. #

_____ (Seal)
Contractor

By: _____
IF CORPORATION, AFFIX SEAL

_____
Address

_____

Change	Subcontractor Name	Tier	FEID #	Subcontract to Whom	Work Description	Partial	Total Amt Sublet	DBE/ NON DBE
					Total			

All pertinent provisions and requirements of the prime contract including but not limited to Required Contract Provisions Federal-Aid Construction Contracts (FHWA-1273) and Special Provisions - Specific Equal Opportunity Responsibilities (Per 23 CFR-633B of Federal-Aid Policy Guide) will be part of the subcontract. It is agreed that an Executed or a certified copy of the subcontract will be submitted upon request, to the State of Florida Department of Transportation. All sublets will be in continued compliance with all Contract provisions and that the Contractor will continue to perform the minimum percentage of Contract work with its own organization, as required by said Contract. It is recognized and agreed that, as prime contractor, the undersigned remains responsible for the proper performance of all requirements of said contract does not relieve or release the undersigned and his surety or either of them of any liability under the contract bond. The Contractor shall send a copy of this form to the subcontractor/ subordinate (with a copy of FHWA-1273 on Federal-Aid Projects) and the Surety Company. The Prime certify that firms or individuals, debarred or suspended are not being used as subcontractors.

A false statement or omission made in connection with this certification is sufficient cause for suspension, revocation, or denial of qualification to bid, and a determination of non-responsibility, and may subject the person and/or entity making the false statement to any and all civil and criminal penalties available pursuant to applicable Federal and State Law.

State of Florida
County of _____

Sworn to and subscribed before me this _____ day
of _____, _____, by _____
(Print name of person signing Certification)

_____
Notary Public

_____
Commission Expires

Personally Known _____ OR Produced Identification _____

Type of Identification Produced _____

ATTACHMENT G

Instructions for Form:

The contractor must provide enough information through a Schedule "A" spreadsheet to determine which pay-item(s) are being sublet, the amounts, and cost. For sublet calculations, the amount will be calculated based on the actual contract unit price(s) unless there is a partial sublet. For partial sublets, use the unit prices from the actual sub-contract.

1) Enter the Date of the certification of sublet work was prepared.
2) Enter the sequential number of the request starting with number 1.
3) Enter the Federal Aid Project number for the Prime Contractor if any.
4) Enter the Financial Project Identification number of the Contract.
5) Enter the Contract number of the Contract with the Department.
6) Enter the County name where the work is being performed.
7) Enter the Name of the Prime Contractor.
8) Enter the FEID number of the Prime Contractor.
9) Enter the Original Contract dollar amount (round to nearest whole dollar).
10) Enter a "Y" in the space marked Change if any information on the line has changed since the previous certification of sublet work was prepared. Otherwise, leave blank.
11) Enter the Subcontractor names. Enter all the subcontractor(s) regardless of their tier.
12) Enter the tier number for the subcontractor. If the subcontractor works directly for the Prime Contractor, enter a "1". If he works one level below, enter a "2" and so on.
13) Enter the FEID number of the Subcontractor(s).
14) Enter the name of the pertinent Contractor or Subcontractor that hired subcontractor.
15) Enter a short description of the work to be performed.
16) Enter a "P" if any pay-item for the sublet is a partial sublet.
17) Enter the DBE status for the subcontractor: "D" for DBE. "N" for non-DBE.

18) One (1) copy of this form shall be submitted to the City of Key West by the Contractor.

19) To be signed by principal of the firm or someone with the delegated authority and notarized.

ATTACHMENT G

Attachment H

Certification Regarding Debarment, Suspension, Ineligibility And Voluntary Exclusion

Contractor Covered Transactions

(1) The prospective contractor of the Recipient, City of Key West , certifies, by submission of this document, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the Recipient's contractor is unable to certify to the above statement, the prospective contractor shall attach an explanation to this form.

CONTRACTOR:

_____

By_____
Signature

_____
Name and Title

_____
Street Address

_____
City, State, Zip

_____
Date

City of Key West
Recipient's Name

11HM-3B-11-54-02-002
Division Contract Number

CONSTRUCTION COMPLIANCE WITH SPECIFICATIONS AND PLANS

FIN PROJECT I.D.(s) _____

_____

_____

_____

DATE: _____

CONTRACT NO: _____

Monthly: ☐

Final: ☐

_____, Prime Contractor for the above referenced contract, hereby verifies based on personal knowledge or reasonable investigation and good faith belief, all work done and all Quality Control functions and Quality Control sampling and testing results are in substantial compliance with the pertinent specification requirements and the approved Quality Control Plan for this project. This includes the input of test results into the Department's LIMS database within 24 hours of results being received. This represents work done between _____ and _____. Exceptions to these requirements are listed below.

1.) Item No.: _____
Exception:

_____

_____

_____

_____

2.) Item No.: _____
Exception:

_____

_____

_____

_____

3.) Item No.: _____
Exception:

_____

_____

_____

_____

4.) Item No.: _____
Exception:

_____

_____

_____

_____

ATTACHMENT I

CONSTRUCTION COMPLIANCE WITH SPECIFICATIONS AND PLANS

5.) Item No.: _____
Exception:

_____

_____

_____

_____

6.) Item No.: _____
Exception:

_____

_____

_____

_____

A false statement or omission made in connection with this certification is sufficient cause for suspension, revocation, or denial of qualification to bid, and a determination of non-responsibility, and may subject the person and/or entity making the false statement to any and all civil and criminal penalties available pursuant to applicable Federal and State Law.

State of Florida
County of _____
Sworn to and subscribed before me this _____ day
of _____, _____, by _____
(Print name of person signing Certification)

_____
Notary Public

_____
Commission Expires

Personally Known _____ or Produced Identification _____
Type of Identification Produced _____

_____
Quality Control Manager

_____
By

_____
Company

State of Florida
County of _____
Sworn to and subscribed before me this _____ day
of _____, _____, by _____
(Print name of person signing Certification)

_____
Notary Public

_____
Commission Expires

Personally Known _____ or Produced Identification _____
Type of Identification Produced _____

_____
Contractor

_____
By

_____
Company

ATTACHMENT I

INSTRUCTION PAGE

Financial Project Number(s): List all financial project numbers on the contract.

Date: Show the date the certification is completed.

Contract No.: Show the contract number the certification represents.

Monthly/Final: Indicate which type of estimates this certification represents, monthly or final.

Prime Contractor: In this field, show the Prime Contractor's full company name.

Date Began: Show the beginning the certification represents. For a monthly or progress estimate, show the beginning date the estimates corresponds to. For a final certification, show the date the contract work began.

Date Ended: Show the ending dates the estimate corresponds to. For final certification, show the final acceptance date.

Item No.: Show the pay item number the exception is associated with.

Exceptions: For the monthly certification, list the following:

1. QC samples that did not compare with VT samples and had VT results upheld by RT samples.
2. Any samples that had Engineering Analysis Report or Delineation Test(s) performed.
3. Any failed QC samples.
4. Any QC samples that do not have results entered into LIMS.
5. Any QC samples that were performed by unqualified technicians or laboratories.
6. Any materials placed without an approval QC Plan or when the QC Plan is suspended.
7. Any materials provided from an unapproved producer or supplier.

The following **would not be listed as an exception** on the subject form:

1. QC samples that have been tested but not verified.
2. QC samples that have been tested and had verification test results that did not compare.

For the final certification, all exceptions to QC sampling and testing must be shown on the certification.

Notary Information: The Notary of the Public completes this section. This certification must be notarized.

Quality Control Manager: Signature of the Quality Control Manager signing the certification.

By: Type or print the name represented by the signature in "Quality Control Manager" section.

Title: Type or print the title of the person signing the certification.

Contractor: To be signed by an officer or director of the Contractor with an authority to bind the Contractor.

By: Type or print the name represented by the signature in "Contractor:" section.

Title: Type or print the title of the person signing the certification.

It is not the City's intent for Contractor's to list as exceptions samples and results for which they are not responsible, such as verification and independent verification samples and test results. Additionally, the City will accept printouts of the Sample Status Progress Report in LIMS, as an attachment to assist in documenting the status of samples.

ATTACHMENT I

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER

CONTACT NAME:

PHONE (A/C, No, Ext): FAX (A/C, No):

E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A :	
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED

Contractor Sample

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	$1,000,000
	X COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$300,000
	CLAIMS-MADE X OCCUR	X	X				MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$1,000,000
							GENERAL AGGREGATE	$2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$2,000,000
	POLICY X PRO-JECT LOC							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	ALL OWNED AUTOS / SCHEDULED AUTOS	X	X				BODILY INJURY (Per accident)	$
	X HIRED AUTOS / X NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
	X UMBRELLA LIAB X OCCUR						EACH OCCURRENCE	$ 2,000,000
	EXCESS LIAB CLAIMS-MADE	X	X				AGGREGATE	$ 2,000,000
	DED X RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY						X WC STATU-TORY LIMITS / OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N N (Mandatory in NH)	N/A	X				E.L. EACH ACCIDENT	$1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$1,000,000
							E.L. DISEASE - POLICY LIMIT	$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER

City of Key West
P.O. Box 1409
Key West, FL 33041-1409

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – SCHEDULED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):	Location(s) Of Covered Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

© ISO Properties, Inc., 2004

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY
CG 20 37 07 04

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – COMPLETED OPERATIONS

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):	Location And Description Of Completed Operations
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by "your work" at the location designated and described in the schedule of this endorsement performed for that additional insured and included in the "products-completed operations hazard".

© ISO Properties, Inc., 2004

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

EARLIER NOTICE OF CANCELLATION PROVIDED BY US

Number of Days Notice 30

For any statutorily permitted reason **other than nonpayment of premium**, the number of days required for notice of cancellation is increased to the number of days shown in the Schedule above.

If this policy is cancelled by us we will send the Named Insured and any party listed in the following schedule notice of cancellation based on the number of days notice shown above.

Schedule

Name of Person or Organization

Mailing Address

POLICY NUMBER:

COMMERCIAL GENERAL LIABILITY
CG 24 04 05 09

WAIVER OF TRANSFER OF RIGHTS OF RECOVERY AGAINST OTHERS TO US

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

SCHEDULE

Name Of Person Or Organization:
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.

The following is added to Paragraph **8. Transfer Of Rights Of Recovery Against Others To Us** of **Section IV – Conditions:**

We waive any right of recovery we may have against the person or organization shown in the Schedule above because of payments we make for injury or damage arising out of your ongoing operations or "your work" done under a contract with that person or organization and included in the "products-completed operations hazard". This waiver applies only to the person or organization shown in the Schedule above.

© Insurance Services Office, Inc., 2008

WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.)

This agreement shall not operate directly or indirectly to benefit anyone not named in the Schedule.

Schedule

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.

(The information below is required only when this endorsement is issued subsequent to preparation of the policy.)

Endorsement
Insured

Effective Policy No.

Endorsement No.
Premium

Insurance Company

Countersigned by_____

© 1983 National Council on Compensation Insurance.

City of Key West

Pre-Bid Grant Information

Presented by:
Carolyn Sheldon
City of Key West, Grants Administrator

Patricia and Ashby Streets
Stormwater Emergency Outfall project

Funding Source:

- This project is being funded in part with federal funding from the Federal Emergency Management Agency (FEMA)

- The Florida Division of Emergency Management (FDEM) is the pass-through agency for the FEMA funding.

Major Applicable Federal Regulations:

- Davis-Bacon and Related Acts

  Not applicable to this project. Therefore, prevailing wages, certified payrolls, employee interviews, etc. are **NOT** required.

- The Robert T. Stafford Diaster Relief and Emergency Assistance Act

  Signed into law on November 23, 1988 (amended the Disaster Relief Act of 1974). This Act constitutes the statutory authority for most Federal disaster responses activities especially as they pertain to FEMA and FEMA programs like the Hazard Mitigation Grant Program, which is the source of funding for this project.

- FEMA policy memoranda and guidance documents including but not limited to 44 CFR Parts 7, 9, 10, 13, 14, 17, 18, 25, 206, 220, and 221.

- State of Florida Administrative Plan for the Hazard Mitigation Grant Program

- Hazard Mitigation Long-Term Recovery Guidance

Major Applicable Federal Regulations (contd):

- Contract Work Hours and Safety Standards Act of 1962

  Requires that mechanics and laborers (including watchmen and guards) employed on federally assisted contacts be paid wages of not less than one and one-half times their basic wage rates for all hours worked in excess of forty (40) hours in a work week. Also prohibits unsanitary, hazardous, or dangerous working conditions on federal and federally financed and assisted construction projects.

- Federal Fair Labor Standards Act of 1938

  Established a national minimum wage, guaranteed time-and-a-half for overtime in certain jobs, and prohibited most employment of minors in “oppressive child labor.”

- Title VI of the Civil Rights Act of 1964 and related Statutes

  No person should be excluded participation in, denied benefits of, or subjected to discrimination under any program or activity receiving Federal financial assistance on the grounds of: race, color, national origin, sex, age, disability, religion, or familial status.

- Other program statutes and regulations apply (for details, see contract documents)

Other grant requirements:

- Access to records:

  All books, documents, papers and records pertinent to the project shall be retained for five (5) years and access to such records shall be given to authorized representatives of the Owner, the United States Agency responsible for the federal grant, and other state agencies associated with the grant.

- Access to work sites:

  Access to the work site at any reasonable time shall be given to authorized representatives of the Owner, the United States Agency responsible for the federal grant, and other state agencies associated with the grant.

- Suspension and debarment:

  The owner shall not award this contract to any party that is debarred or suspended or is otherwise excluded from, or ineligible for participation in, Federal assistance programs

In addition to other monthly certifications, this form is required by FEMA:

Attachment H

Certification Regarding
Debarment, Suspension, Ineligibility
And Voluntary Exclusion

Contractor Covered Transactions

(1) The prospective contractor of the Recipient, City of Key West , certifies, by submission of this document, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the Recipient's contractor is unable to certify to the above statement, the prospective contractor shall attach an explanation to this form.

CONTRACTOR:

_____

By_____
Signature

_____
Name and Title

_____
Street Address

_____
City, State, Zip

_____
Date

City of Key West
Recipient's Name

11HM-3B-11-54-02-002
Division Contract Number

Reminder:

The information contained in this presentation is not all-inclusive. It is meant to be a summary of the major grant requirements that the Contractor will be held accountable for. It is the Contractor's responsibility to thoroughly examine and become familiar with all of the various parts of the contract documents, including grant requirements. Failure to do so shall not release the Contractor from the obligations of the Contract.

Contact:

Carolyn Sheldon

(305) 809-3741

csheldon@keywestcity.com

For any grant-related questions

PART 3

SPECIFICATIONS

SECTION 01 01 00
GENERAL REQUIREMENTS

PART 1 PROJECT DESCRIPTION

1.01 GENERAL

A. A brief description of the Work is stated in the Invitation to Bid. To determine the full scope of the project or any particular part of the project, coordinate the applicable information in the several parts of these Contract Documents.

B. The Work under this Contract shall be performed by the Contractor as required by the Owner. Work will be authorized in the form of a Notice to Proceed issued to the Contractor. The Contractor shall complete all work in the Contract within the number of calendar days stipulated in the Contract unless an extension in the time of completion is granted by the Engineer, as stated in the Instructions to Bidders. Upon completion of the work and compliance with applicable provisions in the Contract Documents, the Contractor will receive final payment for all work done.

C. The following additional information, though not all-inclusive, is given to assist contractors in their evaluation of the work required to meet the project objectives.

D. This Project will provide Owner with a stormwater pump station with a permanent generator system capable of withstanding 175 mph winds wells and emergency outfall.

E. The work is likely to be influenced by the tides. The tides can have an effect on the timing and work schedule. No extra claims shall be made for the tides or for other natural causes.

F. The Contractor shall become familiar with the existing operating conditions of the Owner's stormwater facilities and take such into consideration in planning and scheduling work. No extra claims shall be made for work required to achieve conditions beyond those obtainable under normal operation of the existing stormwater facilities necessary to accomplish the Work.

G. The Contractor shall be responsible for providing a licensed surveyor registered in the State of Florida. Surveyor shall verify all benchmarks used during survey.

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1.02 STANDARD SPECIFICATIONS

A. Portions of The Florida Department of Transportation Standard Specifications for Road and Bridge Construction and their Roadway and Traffic Design Standards, hereinafter referred to as either the Standard or FDOT Specifications, are referred to herein and amended, in part, and the same are hereby made a part of this Contract to the extent of such references and shall be as binding upon the Contract as though reproduced herein. Such reference shall mean the current edition, including all supplements. In case of a conflict in the requirements of the Standard Specifications and the requirements stated herein, the requirements herein shall prevail.

PART 2 SEQUENCE OF OPERATIONS

2.01 SCHEDULING

A. General:

1. Submit estimated progress schedule and preliminary schedule of submittals in duplicate to Engineer. Updated progress schedules and submittal schedules shall be submitted with each partial pay request.
2. Revise and resubmit as specified, and identify all changes made from previous schedule submittal.

B. Construction Schedule:

1. Within 10 days following approval of the Shop Drawings and after establishment of equipment delivery dates the Contractor shall provide an updated bar chart analysis of the required construction work for the Project. All activities should be shown along with the required time to do the work in a proper and continuous sequence of operation and without delays.
2. Show complete sequence of construction by activity, identifying work of separate stages, and other logically grouped activities. Indicate dates for early and late start, early and late finish, float, and duration.
3. Any contingency within the schedule (i.e., a difference in time between the project's early completion and required Contract completion date) and the float in the overall project schedule will belong to the project and not to the parties to the Contract. Contractor shall not sequester shared float through such strategies as extending duration estimates to consume available float time, extensive crew/resource sequencing, etc.
4. Provide a workable plan for monitoring the progress of all elements of the work, establish the critical elements of work, and forecast potential problems in maintaining the specified completion dates.

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C. Schedule of Submittals:

1. Schedule of Submittals: Indicate submittals required by Specification section number with brief description, starting and completion dates for respective submittal preparation, and submittal review by Engineer.
2. Indicate product manufacture and delivery dates.

D. Plan the work and carry it out with minimum interference to the operation of the existing facilities. Prior to starting the work, confer with the Engineer and Owner's representative to develop an approved work schedule which will permit the facilities to function normally as practical. It may be necessary to do certain parts of the construction work outside normal working hours in order to avoid undesirable conditions. The Contractor shall do this work at such times, and at no additional cost to the Owner. Do not make connections between existing work and new work until necessary inspection and tests have been completed on the new work and it is found to conform in all respects to the requirements of the Contract Documents.

E. No work shall be started until the Contractor has received approved shop drawings, established material/delivery dates for all equipment, and received approval of the construction schedule from the Engineer. The Contractor shall have sufficient manpower, equipment, and material to complete the Project. No work shall commence without express consent of the Engineer.

2.02 COORDINATION

A. Contractors shall cooperate in the coordination of their separate activities in a manner that will provide the least interference with the Owner's operations and other contractors and utility companies working in the area, and in the interfacing and connection of the separate elements of the overall Project work.

B. If any difficulty or dispute should arise in the accomplishment of the above, the problem shall be brought immediately to the attention of the Engineer.

C. All contractors working on the site are subject to this requirement for cooperation and all shall abide by the Engineer’s decision in resolving project coordination problems without additional cost to the Owner.

D. Contractor may be asked to stop work during Special Events. No work will be allowed for intersections (To Be Determined) on days corresponding to the events. All material and equipment shall be totally off all streets by 5:00 p.m. the day before. Contractor is responsible to obtain a schedule of Special Events from the Owner.

E. Contractor shall coordinate with the City the outfall pipeline and outfall structure installation Contractor should schedule this work for the month of September.

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2.03 SHUTDOWN OF EXISTING OPERATIONS OR UTILITIES

A. Continuous operation of the Owner's existing stormwater and wastewater system are of critical importance. The Contractor's work shall not result in the interruption of stormwater disposal, sewage, water, or solid waste service to any customers.

B. Minimizing conflicts with the existing stormwater pump stations are of critical importance. The existing storm water pump station is to remain operational during construction with scheduled outages as required for construction. The Contractor's work shall not result in the interruption of any phase of operations at any facility.

C. Any work that requires the temporary shutdown of any existing operations or utilities shall be planned in detail with appropriate scheduling of the work and coordinated with the utility, Owner, and Engineer. The Contractor shall submit for approval by Owner and Engineer a detailed work plan when required before proceeding with the work. Advance notice shall be given in order that the utility, Owner, and Engineer may witness the shutdown, tie-in, and startup. The temporary shutdown must be approved by the Owner. All tie in and bypass operations shall be the responsibility of the Contractor and are considered incidental to the cost of construction and provided at no additional cost to the Owner.

D. All materials and equipment (including emergency equipment) necessary to expedite the tie-in shall be on hand prior to the shutdown of existing services or utilities.

2.04 OPERATION OF EXISTING SYSTEM PROHIBITED

A. At no time undertake to close off any utility lines or open valves or take any other action which would affect the operation of the existing utility systems, except as specifically required by the Drawings and Specifications and after approval is granted by the Owner or Facility Owner. Request approval 5 working days in advance of the time that interruption of the existing system is required. Florida Key Aqueduct Authority (FKAA) water valves can be operated only by FKAA personnel.

2.05 PROGRESS OF PIPELINE CONSTRUCTION

A. **No** excavated material shall be cast on streets or adjacent sidewalks.

B. Cleanup construction debris, excess excavation, excess materials, and completely restore fences, mailboxes, ditches, culverts, signposts, and similar items immediately following the final backfilling.

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PART 3 SITE CONDITIONS

3.01 SITE INVESTIGATION AND REPRESENTATION

A. The Contractor acknowledges satisfaction as to the general nature and location of the work, the general and local conditions, particularly those bearing upon availability of transportation, availability of labor, water, electric power, roads, and uncertainties of weather, and tide stages, or similar physical conditions, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can in any way affect the work or the cost thereof under this Contract.

B. Failure by the Contractor to become acquainted with the physical conditions and all the available information will not relieve the Contractor from responsibility for properly estimating the difficulty or cost of successfully performing the work.

C. The Contractor warrants that as a result of examination and investigation of all the aforesaid data, the Contractor can perform the work in a good and workmanlike manner and to the satisfaction of the Owner. The Owner assumes no responsibility for any representations made by any of its officers or agents during or prior to the execution of this Contract, unless (1) such representations are expressly stated in the Contract, and (2) the Contract expressly provides that the responsibility therefore is assumed by the Owner.

3.02 INFORMATION ONSITE CONDITIONS

A. General: Any information obtained by the Engineer regarding site conditions, subsurface information, groundwater elevations, existing construction of site facilities as applicable, and similar data will be available for inspection at the office of the Engineer upon request. Such information is offered as supplementary information only. Neither the Engineer nor the Owner assumes any responsibility for the completeness or interpretation of such supplementary information.

3.03 UTILITIES

A. The Contractor shall be responsible for determining, at his cost, the locations of all utilities within the project area, and shall be responsible for contacting each utility for location and notification prior to commencing work.

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3.04 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

A. Where the Contractor's operations could cause damage or inconvenience to utilities, telephone, television, power, water, or sewer systems, the operations shall be suspended until all arrangements necessary for the protection of these utilities and services have been made by the Contractor with the owner of the utility affected.

B. Notify all utility offices which are affected by the construction operation at least 48 hours in advance. Under no circumstances expose any utility without first obtaining permission from the appropriate agency. Once permission has been granted, locate, expose, and provide temporary support for all existing underground utilities.

C. The Contractor shall be solely and directly responsible to the Owner and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage which may result from the construction operations under this Contract.

D. Neither the Owner nor its officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the work, whether shown or not.

E. In the event of interruption to domestic water, sewer, storm drain, or other utility services as a result of accidental breakage due to construction operations, promptly notify the proper authority. Cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is granted.

F. In the event the Contractor encounters water service lines that interfere with trenching, he may, by obtaining prior approval of the property owner, Florida Keys Aqueduct Authority, or Fire Department as applicable, and the Engineer, cut the service, dig through, and restore the service with similar and equal materials at the Contractor's expense.

G. The Contractor shall replace, at his own expense, all existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract Documents or ordered by the Engineer.

3.05 INTERFERING STRUCTURES

A. Take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground.

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B. Protect underground and aboveground existing structures from damage, whether or not they lie within the limits of the easements obtained by the Owner. Where such existing fences, gates, sheds, buildings, or any other structure must be removed in order to properly carry out the construction, or are damaged during construction, restore to their original condition to the satisfaction of the property owner involved at the Contractor's own expense. Notify the Engineer of any damaged underground structure, and make repairs or replacements before backfilling.

C. Without additional compensation, the Contractor may remove and replace in a condition as good as or better than original, such small miscellaneous structures as fences, mailboxes, and signposts that interfere with the Contractor's operations.

3.06 FIELD RELOCATION

A. During the progress of construction, it is expected that minor relocations of the work will be necessary. Such relocations shall be made only by direction of the Engineer. If existing structures are encountered which prevent the construction, and which are not properly shown on any Contract Drawings, notify the Engineer before continuing with the construction in order that the Engineer may make such field revisions as necessary to avoid conflict with the existing structures. If the Contractor shall fail to so notify the Engineer when an existing structure is encountered, and shall proceed with the construction despite this interference, he shall do so at his own risk.

3.07 EASEMENTS

A. Where portions of the work are located on public or private property, easements and permits will be obtained by the Owner, except as otherwise noted in these Specifications. Easements will provide for the use of property for construction purposes to the extent indicated on the easements. Copies of these easements and permits are available upon request to the Owner. It shall be the Contractor's responsibility to determine the adequacy of the easement obtained in every case and to abide by all requirements and provisions of the easement. The Contractor shall confine his construction operations to within the easement limits or street right-of-way limits or make special arrangements with the property owners or appropriate public agency for the additional area required. Any damage to property, either inside or outside the limits of the easements provided by the Owner or street rights-of-way, shall be the responsibility of the Contractor as specified herein. The Contractor shall remove, protect, and replace all fences or other items encountered on public or private property. Before final payment will be authorized by the Engineer, the Contractor will be required to furnish the Owner with written releases from property owners or public agencies where side agreements or special easements have been made by the Contractor or where the Contractor's operations, for any reason, have not been kept within the construction right-of-way obtained by the Owner or the street right-of-way.

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B. The Contractor shall delineate the limits of construction easements using T-rail posts painted a florescent orange, extending a minimum 4 feet aboveground and spaced at 25-foot intervals. This delineation shall be maintained until the construction work within a given area has been conditionally accepted by the Owner. In some areas, the Contractor may also be required to delineate the road right-of-way in order that he confines his operations to within the right-of-way.

C. It is anticipated that the required easements and permits will be obtained before construction is started. However, should the procurement of any easement or permit be delayed, the Contractor shall schedule and perform the work around these areas until such a time as the easement or permit has been secured.

3.08 PROTECTED VEGETATION

A. Trees and shrubs are regulated and protected in Key West. All trimming and pruning shall be done in accordance with City guidelines. This work will be considered incidental to the Project costs. Contractor shall obtain such guidelines and gain approvals before commencing work.

PART 4 TEMPORARY CONSTRUCTION UTILITIES AND FACILITIES

4.01 TEMPORARY WATER

A. The Contractor shall make his own arrangements to obtain suitable water and shall pay all costs.

4.02 TEMPORARY ELECTRIC POWER

A. The Contractor shall make arrangements to obtain and pay for electrical power used until final acceptance by the Owner.

4.03 SAFETY REQUIREMENTS FOR TEMPORARY ELECTRIC POWER

A. Temporary electric power installation shall meet the construction safety requirements of OSHA, state and other governing agencies.

4.04 SANITARY FACILITIES

A. The Contractor shall provide and maintain sanitary facilities for his employees and his subcontractors that will comply with the regulations of the local and state departments of health and as directed by the Engineer.

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4.05 STORAGE OF MATERIALS

A. Materials shall be stored based on manufacturer's instructions including pre- and post-storage meggering of all electrical equipment as to ensure the preservation of their quality and fitness for the work. When considered necessary they shall be placed on wooden platforms or other hard, clean surfaces, and not on the ground. If environmentally controlled storage is recommended by the manufacturer's published storage instructions, it shall be provided at no additional costs. Stored materials shall be located so as to facilitate prompt inspection. Private property shall not be used for storage purposes without the written permission of the Owner or lessee. Contractor shall maintain a log of all published manufacturer's required storage and maintenance requirements.

B. Delicate instruments and materials subject to vandalism shall be placed under locked cover and, if necessary, provided with temperature control as recommended by the manufacturer.

PART 5 SAFETY AND CONVENIENCE

5.01 SAFETY EQUIPMENT

A. The Contractor shall do all work necessary to protect the general public from hazards, including, but not limited to, surface irregularities or unramped grade changes in pedestrian sidewalk or walkway, and trenches or excavations in roadway. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the public and the work. All barricades and signs shall be clean and serviceable, in the opinion of the Engineer.

B. During construction, the Contractor shall construct and at all times maintain satisfactory and substantial temporary chain link fencing, solid fencing, railing, barricades or steel plates, as applicable, at all openings, obstructions, or other hazards in streets, sidewalks, floors, roofs, and walkways. All such barriers shall have adequate warning lights as necessary, or required, for safety. All lights shall be regularly maintained, and in a fully operational state at all times.

5.02 ACCIDENT REPORTS

A. In addition, the Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Engineer.

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B. If a claim is made by anyone against the contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

5.03 SAFE ACCESS BY FEDERAL, STATE, AND LOCAL GOVERNMENT OFFICIALS

A. Authorized representatives of the state, federal, or local governmental agencies, shall at all times have safe access to the work, and the Contractor shall provide proper facilities for such access and inspection.

5.04 TRAFFIC MAINTENANCE AND SAFETY

A. Provide and obtain approval of traffic maintenance plans where required by federal, state, county, or local agencies having jurisdiction.

B. Comply with all rules and regulations of the state, county, and city authorities regarding closing or restricting the use of public streets or highways. No public or private road shall be closed, except by express permission of the Owner. Conduct the work so as to assure the least possible obstruction to traffic and normal commercial pursuits. Protect all obstructions within traveled roadways by installing approved signs, barricades, lighted signs, temporary pavement marking, and lights where necessary for the safety of the public. The convenience of the general public and residents adjacent to the project, and the protection of persons and property are of prime importance and shall be provided for in an adequate and satisfactory manner.

C. Where traffic will pass over trenches after they are backfilled and before they are paved, the top of the trench shall be maintained in a condition that will allow normal vehicular traffic to pass over. Contractor shall complete permanent surfacing within 30 days after backfilling trenches. Temporary access driveways must be provided where required. Cleanup operations shall follow immediately behind backfilling and the worksite shall be kept in an orderly condition at all times.

D. When flagmen and guards are required by regulation or when deemed necessary for safety, they shall be furnished with approved orange wearing apparel and other regulation traffic-control devices in accordance with FDOT provisions.

E. Where work is required in Monroe County right-of-way, the Contractor shall obtain a County permit. The Contractor shall provide a MOT completed by a certified engineer with the permit.

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5.05 TRAFFIC CONTROL

A. Traffic control on all city, county and state highway rights-of-way shall meet the requirements of the current edition (including all amendments) of the City of Key West regulations, where applicable, and the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, as well as FDOT standard details for maintenance of traffic, in accordance with the Manual for Uniform Traffic Control and Safe Practices.

B. The Contractor shall provide at no cost to the Owner a Maintenance of Traffic Plan, including 11- by 17-inch engineered drawings of his intended maintenance of traffic scheme, to the agency having jurisdiction for review and approval. This shall include barrier details, barricade type, and location. Two copies of the agency approved plan with drawings shall be submitted to the Engineer prior to initiation of construction.

5.06 PROTECTION OF PROPERTY

A. Protect stored materials located adjacent to the proposed work. Notify property owners affected by the construction at least 48 hours in advance of the time construction begins. During construction operations, construct and maintain such facilities as may be required to provide access by all property owners to their property. No person shall be cut off from access to his residence or place of business for a period exceeding 8 hours, unless the Contractor has made special arrangements with the affected persons.

B. The Contractor shall identify and isolate his work zone in such a manner as to exclude all personnel not employed by him, the Engineer, and the Owner.

5.07 FIRE PREVENTION AND PROTECTION

A. The Contractor shall perform all work in a fire-safe manner. He shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable federal, state, and local fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

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5.08 ACCESS FOR POLICE, FIRE, AND POSTAL SERVICE

A. Notify the fire department and police department before closing any street or portion thereof. No closing shall be made without the Owner's approval. Notify said departments when the streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without special written permission from the fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access.

B. The Contractor shall leave a night emergency telephone number or numbers with the police department, the Engineer, and the Owner, so that contact may be made easily at all times in case of barricade and flare trouble or other emergencies.

C. Maintain postal service facilities in accordance with the requirements of the U.S. Postal Service. Move mailboxes to temporary locations designated by the U. S. Postal Service, and at the completion of the work in each area, replace them in their original location and in a condition satisfactory to the U.S. Postal Service.

5.09 CLEANUP PROCEDURES FOR HURRICANE WARNINGS AND HURRICANE WATCHES

A. In the event that the National Oceanographic and Atmospheric Administration (NOAA), issues a hurricane watch for the Florida Keys, the Engineer will contact the Contractor informing him that the watch has been established within 4 hours of the notice. The Contractor shall implement the approved plan and schedule describing how and when the Contractor will remove all unnecessary items from the work area and tie down all remaining supplies and barricades in the event that a hurricane warning is issued. If a warning is issued, the Contractor shall remove all unnecessary items from the work area(s) and shall tie down all movable (under 200 pounds) objects. The Owner will determine “necessary” items. The Owner will not be liable for any financial hardship or delays caused as a result of demobilization or remobilization due to the above.

PART 6 PRESERVATION, RESTORATION, AND CLEANUP

6.01 SITE RESTORATION AND CLEANUP

A. At all times during the work, keep the premises clean and orderly, and upon completion of the work, repair all damage caused by equipment and leave the project free of rubbish or excess materials of any kind.

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B. Stockpile excavated materials in a manner that will cause the least damage to adjacent lawns, grassed areas, gardens, shrubbery, or fences, regardless of whether these are on private property, or on state, county, or city rights-of-way. Remove all excavated materials from grassed and planted areas, and leave these surfaces in a condition equivalent to their original condition. Excavated material shall not be placed or stockpiled on streets or sidewalks.

C. All existing drainage ditches and culverts shall be reopened and graded and natural drainage restored. Restore culverts broken or damaged to their original condition and location as an incidental cost of construction.

D. Upon completion of backfilling operations, hand-rake and drag all former grassed and planted areas, leaving all disturbed areas free from rocks, gravel, clay, or any other foreign material. The finished surface shall conform to the original surface, and shall be free-draining and free from holes, ruts, rough spots, or other surface features detrimental to a seeded area.

6.02 FINISHING OF SITE, BORROW, AND STORAGE AREAS

A. Upon completion of the project, all areas used by the Contractor shall be properly cleared of all temporary structures, rubbish, and waste materials and properly graded to drain and blend in with the abutting property. Areas used for the deposit of waste materials shall be finished to properly drain and blend with the surrounding terrain.

6.03 STREET CLEANUP DURING CONSTRUCTION

A. Thoroughly clean all spilled dirt, gravel, or other foreign material caused by the construction operations from all streets and roads at the conclusion of each day's operation. Sidewalks, unless under construction, shall be kept clear of material, and available for pedestrian use at all times.

6.04 DUST PREVENTION

A. Give all unpaved streets, roads, detours, haul roads or disturbed areas used in the construction area an approved dust-preventive treatment or periodically water to prevent dust, as necessary or directed by Engineer. Applicable environmental regulations for dust prevention shall be strictly enforced.

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6.05 PRESERVATION OF IRRIGATION AND DRAINAGE DITCHES, AND INLETS

A. After backfilling of the trenches, immediately restore all irrigation and storm drain ditches destroyed, damaged, or otherwise modified during construction to a condition equivalent, in the opinion of the Engineer, to the condition of the ditch before construction. Ditches so reconstructed shall be built in their original locations. All inlets shall be periodically cleaned and kept free of siltation.

PART 7 SUBMITTALS DURING CONSTRUCTION

7.01 RECORD DRAWINGS

A. The Contractor shall maintain a complete set of record drawings to show any items which differ from those shown on Drawings. Such Drawings shall be updated daily and submitted each month with the partial pay request. Final record drawings will be required before substantial completion can be certified and final payment can be made.

B. The Contractor shall keep the Engineer apprised on a weekly basis, by providing Drawing mark-ups of the items that differ.

C. All elevations and coordinates shall be verified by a licensed surveyor. The surveyor shall certify the Record Drawings.

PART 8 PRE- AND POST-CONSTRUCTION VIDEO RECORDINGS

8.01 GENERAL

A. The Contractor shall provide color videos showing the pre-construction site, and the post-construction site. The videos shall be in digital (DVD) format, the video shall indicate on the DVD the date, job title, and brief description of the video and location where the video was taken. Video shall be subject to review and approval by Engineer. Two copies of the video DVD (including the original) shall be delivered to the Engineer as follows:

1. A video shall be taken of the preconstruction conditions, as well as all storage and staging areas, and the property adjacent to the construction sites. Particular emphasis should be directed to roadway conditions as well as all right-of-way features that will be affected by the construction.
2. A video shall be taken of the post-construction conditions and their adjacent properties. Particular emphasis should be directed to roadway conditions as well as all right-of-way features that were affected by the construction.

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B. The Following shall be Included with the Video Documentation:

1. Coverage is required within and adjacent to the right-of-way, and easements, and storage, and staging areas where the work is being constructed.
2. Documentation of the conditions of the adjacent properties or any affected structures as a result of the impending construction.
3. Certification as to date work done and by whom.
4. All videos shall be keyed to the construction drawings.

C. Pre-Construction and Post-Construction on Videos shall be Submitted as Follows:

1. Pre-construction videos shall be presented to the Owner at the pre-construction conference.
2. Post-construction videos shall be submitted prior to final project closeout. This submittal is contingent to final payment.

END OF SECTION

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SECTION 01 11 00
SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. The Project proposes improvements to the City of Key West, Florida, drainage system to reduce flooding. The Project consists of the installation of an emergency generator with concrete platform, associated electrical and I&C, approximately 300 linear feet of 36-inch PVC pipe, concrete endwall outfall structure and all related work and appurtenances, as shown or described in the Contract Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Schedule of Values: Submit on Contractor's standard form.
2. Schedule of Estimated Progress Payments:
   a. Submit with initially acceptable Schedule of Values.
   b. Submit adjustments thereto with Application for Payment.
3. Application for Payment.
4. Final Application for Payment.

1.02 ALLOWANCES

A. Consult with Engineer in selection of products or services. Obtain proposals from Suppliers and offer recommendations.

B. Allowances will be administered in accordance with Paragraph 11.02 of General Conditions.

C. Submit, with application for payment, invoice showing date of purchase, from whom the purchase was made, the date of delivery of the product or service, and the price, including delivery to the Site and applicable taxes.

1.03 SCHEDULE OF VALUES

A. Prepare a separate Schedule of Values for each schedule of the Work under the Agreement.

B. Upon request of Engineer, provide documentation to support the accuracy of the Schedule of Values.

C. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.

D. Lump Sum Work:

1. Reflect specified allowances and alternates, as applicable.
2. List bonds and insurance premiums, mobilization, demobilization, preliminary and detailed progress schedule preparation, equipment testing, facility startup, and contract closeout separately.

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E. An unbalanced or front-end loaded schedule will not be acceptable.

F. Summation of the complete Schedule of Values representing all the Work shall equal the Contract Price.

1.04 SCHEDULE OF ESTIMATED PROGRESS PAYMENTS

A. Show estimated payment requests throughout Contract Times aggregating initial Contract Price.

B. Base estimated progress payments on initially acceptable progress schedule. Adjust to reflect subsequent adjustments in progress schedule and Contract Price as reflected by modifications to the Contract Documents.

1.05 APPLICATION FOR PAYMENT

A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of Contractor.

B. Use detailed Application for Payment Form provided by Owner.

C. Provide separate form for each schedule as applicable.

D. Include accepted Schedule of Values for each schedule or portion of lump sum Work and the unit price breakdown for the Work to be paid on a unit priced basis.

E. Include separate line item for each Change Order and Work Change Directive executed prior to date of submission. Provide further breakdown of such as requested by Engineer.

F. Preparation:

1. Round values to nearest dollar.
2. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by Engineer.

1.06 MEASUREMENT—GENERAL

A. Weighing, measuring, and metering devices used to measure quantity of materials for Work shall be suitable for purpose intended and conform to tolerances and specifications as specified in National Institute of Standards and Technology, Handbook 44.

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B. Whenever pay quantities of material are determined by weight, material shall be weighed on scales furnished by Contractor and certified accurate by state agency responsible. Weight or load slip shall be obtained from weigher and delivered to Owner's representative at point of delivery of material.

C. If material is shipped by rail, car weights will be accepted provided that actual weight of material only will be paid for and not minimum car weight used for assessing freight tariff, and provided further that car weights will not be acceptable for material to be passed through mixing plants.

D. Vehicles used to haul material being paid for by weight shall be weighed empty daily and at such additional times as required by Engineer. Each vehicle shall bear a plainly legible identification mark.

E. Materials that are specified for measurement by the cubic yard measured in the vehicle shall be hauled in vehicles of such type and size that actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. Vehicles shall be loaded to at least their water level capacity. Loads hauled in vehicles not meeting above requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.

F. Quantities will be based on ground profiles shown. Field surveys will not be made to confirm accuracy of elevations shown.

G. Units of measure shown on Bid Form shall be as follows, unless specified otherwise.

Item	Method of Measurement
CY	Cubic Yard—Field Measure by Engineer within limits specified or shown
EA	Each—Field Count by Engineer
LF	Linear Foot—Field Measure by Engineer
SF	Square Foot
SY	Square Yard
TON	Ton—Weight Measure by Scale (2,000 pounds)

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H. Measurement of Linear Items: Where payment will be made based on linear quantities and on parameters other than length, those parameters shall be as follows:

Item	Measurement Parameters
Trench Safety System	Depth of Trench: 0 to 4 feet; 4 to 10 feet; over 10 feet in 2-foot increments. The depth of trench will be measured at intervals of 25 feet along the centerline of the trench. The depth of each measuring point will be the depth from existing at grade surface to bottom of pipe base, 6 inches below pipe invert and will used for computing the depth of trench for a distance of 25 feet ahead of the point of measurement. The depth figures indicated in Bid Form are inclusive to nearest 0.1 foot; that is, a trench depth measured as 11.9 feet will be paid for at the unit price for excavation 10 to 12 feet deep. A trench depth measured as 12 feet will be paid for at the unit price for excavation 12 to 14 feet deep.
Unclassified Trench Excavation	Depth of Trench: Same as Trench Safety System above.
Trench Backfill and Compaction	Depth of Trench: Same as Unclassified Trench Excavation above.
Rock Excavation	Depth: Same as for Unclassified Trench Excavation above except that depth shall be measured from surface of rock to bottom of pipe base 6 inches below pipe invert.

1.07 PAYMENT

A. Payment for all Lump Sum Work shown or specified in Contract Documents is included in the Contract Price. Payment will be based on a percentage complete basis for each line item of the accepted Schedule of Values.

B. Payment for unit price items covers all the labor, materials, and services necessary to furnish and install the following items.

1. **Pay Item 1.1, Performance and Payment Bonds**: Paid with copy of invoice submitted to City.
2. **Pay Item 1.2, Mobilization**: 25 percent paid following receipt of pre-construction video(s) of project sites, initiation of construction, with remaining balance paid based on percentage complete on each following pay application.

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3. **Pay Item 1.3, Demobilization**: Paid on completion of project punch list and acceptance of Project.
4. **Pay Item 1.4, General and Supplemental Conditions**: 25 percent paid on Mobilization with remaining balance paid based on percentage complete on each following pay application.
5. **Pay Item 1.5, MOT**: 25 percent paid on Mobilization with remaining balance paid based on percentage complete on each following pay application.
6. **Pay Items 1.6 through 1.7, Certified AutoCAD As-Builts and Surveyor**: Paid on completion of as-builts acceptance by the Engineer and the City.
7. **Pay Items 2.1 through 2.1.1, 36-inch PVC SDR 51 Storm Pipe**: Item includes trench excavation, pipe material, fittings, pipe zone backfill material, trench backfill, offsite disposal of excess material, compaction and testing. The depth of trench will be measured from the ground surface at the centerline of the trench to the invert of the pipe. The depth of pipe will be measured at intervals of 25 feet along the centerline of the trench. The length of pipe will be measured horizontally from end of pipe to end of pipe.
8. **Pay Item 3, Dewatering**: Item includes dewatering for trenches and excavations for structures, including mobilization and operation of the equipment for the duration of the activity.
9. **Pay Item 4, Florida Safety Trench Act Compliance**:
   Section 00 44 03, Florida Trench Safety Act Compliance for payment requirements.
10. **Pay Items 5 through 5.3, Pavement**: Item includes asphalt restoration over trenches and structures, adjacent to structures and curbs and thermoplastic stripping. Field measurements will be made by Engineer and include all labor, material and equipment necessary for removal, disposal, base preparation, testing, placement, adjusting utility boxes, and inlet tops.
11. **Pay Item 6, 36-inch Buried V-405 Valve**: Item includes connection to 36-inch PVC outfall pipe, valve, valve box, excavation, bedding, compaction, all labor and equipment necessary for installation, and all appurtenances necessary to complete the work.
12. **Pay Item 7, Demolition**: Item includes all demolition required for completion of this Project. This includes removal and disposal of water lines, stormwater piping, sidewalks, curb and gutters, existing inlets and manholes, and cut, cap and fill of water lines and stormwater piping abandoned in-place.

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13. **Pay Item 8, Emergency Generator with Concrete Platform**: Item includes emergency generator, automatic transfer switch, concrete platform with stairs and handrail, electrical conduit, duct banks, wire, connection to pump station, connection to Key Energy System, antenna, instrumentation and control, and all appurtenances necessary to complete the work. Also included is excavation, backfill, offsite disposal of excess material, compaction, fence, and all labor, material, and equipment necessary to complete the work.
14. **Pay Item 9, Concrete Endwall at Ocean**: Item includes, installation of the winged concrete enwall, galvanized steel grating, stainless steel anchors, concrete, excavation, placement of riprap, backfill, offsite disposal of excess material, compaction, connection to stormwater pipe, and all labor, material, and equipment necessary to complete the Work.

1.08 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected material.
2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
4. Material not unloaded from transporting vehicle.
5. Defective Work not accepted by Owner.
6. Material remaining on hand after completion of Work.

1.09 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings and preliminary operation and maintenance data is acceptable to Engineer.

B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 31 19
PROJECT MEETINGS

PART 1 GENERAL

1.01 GENERAL

A. Engineer will schedule physical arrangements for meetings throughout progress of Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within 5 days after each meeting to participants and parties affected by meeting decisions.

1.02 PRECONSTRUCTION CONFERENCE

A. Contractor shall be prepared to discuss the following subjects, as a minimum:

1. Required schedules (Preliminary Construction Schedule, Schedule of Values, Submittal).
2. Status of Bonds and insurance.
3. Sequencing of critical path work items.
4. Progress payment procedures.
5. Project changes and clarification procedures.
6. Use of site, access, office and storage areas, security and temporary facilities.
7. Major product delivery and priorities.
8. Contractor's safety plan and representative.
9. Preliminary Hurricane Evaluation Plan.

B. Attendees will Include:

1. Owner's representatives.
2. Contractor's office representative.
3. Contractor's resident superintendent.
4. Contractor's quality control representative.
5. Subcontractors' representatives whom Contractor may desire or Engineer may request to attend.
6. Engineer's representatives.
7. Others as appropriate.

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1.03 PROGRESS MEETINGS

A. Engineer will schedule regular progress meetings at Site, conducted monthly to review Work progress, progress schedule, Shop Drawing and Sample submissions schedule, Application for Payment, contract modifications, and other matters needing discussion and resolution.

B. Attendees will Include:

1. Owner's representative(s), as appropriate.
2. Contractor, Subcontractors, and Suppliers, as appropriate.
3. Engineer's representative(s).
4. Others as appropriate.

1.04 QUALITY CONTROL AND COORDINATION MEETINGS

A. Scheduled by Engineer on regular basis and as necessary to review test and inspection reports, and other matters relating to quality control of Work and work of other contractors.

B. Attendees will Include:

1. Contractor.
2. Contractor's designated quality control representative.
3. Subcontractors and Suppliers, as necessary.
4. Engineer's representatives.

1.05 PREINSTALLATION MEETINGS

A. When required in individual Specification sections, convene at Site prior to commencing Work of that Section.

B. Require attendance of entities directly affecting, or affected by, Work of that Section.

C. Notify Engineer 4 days in advance of meeting date.

D. Provide suggested agenda to Engineer to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.

1.06 OTHER MEETINGS

A. In accordance with Contract Documents and as may be required by Owner and Engineer.

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PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 32 00
PROGRESS SCHEDULES

PART 1 GENERAL

1.01 SUBMITTALS

A. Preliminary Progress Schedule: Submit within time specified in paragraph 2.05 of the General Conditions.

B. Detailed Progress Schedule: Submit initial Detailed Progress Schedule within 30 days after Effective Date of the Agreement.

C. Submit with Each Progress Schedule Submission:

1. Contractor's certification that progress schedule submission is the actual schedule being utilized for execution of the Work.
2. Progress Schedule: Four legible copies.
3. Narrative Progress Report: Same number of copies as specified for Progress Schedule.

D. Prior to final payment, submit a final Updated Progress Schedule.

1.02 PRELIMINARY PROGRESS SCHEDULE

A. In addition to basic requirements outlined in General Conditions, show a detailed schedule, beginning with Notice to Proceed, for minimum duration of 120 days, and a summary of balance of Project through Final Completion.

B. Show activities including, but not limited to the following:

1. Notice to Proceed.
2. Permits.
3. Submittals, with review time.
4. Early procurement activities for long lead equipment and materials.
5. Initial Site work.
6. Earthwork.
7. Specified Work sequences and construction constraints.
8. Contract Milestone and Completion Dates.
9. Major structural, mechanical, equipment, electrical, and instrumentation and control Work.
10. System startup summary.
11. Project close-out summary.
12. Demobilization summary.

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C. Update Preliminary Progress Schedule monthly; as part of progress payment process. Failure to do so may cause Owner to withhold all or part of the monthly progress payment until the Preliminary Progress Schedule is updated in a manner acceptable to Engineer.

D. Format: In accordance with Article Progress Schedule - Bar Chart.

E. Detailed progress schedule.

F. In addition to requirements of General Conditions, submit Detailed Progress Schedule beginning with Notice to Proceed and continuing through Final Completion.

G. Show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by Contractor.

H. When accepted by Engineer, Detailed Progress Schedule will replace Preliminary Progress Schedule and become Baseline Schedule. Subsequent revisions will be considered as Updated Progress Schedules.

I. Update monthly to reflect actual progress and occurrences to date, including weather delays.

1.03 PROGRESS SCHEDULE - BAR CHART

A. General: Comprehensive bar chart schedule, generally as outlined in Associated General Contractors of America (AGC) Publication No. 1107.1, “Construction Planning and Scheduling, latest edition. If a conflict occurs between the AGC publication and this specification, this specification shall govern.

B. Format:

1. Unless otherwise approved, white paper, 11-inch by 17-inch sheet size.
2. Title Block: Show name of project and Owner, date submitted, revision or update number, and name of scheduler.
3. Identify horizontally, across the top of the schedule, the time frame by year, month, and day.
4. Identify each activity with a unique number and a brief description of the Work associated with that activity.
5. Legend: Describe standard and special symbols used.

C. Contents: Identify, in chronological order, those activities reasonably required to complete the Work, including as applicable, but not limited to:

1. Obtaining permits, submittals for early product procurement and long lead time items.

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2. Mobilization and other preliminary activities.
3. Initial Site work.
4. Specified Work sequences, constraints, and Milestones, including Substantial Completion date(s) Subcontract Work.
5. Major equipment design, fabrication, factory testing, and delivery dates.
6. Sitework.
7. Concrete Work.
8. Structural steel Work.
9. Architectural features Work.
10. Conveying systems Work.
11. Equipment Work.
12. Mechanical Work.
13. Electrical Work.
14. Instrumentation and control Work.
15. Interfaces with Owner-furnished equipment.
16. Other important Work for each major facility.
17. Equipment and system startup and test activities.
18. Project closeout and cleanup.
19. Demobilization.

1.04 PROGRESS OF THE WORK

A. Updated Progress Schedule shall Reflect:

1. Progress of Work to within 5 working days prior to submission.
2. Approved changes in Work scope and activities modified since submission.
3. Delays in Submittals or resubmittals, deliveries, or Work.
4. Adjusted or modified sequences of Work.
5. Other identifiable changes.
6. Revised projections of progress and completion.
7. Report of changed logic.

B. Produce detailed subschedules during Project, upon request of Owner or Engineer, to further define critical portions of the Work such as facility shutdowns, etc.

C. If Contractor fails to complete activity by its latest scheduled completion date and this failure is anticipated to extend Contract Times (or Milestones), Contractor shall, within 7 days of such failure, submit a written statement as to how Contractor intends to correct nonperformance and return to acceptable current progress schedule. Actions by Contractor to complete Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.

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D. Owner may order Contractor to increase plant, equipment, labor force or working hours if Contractor fails to:

1. Complete a Milestone activity by its completion date.
2. Satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to Owner.

1.05 NARRATIVE PROGRESS REPORT

A. Format:

1. Organize same as Progress Schedule.
2. Identify, on a cover letter, reporting period, date submitted, and name of author of report.

B. Contents:

1. Number of days worked over the period, work force on hand, construction equipment on hand (including utility vehicles such as pickup trucks, maintenance vehicles, stake trucks, etc.).
2. General progress of Work, including a listing of activities started and completed over the reporting period, mobilization/demobilization of subcontractors, and major milestones achieved.
3. Contractor's plan for management of Site (for example, lay down and staging areas, construction traffic, etc.), utilization of construction equipment, buildup of trade labor, and identification of potential Contract changes.
4. Identification of new activities and sequences as a result of executed Contract changes.
5. Documentation of weather conditions over the reporting period, and any resulting impacts to the work.
6. Description of actual or potential delays, including related causes, and the steps taken or anticipated to mitigate their impact.
7. Changes to activity logic.
8. Changes to the critical path.
9. Identification of, and accompanying reason for, any activities added or deleted since the last report.
10. Steps taken to recover the schedule from Contractor-caused delays.

1.06 SCHEDULE ACCEPTANCE

A. Engineer's acceptance will demonstrate agreement that the proposed schedule conforms with requirements of Contract including, but not limited to, the following:

1. Contract Times, including Final Completion and all intermediate Milestones are within the specified times.

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2. Specified Work sequences and constraints are shown as specified.
3. Complete Scope of Work is included.
4. Specified Owner furnished Equipment or Material arrival dates, or range of dates, are included.
5. Access restrictions are accurately reflected.
6. Start-up and testing times are as specified.
7. Training time is as specified.
8. Level of detail is as specified herein.
9. Submittal submission and review times are as specified.
10. Duration of activities are reasonable.
11. Sequencing is reasonable and does not include preferential logic contrary to the contingency/float sharing clauses of this Specification.
12. Meets all administrative requirements of Contract Documents.
13. Updated schedules reflect actual dates and duration of Work performed.

B. Preliminary Progress Schedule Review Disposition:

1. Accepted.
2. Rejected as Noted:
   a. Make requested corrections; resubmit within 10 days.
   b. Until acceptable to Engineer as the Baseline Progress Schedule, continue the review and revision process, during which time Contractor shall update the schedule on a monthly basis to reflect actual progress and occurrences to date.

C. Detailed Progress Schedule:

1. Accepted.
2. Rejected as Noted:
   a. Make requested corrections; resubmit within 10 days.
   b. Until acceptable to Engineer as the Baseline Progress Schedule, continue the review and revision process.

D. Narrative Report: All changes to activity duration and sequences, including the addition or deletion of activities subsequent to Engineer's acceptance of the Baseline Progress Schedule, shall be delineated in the Narrative Report current with the proposed Updated Progress Schedule.

1.07 ADJUSTMENT OF CONTRACT TIMES

A. Reference General Conditions.

B. Evaluation and reconciliation of Adjustments of Contract Times shall be based on the Updated Progress Schedule at the time of proposed adjustment or claimed delay.

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C. Schedule Contingency:

1. Contingency, when used in the context of the Progress Schedule, is time between Contractor’s proposed Completion Time and Contract Completion Time.
2. Contingency included in Progress Schedule is a Project resource available to both Contractor and Owner to meet Contract Milestones and Contract Times. Use of Schedule contingency shall be shared to the proportionate benefit of both parties.
3. Use of schedule contingency suppression techniques such as preferential sequencing and extended activity times are prohibited.
4. Pursuant to Contingency sharing provisions of this Specification, no time extensions will be granted, nor will delay damages be paid until a delay occurs which (i) consumes all available contingency time, and (ii) extends Work beyond the Contract Completion date.

D. Claims Based on Contract Times:

1. Where Engineer has not yet rendered formal decision on Contractor's claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in progress schedule, Contractor shall reflect an interim adjustment in the progress schedule as acceptable to Engineer.
2. It is understood and agreed that such interim acceptance will not be binding on either Contractor or Owner, and will be made only for the purpose of continuing to schedule Work until such time as formal decision has been rendered as to an adjustment, if any, of the Contract Times.
3. Contractor shall revise progress schedule prepared thereafter in accordance with Engineer's formal decision.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 33 00
SUBMITTALS

PART 1 GENERAL

1.01 GENERAL

A. Inquiries: Direct to Engineer regarding procedure, purpose, or extent of Submittal.

B. Timeliness: Schedule and make submissions in accordance with requirements of individual Specification sections and in such sequence as to cause no delay in Work or in work of other Contractors.

C. Identification of Submittals:

1. Complete, sign, and transmit with each Submittal package, one Transmittal of Contractor's Submittal Form attached at end of this section.
2. Identify each Submittal with the following numbering and tracking system:
   a. Sequentially number each Submittal.
   b. Resubmission of a Submittal will have original number with sequential alphabetic suffix.
3. Format: Orderly, indexed with labeled tab dividers.
4. Show date of submission.
5. Show Project title and Owner's contract identification and contract number.
6. Show names of Contractor, Subcontractor or Supplier, and manufacturer as appropriate.
7. Identify, as applicable, Contract Document section and paragraph to which Submittal applies.
8. Identify Submittal type; submit only one type in each Submittal package.
9. Identify and indicate each deviation or variation from Contract Documents.

D. Resubmissions: Clearly identify each correction or change made.

E. Incomplete Submittal Submissions:

1. Engineer will return entire Submittal for Contractor's revision/correction and resubmission.
2. Submittals which do not clearly bear Contractor's specific written indication of Contractor review and approval of Submittal or which are transmitted with an unsigned or uncertified submission form or as may otherwise be required will be returned to Contractor unreviewed.

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F. Nonspecified Submissions: Submissions not required under these Contract Documents and not shown on submissions will not be reviewed and will be returned to Contractor.

G. Engineer's Review: Engineer will act upon Contractor's Submittal and transmit response to Contractor not later than 20 working days after receipt, unless otherwise specified. Resubmittals will be subject to same review time.

H. Schedule Delays:

1. No adjustment of Contract Times or Price will be allowed due to Engineer's review of Submittals, unless all of the following criteria are met:
   a. Contractor has notified Engineer in writing that timely review of Submittal in question is critical to progress of Work, and has received Engineer's written acceptance to reflect such on current accepted submissions and progress schedule. Written agreement by the Engineer to reduce Submittal review time will be made only for unusual and Contractor-justified reasons. Acceptance of a progress schedule containing Submittal review times less than specified or less than agreed to in writing by Engineer will not constitute Engineer's acceptance of review times.
   b. Engineer has failed to review and return first submission of a Submittal within agreed time indicated on current accepted schedule of submissions or, if no time is indicated thereon, within 30 days after receipt.
   c. Contractor demonstrates that delay in progress of Work is directly attributable to Engineer's failure to return Submittal within time indicated and accepted by Engineer.
2. No adjustment of Contract Times or Price will be allowed due to delays in progress of Work caused by rejection and subsequent resubmission of Submittals, including multiple resubmissions.

1.02 SHOP DRAWINGS AND SAMPLES

A. Copies:

1. Shop Drawings and Product Data: Submit four copies, plus whatever the Contractor requires to be returned, maximum eight.
2. Samples: Two, unless otherwise specified in individual specification sections.

B. General: Submit to Engineer as required by individual specification sections.

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C. Identify and Indicate:

1. Pertinent Drawing sheet(s) and detail number(s), products, units and assemblies, and system or equipment identification or tag numbers.
2. Critical field dimensions and relationships to other critical features of Work.
3. Samples: Source, location, date taken, and by whom.
4. Each deviation or variation from Contract Documents.
5. Proper storage and maintenance requirements.

D. Design Data: When specified, provide Project-specific information as required and as necessary to clearly show calculations, dimensions, logic and assumptions, and referenced standards and codes upon which design is based.

E. Foreign Manufacturers: When proposed, include following additional information:

1. Names and addresses of at least two companies closest to Project that maintain technical service representatives.
2. Complete inventory of spare parts and accessories for each piece of equipment.

F. Preparation:

1. Format: Whenever possible, schedule for and combine Shop Drawings and Samples required for submission in each Specification section or division into a single Submittal package. Also combine product data for like items into a single Submittal package.
2. Present in a clear and thorough manner and of sufficient detail to show kind, size, arrangement, and function of components, materials, and devices and compliance with Contract Documents. Identify details by reference to sheet and detail, and schedule or room numbers shown on Drawings.
3. Reproducible Copy:
   a. Preferred Minimum Sheet Size: 8-1/2- by 11-inch and 11- by 17-inch pages, suitable for photocopying.
   b. Larger than 11- by 17-Inch Sheets: 22-inch by 34-inch preferred, mylar or sepias suitable for copying in a blueprint machine.
4. Piping Systems: Drawn to scale.
5. Product Data: Clearly mark each copy to identify pertinent products or models and show performance characteristics and capacities, dimensions and clearances required, wiring or piping diagrams and controls, and external connections, anchorage, and supports required.

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6. Equipment and Component Titles: Identical to title shown on Drawings.
7. Manufacturer's Standard Schematic Drawings and Diagrams as Follows:
   a. Modify to delete information that is not applicable to Work.
   b. Supplement standard information to provide information specifically applicable to Work.

G. Shop Drawing Disposition: Engineer will review, mark, and stamp as appropriate and distribute marked-up copies as noted:

1. Approved as Submitted (for Incorporation in Work):
   a. Two copies furnished Owner.
   b. One copy furnished Resident Project Representative.
   c. One copy retained in Engineer's file.
   d. Remaining copies returned to Contractor appropriately annotated.
   e. Contractor may begin to implement activities to incorporate specific product(s) or Work covered by Submittal.
2. Approved as Noted (for Incorporation in Work):
   a. Two copies furnished Owner.
   b. One copy furnished Resident Project Representative.
   c. One copy retained in Engineer's file.
   d. Remaining copies returned to Contractor appropriately annotated.
   e. Contractor may begin to implement activities to incorporate product(s) or Work covered by Submittal, in accordance with Engineer's notations.
3. Disapproved:
   a. One copy furnished Resident Project Representative.
   b. One copy retained in Engineer's file.
   c. Remaining copies returned to Contractor appropriately annotated.
   d. Contractor shall make corrections or develop replacement and resubmit (in same manner and quantity as specified for original submission).
   e. Submittal is not approved.
4. Incomplete:
   a. One copy furnished Resident Project Representative.
   b. One copy retained in Engineer's file.
   c. Remaining copies returned to Contractor appropriately annotated.
   d. Contractor shall complete and resubmit or submit missing portions.
   e. Submittal is not approved.

H. Sample Disposition: Same as Shop Drawing disposition; samples will not be returned.

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1.03 ADMINISTRATIVE SUBMITTALS

A. Copies: Submit four.

B. Description: Submittals that are not Shop Drawings or Samples, or that do not reflect quality of product or method of construction. May include, but not limited to those Submittals identified below.

C. Applications for Payment (and Cash Allowance Data and Values): Meet requirements of Section 01 29 00, Payment Procedures.

D. Progress Reports and Quantity Charts: As may be required in Section 01 32 00, Progress Schedules.

E. Hurricane Evaluation Plan: The Contractor shall prepare the Engineer with a written plan and schedule describing how and when the Contractor will remove all unnecessary items from the work area and tie down all remaining supplies and barricades in the event that a hurricane warning is issued, identifying gussets in particular. If a warning is issued, the Contractor shall remove all unnecessary items from the work area(s) and will tie down all movable (under 200 pounds) objects. The Owner shall not be liable for any financial hardship or delays caused as a result of demobilization or remobilization due to the above.

F. Schedules:

1. Progress Schedule(s): Meet the requirements of Section 01 32 00, Progress Schedules.
2. Schedule of Values: Meet requirements of Section 01 29 00, Payment Procedures.
3. Schedule of Submittal Submissions:
   a. Prepare and submit, preliminary list of submissions grouped by Contract Document article/paragraph number or Specification section number, with identification, numbering and tracking system as specified under Paragraph Identification of Submittals and as approved by Engineer.
   b. Include Only the Following Required Submissions:
      1) Shop Drawings and Samples.
      2) Training plans.
      3) Test procedures.
      4) Operation and maintenance manuals.
      5) Record documents.
      6) Specifically required certificates, warranties, and service agreements.

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c. Coordinate with progress schedule and prepare submissions to show for each Submittal, at a minimum, the following:
   1) Estimated submission date to Engineer.
   2) Specifically requested and clearly identified Engineer review time if shorter than that set forth herein, with justification for such request and critical dates Submittals will be needed from Engineer.
   3) For first 6-month period from the date the Contract Times commence or following any update or adjustment of the submissions, the estimated submission date shall be week, month, and year; for submissions beyond 6-month time period, show closest month and year.
d. Submit to Engineer Monthly:
   1) Updated list if changes have occurred. Otherwise, submit a written communication confirming existing list.
   2) Adjusted submissions reflecting submission activity planned for forthcoming 6-month time period and beyond. Coordinate with progress schedule updates.

G. Submittals Required by Laws, Regulations, and Governing Agencies:

1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
2. Transmit to Engineer for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.

H. Disposition: Engineer will review, stamp, and indicate requirements for resubmission or acceptance on Submittal as follows:

1. Accepted:
   a. Acceptance will indicate that Submittal conforms to intent of Contract Documents as to form and substance.
   b. Contractor may proceed to perform Submittal related Work.
   c. One copy furnished Owner.
   d. One copy furnished Resident Project Representative.
   e. One copy retained in Engineer's file.
   f. Remaining copies returned to Contractor appropriately annotated.
2. Rejected as Noted:
   a. One copy retained in Engineer's file.
   b. Remaining copies returned to Contractor appropriately annotated.
   c. Contractor shall revise/correct or develop replacement and resubmit.

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1.04 QUALITY CONTROL SUBMITTALS

A. Certificates: Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in the individual Specification sections.

B. Statements of Qualification: Evidence of qualification, certification, or registration. As required in these Contract Documents to verify qualifications of professional land surveyors, engineers, materials testing laboratories, specialty Subcontractors, trades, specialists, consultants, installers, and other professionals. Reference paragraph 1.01.A.51 of Supplementary Conditions for the definition of Specialist.

C. Field Samples: Provide as required by individual Specifications and as may be required by Engineer during progress of Work.

D. Written Test Reports of Each Test and Inspection: As a minimum, include the following:

1. Date of test and date issued, Project title and number, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
2. Date and time of sampling or inspection and record of temperature and weather conditions.
3. Identification of product and Specification section, location of Sample, test or inspection in the Project, type of inspection or test with referenced standard or code, certified results of test.
4. Compliance with Contract Documents, and identifying corrective action necessary to bring materials and equipment into compliance.
5. Provide an interpretation of test results, when requested by Engineer.

E. Disposition: Engineer will review, stamp, and indicate requirements for resubmission or acceptance on Submittal as follows:

1. Accepted:
   a. Acceptance will indicate that Submittal conforms to intent of Contract Documents as to form and substance.
   b. Contractor may proceed to perform Submittal related Work.
   c. One copy furnished Owner.
   d. One copy furnished Resident Project Representative.
   e. One copy retained in Engineer's file.
   f. Remaining copies returned to Contractor appropriately annotated.

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2. Rejected as Noted:
   a. One copy retained in Engineer's file.
   b. Remaining copies returned to Contractor appropriately annotated.
   c. Contractor shall revise/correct or develop replacement and resubmit.

1.05 CONTRACT CLOSEOUT SUBMITTALS

A. General: In accordance with Section 01 77 00, Contract Closeout.

B. Disposition: Engineer will review, stamp, and indicate requirements for resubmission or acceptance on Submittal as follows:

1. Accepted:
   a. Acceptance will indicate that Submittal conforms to intent of Contract Documents as to form and substance.
   b. Contractor may proceed to perform Submittal related Work.
   c. One copy furnished Owner.
   d. One copy furnished Resident Project Representative.
   e. One copy retained in Engineer's file.
   f. Remaining copies returned to Contractor appropriately annotated.
2. Rejected as Noted:
   a. One copy retained in Engineer's file.
   b. Remaining copies returned to Contractor appropriately annotated.
   c. Contractor shall revise/correct or develop replacement and resubmit.

1.06 SUPPLEMENTS

A. The supplement listed below, following "END OF SECTION," is part of this Specification.

1. Transmittal of Contractor's Submittal.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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TRANSMITTAL OF CONTRACTOR'S SUBMITTAL
(ATTACH TO EACH SUBMITTAL)

DATE:_____

TO:_____

_____

_____

_____

_____

Submittal No.:_____

☐ New Submittal ☐ Resubmittal

Previous Submittal No.:_____

Project:_____

Project No.:_____

Specification Section No.:_____

(Cover only one section with each transmittal)

FROM:_____

Contractor

_____

_____

_____

Schedule Date of Submittal:

_____

SUBMITTAL TYPE: ☐ Shop Drawing ☐ Administrative ☐ Sample ☐ Quality Control ☐ Contract Closeout ☐ "Or-Equal"/Substitute

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By:_____

Contractor (Authorized Signature)

SECTION 01 42 13
ABBREVIATIONS

PART 1 GENERAL

1.01 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES

A. Reference to standards and specifications of technical societies and reporting and resolving discrepancies associated therewith shall be as provided in paragraph 3.02 of the General Conditions, and as may otherwise be required herein and in the individual Specification sections.

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

C. Where so specified, products or workmanship shall also meet or exceed the additional prescriptive or performance requirements included within the Contract Documents to establish a higher or more stringent standard of quality than that required by the referenced standard.

D. Where two or more standards are specified to establish quality, the product and workmanship shall meet or exceed the requirements of the most stringent.

E. Where both a standard and a brand name are specified for a product in the Contract Documents, the proprietary product named shall meet or exceed the requirements of the specified reference standard.

F. Copies of Standards and Specifications of Technical Societies:

1. Copies of applicable referenced standards have not been bound in these Contract Documents.
2. Where copies of standards are needed by the Contractor, obtain a copy or copies directly from the publication source and maintain in an orderly manner at the site as Work site records, available to the Contractor's personnel, Subcontractors, Owner, and Engineer.

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1.02 ABBREVIATIONS

A. Abbreviations for trade organizations and government agencies: Following is a list of construction industry organizations and government agencies to which references may be made in the Contract Documents, with abbreviations used.

1.	AA	Aluminum Association
2.	AABC	Associated Air Balance Council
3.	AAMA	American Architectural Manufacturers Association
4.	AASHTO	American Association of State Highway and Transportation Officials
5.	ACI	American Concrete Institute
6.	AFBMA	Anti-Friction Bearing Manufacturers' Association
7.	AGA	American Gas Association
8.	AGMA	American Gear Manufacturers' Association
9.	AI	Asphalt Institute
10.	AISC	American Institute of Steel Construction
11.	AISI	American Iron and Steel Institute
12.	AITC	American Institute of Timber Construction
13.	ALS	American Lumber Standards
14.	AMA	Acoustical Materials Association
15.	AMCA	Air Movement and Control Association
16.	ANSI	American National Standards Institute
17.	APA	American Plywood Association
18.	API	American Petroleum Institute
19.	APWA	American Public Works Association
20.	AREA	American Railway Engineering Association
21.	ARI	Air Conditioning and Refrigeration Institute
22.	ASA	American Standards Association
23.	ASAE	American Society of Agricultural Engineers
24.	ASCE	American Society of Civil Engineers
25.	ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
26.	ASNT	American Society for Nondestructive Testing
27.	ASME	American Society of Mechanical Engineers
28.	ASTM	American Society for Testing and Materials
29.	AWI	Architectural Wood Work Institute
30.	AWPA	American Wood Preservers' Association
31.	AWPB	American Wood Preservers Bureau
32.	AWPI	American Wood Preservers' Institute
33.	AWS	American Welding Society
34.	AWWA	American Water Works Association

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35.	BHMA	Builders Hardware Manufacturers' Association
36.	CBMA	Certified Ballast Manufacturers' Association
37.	CDA	Copper Development Association
38.	CGA	Compressed Gas Association
39.	CIPRI	Cast Iron Pipe Research Institute
40.	CISPI	Cast Iron Soil Pipe Institute
41.	CMAA	Crane Manufacturers' Association of America
42.	CRSI	Concrete Reinforcing Steel Institute
43.	CS	Commercial Standard
44.	CSA	Canadian Standards Association
45.	CSI	Construction Specifications Institute
46.	CTSS	Caltrans Standard Specification
47.	EJCDC	Engineers Joint Contract Documents' Committee
48.	ETL	Engineering Test Laboratories
49.	FCC	Federal Communications Commission
50.	FAA	Federal Aviation Administration
51.	FEMA	Federal Emergency Management Agency
52.	FGMA	Flat Glass Marketing Association
53.	FM	Factory Mutual
54.	Fed. Spec.	Federal Specifications
55.	FS	Federal Specification
56.	GA	Gypsum Association
57.	HI	Hydraulic Institute
58.	HMI	Hoist Manufacturers' Institute
59.	ICBO	International Conference of Building Officials
60.	ICEA	Insulated Cable Engineers' Association
61.	IEEE	Institute of Electrical and Electronics Engineers, Inc.
62.	IES	Illuminating Engineering Society
63.	IFI	Industrial Fasteners Institute
64.	ISA	Instrument Society of America
65.	ISO	Insurance Service Office
66.	JIC	Joint Industry Conferences of Hydraulic Manufacturers
67.	MIA	Marble Institute of America
68.	Mil. Sp.	Military Specification or MIL
69.	MS	Military Specifications
70.	MMA	Monorail Manufacturers' Association
71.	NAAMM	National Association of Architectural Metal Manufacturers
72.	NACE	National Association of Corrosion Engineers
73.	NBHA	National Builders' Hardware Association
74.	NEBB	National Environmental Balancing Bureau
75.	NEC	National Electrical Code
76.	NECA	National Electrical Contractors Association
77.	NEMA	National Electrical Manufacturers' Association

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78.	NESC	National Electric Safety Code
79.	NFPA	National Fire Protection Association
80.	NHLA	National Hardwood Lumber Association
81.	NHPMA	Northern Hardwood and Pine Manufacturer's Association
82.	NLMA	National Lumber Manufacturers' Association
83.	NRCA	National Roofing Contractors Association
84.	NSF	National Sanitation Foundation Testing Laboratory
85.	NSPE	National Society of Professional Engineers
86.	NTMA	National Terrazzo and Mosaic Association
87.	NWWDA	National Wood Window and Door Association
88.	OECI	Overhead Electrical Crane Institute
89.	OSHA	Occupational Safety and Health Act (both Federal and State)
90.	PCI	Prestressed Concrete Institute
91.	PEI	Porcelain Enamel Institute
92.	PPI	Plastic Pipe Institute
93.	PS	Product Standards Section-U.S. Department of Commerce
94.	RMA	Rubber Manufacturers' Association
95.	SAE	Society of Automotive Engineers
96.	SCPRF	Structural Clay Products Research Foundation
97.	SDI	Steel Deck Institute
98.	SDI	Steel Door Institute
99.	SIGMA	Sealed Insulating Glass Manufacturing Association
100.	SJI	Steel Joist Institute
101.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
102.	SPI	Society of the Plastics Industry
103.	SSPC	Steel Structures Painting Council
104.	SWI	Steel Window Institute
105.	TEMA	Tubular Exchanger Manufacturers' Association
106.	TCA	Tile Council of America
107.	UBC	Uniform Building Code
108.	UFC	Uniform Fire Code
109.	UL	Underwriters Laboratories Inc.
110.	UMC	Uniform Mechanical Code
111.	US	U.S. Bureau of Standards
112.	USBR	U.S. Bureau of Reclamation
113.	WCLIB	West Coast Lumber Inspection Bureau
114.	WWPA	Western Wood Products Association

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 43 33
MANUFACTURERS' FIELD SERVICES

PART 1 GENERAL

1.01 DEFINITIONS

A. Person-Day: One person for 8 hours within regular Contractor working hours.

1.02 SUBMITTALS

A. Informational Submittals:

1. Training Schedule: Submit, in accordance with requirements of this Specification and obtain approval from Engineer, not less than 21 days prior to start of equipment installation and revise as necessary for acceptance.
2. Lesson Plan: Submit, in accordance with requirements of this Specification, proposed lesson plan not less than 21 days prior to scheduled training and revise as necessary for acceptance.

1.03 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

A. Authorized representative of the manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment manufacturer to issue the certifications required of the manufacturer. Additional qualifications may be specified elsewhere.

B. Representative subject to acceptance by Owner. No substitute representatives will be allowed unless prior written approval by such has been given.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

A. Furnish manufacturers' services when required by an individual Specification section, to meet the requirements of this section.

B. Where time is necessary in excess of that stated in the Specifications for manufacturers' services, or when a minimum time is not specified, the time required to perform the specified services shall be considered incidental.

C. Schedule manufacturer' services to avoid conflict with other onsite testing or other manufacturers' onsite services.

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D. Determine, before scheduling services, that all conditions necessary to allow successful testing have been met.

E. Only those days of service approved by Engineer will be credited to fulfill the specified minimum services.

F. When specified in individual Specification sections, manufacturer's onsite services shall include:

1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.
2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.
3. Providing, on a daily basis, copies of all manufacturers' representatives field notes and data to Owner.
4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to Engineer.
5. Resolution of assembly or installation problems attributable to, or associated with, respective manufacturer's products and systems.
6. Assistance during functional and performance testing, and facility startup and evaluation.
7. Training of Owner's personnel in the operation and maintenance of respective product as required.
8. Additional requirements may be specified elsewhere.

3.02 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

A. When so specified, a Manufacturer's Certificate of Compliance, a copy of which is attached to this section, shall be completed in full, signed by the entity supplying the product, material, or service, and submitted prior to shipment of product or material or the execution of the services.

B. Engineer may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.

C. Such form shall certify that the proposed product, material, or service complies with that specified. Attach supporting reference data, affidavits, and certifications as appropriate.

D. May reflect recent or previous test results on material or product, if acceptable to Engineer.

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3.03 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

A. When so specified, a Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this section, shall be completed and signed by the equipment manufacturer's representative.

B. Such form shall certify that the signing party is a duly authorized representative of the manufacturer, is empowered by the manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to assure that the equipment is complete and operational.

3.04 TRAINING

A. General:

1. Furnish manufacturers' representatives for detailed classroom and hands-on training to Owner's personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.
2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with Owner, and familiar with operation and maintenance manual information specified in Section 01 78 23, Operation and Maintenance Data.
3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.
4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.

B. Training Schedule:

1. List specified equipment and systems that require training services and show:
   a. Respective manufacturer.
   b. Estimated dates for installation completion.
   c. Estimated training dates.
2. Allow for multiple sessions when several shifts are involved at no additional cost to Owner.
3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by Owner, and to allow full participation by manufacturers' representatives. Adjust schedule for interruptions in operability of equipment.
4. Coordinate with Section 01 32 00, Progress Schedules, and Section 01 91 14, Equipment Testing and Facility Startup.

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C. Lesson Plan: When manufacturer or vendor training of Owner personnel is specified, prepare and obtain Engineer's approval of a lesson plan for each required course containing the following minimum information:

1. Title and objectives.
2. Recommended attendees (such as, managers, engineers, operators, maintenance).
3. Course description, outline of course content, and estimated class duration.
4. Format (such as, lecture, self-study, demonstration, hands-on).
5. Instruction materials and equipment requirements.
6. Resumes of instructors providing the training.

D. Pre-startup Training:

1. Coordinate training sessions with Owner's operating personnel and manufacturers' representatives, and with submission of operation and maintenance manuals in accordance with Section 01 78 23, Operation and Maintenance Data.
2. Complete at least 14 days prior to beginning of facility startup.

E. Post-startup Training: If required in Specifications, furnish and coordinate training of Owner's operating personnel by respective manufacturer's representatives.

3.05 SUPPLEMENTS

A. The supplements listed below, following "End of Section", are part of this Specification.

1. Form: Manufacturer's Certificate of Compliance.
2. Form: Manufacturer's Certificate of Proper Installation.

END OF SECTION

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MANUFACTURER'S CERTIFICATE OF COMPLIANCE

OWNER:

PRODUCT, MATERIAL, OR SERVICE SUBMITTED:

PROJECT NAME:

PROJECT NO:

Comments:_____

_____

_____

_____

_____

_____

I hereby certify that the above-referenced product, material, or service called for by the contract for the named project will be furnished in accordance with all applicable requirements. I further certify that the product, material, or service are of the quality specified and conform in all respects with the contract requirements, and are in the quantity shown.

Date of Execution: _____, 20___

Manufacturer:_____

Manufacturer's Authorized Representative *(print)*: _____

_____
(Authorized Signature)

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MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO:_____

EQPT TAG NO:_____ EQPT/SYSTEM:_____

PROJECT NO:_____ SPEC. SECTION:_____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer's recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments:_____

_____

_____

_____

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate his equipment and (iii) authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20___

Manufacturer:_____

By Manufacturer's Authorized Representative: _____
(Authorized Signature)

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SECTION 01 50 00
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of Nurserymen: American Standards for Nursery Stock.
2. U.S. Weather Bureau, “Rainfall-Frequency Atlas of the U.S. for Durations From 30 Minutes to 24 Hours and Return Periods From 1 to 100 Years.”
3. U.S. Department of Agriculture, “Urban Hydrology for Small Watersheds.”
4. Federal Emergency Management Agency.
5. NFPA, National Fire Prevention Standard for Safeguarding Building Construction Operations.

1.02 SUBMITTALS

A. Administrative Submittals: Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.

B. Shop Drawings:

1. Temporary Utility Submittals:
   a. Electric power supply and distribution plans.
   b. Drainage plans.
2. Temporary Construction Submittals:
   a. Parking area plans.
   b. Contractor’s field office, storage yard, and storage building plans, including gravel surfaced area.
   c. Fencing and protective barrier locations and details.
   d. Staging area location plan.
   e. Traffic Control and Routing Plans: As specified herein, and proposed revisions thereto.
   f. Plan for maintenance of existing plant operations.
3. Temporary Control Submittals: Noise control plan.

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1.03 MOBILIZATION

A. Mobilization shall Include, but Not be Limited to, these Principal Items:

1. Obtaining required permits.
2. Installing temporary construction power, wiring, and lighting facilities.
3. Providing onsite communication facilities, including telephones.
4. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
5. Arranging for and erection of Contractor's work and storage yard.
6. Posting OSHA required notices and establishing safety programs and procedures.
7. Having Contractor's superintendent at site full time.

B. Areas designated for Contractor's temporary facilities shall be coordinated with Engineer and City.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 TEMPORARY UTILITIES

A. Fire Protection: Furnish and maintain on site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA 241).

B. Cooling and Ventilating:

1. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the proper storage, maintenance, and installation of materials, and to protect materials, equipment, and finishes from damage due to temperature or humidity.
2. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.
3. Pay all costs of installation, maintenance, operation, removal, and fuel consumed.

3.02 TEMPORARY ELECTRIC POWER

A. The Contractor shall make arrangements to obtain and pay for electrical power used until final acceptance by the Owner.

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3.03 SAFETY REQUIREMENTS FOR TEMPORARY ELECTRIC POWER

A. Temporary electric power installation shall meet the construction safety requirements of OSHA, state and other governing agencies.

3.04 TEMPORARY WATER

A. The Contractor shall make his own arrangements to obtain suitable water and shall pay all costs until final acceptance by Owner.

3.05 SANITARY FACILITIES

A. The Contractor shall provide and maintain sanitary facilities for his employees and his subcontractors that will comply with the regulations of the local and state departments of health and as directed by the Engineer.

3.06 PROTECTION OF WORK AND PROPERTY

A. General:

1. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.
2. Maintain in continuous service all existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and all other utilities encountered along the line of work, unless other arrangements satisfactory to owners of said utilities have been made.
3. Where completion of Work requires temporary or permanent removal and/or relocation of an existing utility, coordinate all activities with owner of said utility and perform all work to their satisfaction.
4. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
5. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
6. In areas where Contractor’s operations are adjacent to or near a utility such as gas, telephone, television, electric power, water, sewer, or irrigation system and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection thereof have been made by Contractor.
7. Notify property owners and utility offices that may be affected by construction operation at least 2 days in advance.
    a. Before exposing a utility, obtain utility owner’s permission. Should service of utility be interrupted due to the Contractor’s operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.

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8. Do not impair operation of existing sewer systems. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.
9. Maintain original site drainage wherever possible.

B. Site Security: Reference the General Conditions.

C. Barricades and Lights:

1. Provide as necessary to prevent unauthorized entry to construction areas and affected roads, streets, and alleyways, inside and outside of fenced area, and as required to ensure public safety and the safety of Contractor's employees, other employer's employees, and others who may be affected by the Work.
2. Provide to protect existing facilities and adjacent properties from potential damage.
3. Locate to enable access by facility operators and property owners.
4. Protect streets, roads, highways, and other public thoroughfares that are closed to traffic by effective barricades with acceptable lighted warning signs.
5. Locate barricades at the nearest intersecting public thoroughfare on each side of the blocked section.

D. Trees and Plantings:

1. Protect from damage and preserve trees, shrubs, and other plants outside limits of the Work and within limits of the Work which are designated on the Drawings to remain undisturbed.
   a. Where practical, tunnel beneath trees when on or near the line of trench.
   b. Employ hand excavation as necessary to prevent tree injury.
   c. Do not stockpile materials or permit traffic within drip lines of trees.
   d. Provide and maintain temporary barricades around trees.
   e. Water vegetation as necessary to maintain health.
   f. Cover temporarily exposed roots with wet burlap, and keep the burlap moist until soil is replaced around the roots.
   g. No trees, except those specifically shown on Drawings to be removed, shall be removed without written approval of Engineer.
   h. Dispose of removed trees in a legal manner off the Site.
2. Balling and burlapping of trees indicated for replacement shall conform to the recommended specifications set forth in the American Standards for Nursery Stock, published by American Association of Nurserymen. All balls shall be firm and intact and made-balls will not be accepted. Handle ball and burlap trees by the ball and not by the top.

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3. In event of damage to bark, trunks, limbs, or roots of plants that are not designated for removal, treat damage by corrective pruning, bark tracing, application of a heavy coating of tree paint, and other accepted horticultural and tree surgery practices.
4. Replace each plant that dies as a result of construction activities.
5. Tree and scrub removal and/or trimming must be performed by a City-approved ISA Certified Arborist.

E. Existing Structures: Where Contractor contemplates removal of small structures such as mailboxes, signposts, and culverts that interfere with Contractor's operations, obtain approval of property owner and Engineer. Replace those removed in a condition equal to or better than original.

F. Waterways: Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.

3.07 TEMPORARY CONTROLS

A. Air Pollution Control:

1. Minimize air pollution from construction operations.
2. Burning of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in the construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.
4. Provide and maintain temporary dust-tight partitions, bulkheads, or other protective devices during construction to permit normal operation of existing facilities. Construct partitions of plywood, insulating board, plastic sheets, or similar material. Construct partitions in such a manner that dust and dirt from demolition and cutting will not enter other parts of existing building or facilities. Remove temporary partitions as soon as the need no longer exists.

B. Noise Control:

1. Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels.
2. Noise Control Ordinance: City of Key West.
3. Noise Control Plans: Proposed plan to mitigate construction noise impacts and to comply with noise control ordinances including method of construction, equipment to be used, and acoustical treatments.

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C. Water Pollution Control:

1. Divert sanitary sewage and non-storm waste flow interfering with construction and requiring diversion to sanitary sewers. Do not cause or permit action to occur which would cause an overflow to an existing waterway.
2. Prior to commencing excavation and construction, obtain Owner's agreement with detailed plans showing procedures intended to handle and dispose of sewage, groundwater, and stormwater flow, including dewatering pump discharges.
3. Comply with procedures outlined in U.S. Environmental Protection Agency manuals entitled, "Guidelines for Erosion and Sedimentation Control Planning" and "Implementation, Processes, Procedures, and Methods to Control Pollution Resulting from All Construction Activity," and "Erosion and Sediment Control-Surface Mining in Eastern United States."
4. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

D. Erosion, Sediment, and Flood Control: Provide, maintain, and operate temporary facilities to control erosion and sediment releases, and to protect Work and existing facilities from flooding during construction period.

3.08 ROADS

A. Maintain access to all roads. Do not block any roadways during construction. If road blockage is anticipated, Contractor shall receive approval from City prior to starting construction.

B. Maintain drainage ways. Install and maintain culverts to allow water to flow. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.

C. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.

D. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.

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3.09 PARKING AREAS

A. Parking cars on individual work sites shall be kept to a minimum. A parking plan shall be required for the Site.

B. Control Vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations. No parking along roadways shall be allowed.

3.10 CLEANING DURING CONSTRUCTION

A. In accordance with General Conditions, as may be specified in Specification sections, and as required herein.

B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep all floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up all debris and dispose.

C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.

D. At least weekly, brush sweep the entry drive and roadways, and all other streets and walkways affected by Work and where adjacent to Work.

END OF SECTION

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SECTION 01 61 00
COMMON PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 DEFINITIONS

A. Products:

1. New items for incorporation in the Work, whether purchased by Contractor or Owner for the Project, or taken from previously purchased stock, and may also include existing materials or components required for reuse. Metal fabrications intended or subject to immersion shall comply with NACE SPO-178-2007.
2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.
3. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.02 ENVIRONMENTAL REQUIREMENTS

A. Altitude: Provide materials and equipment suitable for installation and operation under rated conditions at 10 feet above sea level.

B. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of 20 degrees F to 105 degrees F and a salt water humidity of 100 percent.

1.03 PREPARATION FOR SHIPMENT

A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.

B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.

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C. Extra Materials, Special Tools, Test Equipment, and Expendables:

1. Furnish as required by individual specifications.
2. Schedule:
   a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.
   b. Transfer to Owner shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.
3. Packaging and Shipment:
   a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.
   b. Prominently displayed on each package, the following:
      1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
      2) Applicable equipment description.
      3) Quantity of parts in package.
      4) Equipment manufacturer.
4. Deliver materials to Site.
5. Notify Construction Manager upon arrival for transfer of materials.
6. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to Owner.

D. Request a minimum 7-day advance notice of shipment from manufacturer.

E. Factory Test Results: Reviewed and accepted by Engineer before product shipment as required in individual specification sections.

1.04 DELIVERY AND INSPECTION

A. Deliver products in accordance with accepted current Progress Schedule and coordinate to avoid conflict with the Work and conditions at Site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.

B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable.

C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at Site. Promptly inspect for completeness and evidence of damage during shipment.

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D. Remove damaged products from Site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.05 HANDLING, STORAGE, AND PROTECTION

A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01 50 00, Temporary Facilities and Controls. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.

B. Manufacturer's instructions for material requiring special handling, storage, or protection shall be provided prior to delivery of material.

C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.

D. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulate against moisture, water, and dust damage. Connect and operate continuously space heaters furnished in electrical equipment.

E. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

F. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.

G. After installation, provide coverings to protect products from damage due to traffic and construction operations. Remove coverings when no longer needed.

H. Hazardous Materials: Prevent contamination of personnel, storage area, and Site. Meet requirements of product specification, codes, and manufacturer's instructions.

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I. All improperly stored, handled, maintained or monitored material or equipment shall be replaced by the Contractor at no additional cost to the Owner if so directed by the Engineer.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual specifications.

B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.

C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.

D. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.

E. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.

F. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated 1/2-inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.

G. Authority Having Jurisdiction (AHJ):

1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.

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2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

H. Equipment Finish:

1. Provide manufacturer's standard finish and color, except where specific color or finish is indicated.
2. If manufacturer has no standard color, provide equipment with gray finish as approved by Owner.

I. Special Tools and Accessories: Furnish to Owner, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.

J. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by Owner.

2.02 FABRICATION AND MANUFACTURE

A. General:

1. Manufacture parts to U.S.A. standard sizes and gauges.
2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
3. Design structural members for anticipated shock and vibratory loads.
4. Use 1/4-inch minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
5. Modify standard products as necessary to meet performance Specifications.

B. Lubrication System:

1. Require no more than weekly attention during continuous operation.
2. Convenient and accessible; oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.
3. Provide constant-level oilers or oil level indicators for oil lubrication systems.

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4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

2.03 SOURCE QUALITY CONTROL

A. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).

B. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

PART 3 EXECUTION

3.01 INSPECTION

A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

3.02 INSTALLATION

A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

B. No shimming between machined surfaces is allowed.

C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.

D. Repaint painted surfaces that are damaged prior to equipment acceptance.

E. Do not cut or notch any structural member or building surface without specific approval of Engineer.

F. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at Site, available for review at all times.

3.03 FIELD FINISHING

A. In accordance with Section 09 90 00, Painting and Coating, and individual Specification sections.

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3.04 ADJUSTMENT AND CLEANING

A. Perform required adjustments, tests, operation checks, and other startup activities.

3.05 LUBRICANTS

A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by Owner.

END OF SECTION

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SECTION 01 77 00
CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SUBMITTALS

A. Quality Control Submittals: Written procedures for maintaining and markup of record documents.

B. Contract Closeout Submittals: Submit prior to application for final payment.

1. Record Documents: As required in the General Conditions.
2. Approved Shop Drawings and Samples: As required in the General Conditions.
3. Special Bonds, Special Warranties, and Service Agreements.
4. Consent of Surety to Final Payment: As required in the General Conditions.
5. Releases or Waivers of Liens and Claims: As required in the General Conditions.
6. Releases from Agreements.
7. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01 29 00, Payment Procedures.
8. Spare Parts and Special Tools: As required by individual Specification sections.

1.02 RECORD DOCUMENTS

A. Quality Assurance:

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
2. Accuracy of Records:
   a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
   b. Purpose of Project record documents is to document factual information regarding aspects of Work, both concealed and visible, to enable future modification of Work to proceed without lengthy and expensive site measurement, investigation, and examination.
3. Make entries within 24 hours after receipt of information that a change in Work has occurred.

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4. Prior to submitting each request for progress payment, request Engineer's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by Engineer to recommend the whole or any part of the Contractor's Application for Payment, either partial or final.
5. Contractor to have a licensed surveyor provide signed and sealed drawing that include the following as an attachment to the Project Record Drawings.
    a. All pipe inverts elevations, bottom of structures elevation, top of structural elevations, pipe grade, LF of new pipe installed;
    b. All rim elevations. All grate elevations.
    c. Locations of Catch basins, Well structures, and Manholes.
    d. Ramps Top and Bottom.
    e. Limits of construction.
    f. Replace existing property pins removed for construction.
    g. Submit record drawings (four) signed and sealed. Provide to the city three DISCS with electronic copies in AUTOCAD and PDF.

1.03 RELEASES FROM AGREEMENTS

A. Furnish Owner written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within the Owner's construction right-of-way.

B. In the event Contractor is unable to secure written releases, inform the Owner of the reasons:

1. Owner or its representatives will examine the site, and Owner will direct Contractor to complete Work that may be necessary to satisfy terms of the easement.
2. Should Contractor refuse to perform this Work, Owner reserves the right to have it done by separate contract and deduct the cost of same from the Contract Price, or require the Contractor to furnish a satisfactory Bond in a sum to cover legal claims for damages.
3. When Owner is satisfied that Work has been completed in agreement with the Contract Documents and terms of easements, the right is reserved to waive the requirement for written release if: (i) Contractor's failure to obtain such statement is due to the grantor's refusal to sign, and this refusal is not based upon any legitimate claims that Contractor has failed to fulfill the terms of the easement, or (ii) Contractor is unable to contact or has had undue hardship in contacting the grantor.

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PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. General:

1. Promptly following commencement of Contract Times, secure from Engineer at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.
2. Delete Engineer title block and seal from all documents.
3. Label or stamp each record document with title, “RECORD DOCUMENTS,” in neat large printed letters.
4. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by Engineer.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
   a. Color Coding:
      1) Green when showing information deleted from Drawings.
      2) Red when showing information added to Drawings.
      3) Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by “cloud” drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including, but not limited to:
   a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
   b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.

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c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and Engineer's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.

5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
   a. Clearly identify the item by accurate note such as "cast iron drain," "galv. water," and the like.
   b. Show, by symbol or note, vertical location of item ("under slab," "in ceiling plenum," "exposed," and the like).
   c. Make identification so descriptive that it may be related reliably to Specifications.

3.02 FINAL CLEANING

A. At completion of Work at each Site or of a part thereof and immediately prior to Contractor's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor's notice of completion, clean entire site or parts thereof, as applicable.

1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner and Engineer.
2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
3. Repair, patch, and touchup marred surfaces to specified finish and match adjacent surfaces.
4. Broom clean exterior paved driveways and parking areas.
5. Hose clean sidewalks, loading areas, and others contiguous with principal structures.
6. Rake clean all other surfaces.
7. Leave water courses, gutters, and ditches open and clean.

B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

END OF SECTION

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SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Detailed information for the preparation, submission, and Engineer's review of Operations and Maintenance (O&M) Data, as required by individual Specification sections.

1.02 DEFINITIONS

A. Preliminary Data: Initial and subsequent submissions for Engineer's review.

B. Final Data: Engineer-accepted data, submitted as specified herein.

C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

1.03 SEQUENCING AND SCHEDULING

A. Equipment and System Data:

1. Preliminary Data:
   a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by Engineer.
   b. Submit prior to shipment date.
2. Final Data: Submit Instructional Manual Formatted data not less than 30 days prior to equipment or system field functional testing.

B. Materials and Finishes Data:

1. Preliminary Data: Submit at least 15 days prior to request for final inspection.
2. Final Data: Submit within 10 days after final inspection.

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1.04 DATA FORMAT

A. Prepare preliminary and final data in the form of an instructional manual.

B. Instructional Manual Format:

1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
2. Size: 8-1/2 inches by 11 inches, minimum.
3. Cover: Identify manual with typed or printed title “OPERATION AND MAINTENANCE DATA” and list:
   a. Project title.
   b. Designate applicable system, equipment, material, or finish.
   c. Identity of separate structure as applicable.
   d. Identify volume number if more than one volume.
   e. Identity of general subject matter covered in manual.
4. Spine:
   a. Project title.
   b. Identify volume number if more than one volume.
5. Title Page:
   a. Contractor name, address, and telephone number.
   b. Subcontractor, Supplier, installer, or maintenance contractor’s name, address, and telephone number, as appropriate.
      1) Identify area of responsibility of each.
      2) Provide name and telephone number of local source of supply for parts and replacement.
6. Table of Contents:
   a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
   b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
7. Paper: 20-pound minimum, white for typed pages.
8. Text: Manufacturer’s printed data, or neatly typewritten.
9. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
10. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.

C. Data Compilation Format:

1. Compile all Engineer-accepted preliminary O&M data into a hard-copy, hard-bound set.
2. Each set shall consist of the following:
   a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.

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b. Cover: Identify each volume with typed or printed title "OPERATION AND MAINTENANCE DATA, VOLUME NO. ___ OF ___", and list:
   1) Project title.
   2) Contractor's name, address, and telephone number.
   3) If entire volume covers equipment or system provided by one Supplier include the following:
      a) Identity of general subject matter covered in manual.
      b) Identity of equipment number and Specification section.
c. Provide each volume with title page and typed table of contents with consecutive page numbers. Place contents of entire set, identified by volume number, in each binder.
d. Table of contents neatly typewritten, arranged in a systematic order:
   1) Include list of each product, indexed to content of each volume.
   2) Designate system or equipment for which it is intended.
   3) Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
e. Section Dividers:
   1) Heavy, 80 pound cover weight, tabbed with numbered plastic index tabs.
   2) Fly-Leaf:
      a) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.
      b) List with Each Product:
         (1) Name, address, and telephone number of Subcontractor, Supplier, installer, and maintenance contractor, as appropriate.
         (2) Identify area of responsibility of each.
         (3) Provide local source of supply for parts and replacement.
      c) Identity of separate structure as applicable.
f. Assemble and bind material, as much as possible, in same order as specified in the Contract Documents.

1.05 SUBMITTALS

A. Informational:

1. Data Outline: Submit two copies of a detailed outline of proposed organization and contents of Final Data prior to preparation of Preliminary Data.

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2. Preliminary Data:
   a. Submit two copies for Engineer's review.
   b. If data meets conditions of the Contract:
      1) One copy will be returned to Contractor.
      2) One copy will be forwarded to Resident Project Representative.
   c. If data does not meet conditions of the Contract:
      1) All copies will be returned to Contractor with Engineer's comments (on separate document) for revision.
      2) Engineer's comments will be retained in Engineer's file.
      3) Resubmit two copies revised in accordance with Engineer's comments.
3. Final Data: Submit two copies in format specified herein and one electronic copy in PDF.

1.06 DATA FOR EQUIPMENT AND SYSTEMS

A. Content for Each Unit (or Common Units) and System:

1. Product Data:
   a. Include only those sheets that are pertinent to specific product.
   b. Clearly annotate each sheet to:
      1) Identify specific product or part installed.
      2) Identify data applicable to installation.
      3) Delete references to inapplicable information.
   c. Function, normal operating characteristics, and limiting conditions.
   d. Performance curves, engineering data, nameplate data, and tests.
   e. Complete nomenclature and commercial number of replaceable parts.
   f. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
   g. Spare parts ordering instructions.
   h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).
2. As-installed, color-coded piping diagrams.
3. Charts of valve tag numbers, with the location and function of each valve.
4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
   a. Format:
      1) Provide reinforced, punched, binder tab; bind in with text.
      2) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.

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3) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.
4) Identify Specification section and product on Drawings and envelopes.

b. Relations of component parts of equipment and systems.
c. Control and flow diagrams.
d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.

5. Instructions and Procedures: Within text, as required to supplement product data.
   a. Format:
      1) Organize in consistent format under separate heading for each different procedure.
      2) Provide logical sequence of instructions for each procedure.
      3) Provide information sheet for Owner's personnel, including:
         a) Proper procedures in event of failure.
         b) Instances that might affect validity of guarantee or Bond.
   b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
   c. Operating Procedures:
      1) Startup, break-in, routine, and normal operating instructions.
      2) Test procedures and results of factory tests where required.
      3) Regulation, control, stopping, and emergency instructions.
      4) Description of operation sequence by control manufacturer.
      5) Shutdown instructions for both short and extended duration.
      6) Summer and winter operating instructions, as applicable.
      7) Safety precautions.
      8) Special operating instructions.
   d. Maintenance and Overhaul Procedures:
      1) Routine maintenance.
      2) Guide to troubleshooting.
      3) Disassembly, removal, repair, reinstallation, and re-assembly.
6. Guarantee, Bond, and Service Agreement: In accordance with Section 01 77 00, Closeout Procedures.

B. Content for Each Electric or Electronic Item or System:

1. Description of Unit and Component Parts:
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data, nameplate data, and tests.
   c. Complete nomenclature and commercial number of replaceable parts.
   d. Interconnection wiring diagrams, including control and lighting systems.
2. Circuit Directories of Panelboards.

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3. Electrical service.
4. Control requirements and interfaces.
5. Communication requirements and interfaces.
6. List of electrical relay settings, and control and alarm contact settings.
7. Electrical interconnection wiring diagram, including as applicable, single-line, three-line, schematic and internal wiring, and external interconnection wiring.
8. As-installed control diagrams by control manufacturer.
9. Operating Procedures:
   a. Routine and normal operating instructions.
   b. Startup and shutdown sequences, normal and emergency.
   c. Safety precautions.
   d. Special operating instructions.
10. Maintenance Procedures:
    a. Routine maintenance.
    b. Guide to troubleshooting.
    c. Adjustment and checking.
    d. List of relay settings, control and alarm contact settings.
11. Manufacturer's printed operating and maintenance instructions.
12. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

C. Maintenance Summary:

1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.
2. Format:
   a. Use Maintenance Summary Form bound with this section or electronic facsimile of such.
   b. Each Maintenance Summary may take as many pages as required.
   c. Use only 8-1/2-inch by 11-inch size paper.
   d. Complete using typewriter or electronic printing.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
   a. Data to be consistent with manufacturer's Bill of Materials/Parts List furnished in O&M manuals.
   b. "Unit" is the unit of measure for ordering the part.
   c. "Quantity" is the number of units recommended.
   d. "Unit Cost" is the current purchase price.

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1.07 DATA FOR MATERIALS AND FINISHES

A. Content for Architectural Products, Applied Materials, and Finishes:

1. Manufacturer's data, giving full information on products:
   a. Catalog number, size, and composition.
   b. Color and texture designations.
   c. Information required for reordering special-manufactured products.
2. Instructions for Care and Maintenance:
   a. Manufacturer's recommendation for types of cleaning agents and methods.
   b. Cautions against cleaning agents and methods that are detrimental to product.
   c. Recommended schedule for cleaning and maintenance.

B. Content for Moisture Protection and Weather Exposed Products:

1. Manufacturer's data, giving full information on products:
   a. Applicable standards.
   b. Chemical composition.
   c. Details of installation.
2. Instructions for inspection, maintenance, and repair.

1.08 SUPPLEMENTS

A. The supplement listed below, following "End of Section," is part of this Specification.

1. Form: Maintenance Summary Form.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER'S LOCAL REPRESENTATIVE _____

   a. Name_____ Telephone No. _____

   b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	**Frequency**	**Lubricant (If Applicable)**
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

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8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER'S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

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SECTION 01 91 14
EQUIPMENT TESTING AND FACILITY STARTUP

PART 1 GENERAL

1.01 DEFINITIONS

A. Facility: Entire Project, or an agreed-upon portion, including all of its unit processes.

B. Functional Test: Test or tests in presence of Engineer and Owner to demonstrate that installed equipment meets manufacturer's installation, calibration, and adjustment requirements and other requirements as specified.

C. Performance Test: Test or tests performed after any required functional test in presence of Engineer and Owner to demonstrate and confirm individual equipment meets performance requirements specified in individual sections.

D. Unit Process: As used in this section, a unit process is a portion of the facility that performs a specific process function, such as pump station and generator.

E. Facility Performance Demonstration:

1. A demonstration, conducted by Contractor, with assistance of Owner, to demonstrate and document the performance of the entire operating facility, both manually and automatically (if required), based on criteria developed in conjunction with Owner and as accepted by Engineer.
2. Such demonstration is for the purposes of (i) verifying to Owner entire facility performs as a whole, and (ii) documenting performance characteristics of completed facility for Owner's records. Neither the demonstration nor the evaluation is intended in any way to make performance of a unit process or entire facility the responsibility of Contractor, unless such performance is otherwise specified.

1.02 SUBMITTALS

A. Action Submittals:

1. Facility Startup and Performance Demonstration Plan.
2. Functional and performance test results. Detailed Functional Test Plan.
3. Completed Unit Process Startup Form for each unit process. Detailed Unit Process Startup Plan.
4. Completed Facility Performance Demonstration/Certification Form.

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1.03 FACILITY STARTUP AND PERFORMANCE DEMONSTRATION PLAN

A. Develop a written plan, in conjunction with Owner's operations personnel; to include the following:

1. Step-by-step instructions for startup of each unit process and the complete facility.
2. Unit Process Startup Form (sample attached), to minimally include the following:
   a. Description of the unit process, including equipment numbers/nomenclature of each item of equipment and all included devices.
   b. Detailed procedure for startup of the unit process, including valves to be opened/closed, order of equipment startup, etc.
   c. Startup requirements for each unit process, including water, power, chemicals, etc.
   d. Space for evaluation comments.
3. Facility Performance Demonstration/Certification Form (sample attached), to minimally include the following:
   a. Description of unit processes included in the facility startup.
   b. Sequence of unit process startup to achieve facility startup.
   c. Description of computerized operations, if any, included in the facility.
   d. Contractor certification facility is capable of performing its intended function(s), including fully automatic operation.
   e. Signature spaces for Contractor and Engineer.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Facility Startup Meetings: Schedule, in accordance with requirements of Section 01 31 19, Project Meetings, to discuss test schedule, test methods, materials, chemicals and liquids required, facilities operations interface, and Owner involvement.

B. Contractor's Testing and Startup Representative:

1. Designate and furnish one or more personnel to coordinate and expedite testing and facility startup.
2. Representative(s) shall be present during startup meetings and shall be solely dedicated to the startup process, and available at all times during testing and startup.

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C. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required for testing and startup. Contractor shall supply fuel for the generator for startup and testing. Contractor shall supply a full tank of diesel fuel for the generator when turned over to the Owner.

D. Provide Subcontractor and equipment manufacturers' staff adequate to prevent delays. Schedule ongoing work so as not to interfere with or delay testing and startup.

E. Owner will:

1. Provide water, power, chemicals, and other items as required for startup, unless otherwise indicated.
2. Operate process units and facility with support of Contractor.
3. Provide labor and materials as required for laboratory analyses.

3.02 EQUIPMENT TESTING

A. Preparation:

1. Complete and obtain Engineer's approval of all installation before testing.
2. Furnish qualified manufacturers' representatives, when required by individual Specification sections.
3. Obtain and submit from equipment manufacturer's representative Manufacturer's Certificate of Proper Installation Form, in accordance with Section 01 43 33, Manufacturers' Field Services, when required by individual Specification sections.
4. Equipment Test Report Form: Provide written test report for each item of equipment to be tested, to include the minimum information:
   a. Owner/Project Name.
   b. Equipment or item tested.
   c. Date and time of test.
   d. Type of test performed (Functional or Performance).
   e. Test method.
   f. Test conditions.
   g. Test results.
   h. Signature spaces for Contractor and Engineer as witness.
5. Cleaning and Checking: Prior to beginning functional testing:
   a. Calibrate testing equipment in accordance with manufacturer's instructions.
   b. Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
   c. Lubricate equipment in accordance with manufacturer's instructions.

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d. Turn rotating equipment by hand when possible to confirm that equipment is not bound.
e. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
f. Check power supply to electric-powered equipment for correct voltage.
g. Adjust clearances and torque.
h. Test piping and valves for leaks.

6. Ready-to-test determination will be by Engineer based at least on the following:
   a. Acceptable Operation and Maintenance Data.
   b. Notification by Contractor of equipment readiness for testing.
   c. Receipt of Manufacturer's Certificate of Proper Installation, if so specified.
   d. Adequate completion of work adjacent to, or interfacing with, equipment to be tested.
   e. Availability and acceptability of manufacturer's representative, when specified, to assist in testing of respective equipment.
   f. Satisfactory fulfillment of other specified manufacturer's responsibilities.
   g. Equipment and electrical tagging complete.
   h. Delivery of all spare parts and special tools.

B. Functional Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Owner and Engineer in writing at least 10 days prior to scheduled date of testing.
3. Prepare Equipment Test Report summarizing test method and results.
4. When, in Engineer's opinion, equipment meets functional requirements specified, such equipment will be accepted for purposes of advancing to performance testing phase, if so required by individual Specification sections. Such acceptance will be evidenced by Engineer/Owner's signature as witness on Equipment Test Report.

C. Performance Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Engineer and Owner in writing at least 10 days prior to scheduled date of test.
3. Performance testing shall not commence until equipment has been accepted by Engineer as having satisfied functional test requirements specified.
4. Type of fluid, gas, or solid for testing shall be as specified.
5. Unless otherwise indicated, furnish labor, materials, and supplies for conducting the test and taking samples and performance measurements.

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6. Prepare Equipment Test Report summarizing test method and results.
7. When, in Engineer's opinion, equipment meets performance requirements specified, such equipment will be accepted as to conforming to Contract requirements. Such acceptance will be evidenced by Engineer's signature on Equipment Test Report.

3.03 STARTUP OF UNIT PROCESSES

A. Prior to unit process startup, equipment within unit process shall be accepted by Engineer as having met functional and performance testing requirements specified.

B. Startup sequencing of unit processes shall be as chosen by Contractor and approved by Engineer to meet schedule requirements.

C. Make adjustments, repairs, and corrections necessary to complete unit process startup.

D. Startup shall be considered complete when, in opinion of Engineer, unit process has operated in manner intended for 5 continuous days without significant interruption. This period is in addition to functional or performance test periods specified elsewhere.

E. Significant Interruption: May include any of the following events:

1. Failure of Contractor to provide and maintain qualified onsite startup personnel as scheduled.
2. Failure to meet specified functional operation for more than 2 consecutive hours.
3. Failure of any critical equipment or unit process that is not satisfactorily corrected within 5 hours after failure.
4. Failure of any noncritical equipment or unit process that is not satisfactorily corrected within 8 hours after failure.
5. As determined by Engineer.

F. A significant interruption will require startup then in progress to be stopped. After corrections are made, startup test period to start from beginning again.

3.04 FACILITY PERFORMANCE DEMONSTRATION

A. When, in the opinion of Engineer, startup of all unit processes has been achieved, sequence each unit process to the point that facility is operational.

B. Demonstrate proper operation of required interfaces within and between individual unit processes.

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C. After facility is operating, complete performance testing of equipment and systems not previously tested.

D. Document, as defined in Facility Startup and Performance Demonstration Plan, the performance of the facility.

E. Certify, on the Facility Performance Demonstration/Certification Form, that facility is capable of performing its intended function(s), including fully automatic operation.

3.05 SUPPLEMENTS

A. Supplements listed below, following “End of Section,” are a part of this Specification:

1. Unit Process Startup Form.
2. Facility Performance Demonstration/Certification Form.

END OF SECTION

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UNIT PROCESS STARTUP FORM

OWNER:_____ **PROJECT:**_____

Unit Process Description: (Include description and equipment number of all equipment and devices):

_____

_____

_____

_____

Startup Procedure (Describe procedure for sequential startup and evaluation, including valves to be opened/closed, order of equipment startup, etc.):

_____

_____

_____

_____

_____

Startup Requirements (Water, power, chemicals, etc.):_____

_____

_____

Evaluation Comments:_____

_____

_____

_____

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FACILITY PERFORMANCE DEMONSTRATION/CERTIFICATION FORM

OWNER:_____ **PROJECT:**_____

Unit Processes Description (List unit processes involved in facility startup):

_____

_____

_____

_____

Unit Processes Startup Sequence (Describe sequence for startup, including computerized operations, if any):

_____

_____

_____

_____

_____

Contractor Certification that Facility is capable of performing its intended function(s), including fully automatic operation:

Contractor: _____ **Date:** _____**, 20**____

Engineer: _____ **Date:** _____**, 20**____
(Authorized Signature)

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SECTION 02 41 00
DEMOLITION

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American National Standards Institute (ANSI): A10.6, Safety Requirements for Demolition Operations.
2. Occupational Safety and Health Administration (OSHA), U.S. Code of Federal Regulations (CFR) Title 29 Part 1926—Occupational Safety and Health Regulations for Construction.
3. Environmental Protection Agency (EPA), U.S. Code of Federal Regulations (CFR), Title 40:
   a. Part 61—National Emission Standards for Hazardous Air Pollutants.
   b. Part 82—Protection of Stratospheric Ozone.
   c. Part 273—Standards for Universal Waste Management.

1.02 DEFINITIONS

A. Demolition: Dismantling, razing, destroying, or wrecking of any fixed building or structure or any part thereof.

B. Modify: Provide all necessary material and labor to modify an existing item to the condition indicated or specified.

C. Relocate: Remove, protect, clean and reinstall equipment, including electrical, instrumentation, and all ancillary components required to make the equipment fully functional, to the new location identified on the Drawings.

D. Renovation: Altering a facility or one or more facility components in any way.

E. Salvage/Salvageable: Remove and deliver, to the specified location(s), the equipment, building materials, or other items so identified to be saved from destruction, damage, or waste; such property to remain that of Owner. Unless otherwise specified, title to items identified for demolition shall revert to Contractor.

1.03 REGULATORY AND SAFETY REQUIREMENTS

A. When applicable, demolition Work shall be accomplished in strict accordance with 29 CFR 1926-Subpart T.

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B. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the General Conditions, Contractor's safety requirements shall conform to ANSI A10.6.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXISTING FACILITIES TO BE DEMOLISHED OR RENOVATED

A. Structures: The existing field access platform shall be entirely removed.

B. Utilities and Related Equipment:

1. Notify Owner or appropriate utilities to turn off affected services at least 48 hours before starting demolition activities.
2. Remove existing utilities as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by Engineer.
3. When utility lines are encountered that are not indicated on the Drawings, notify Engineer prior to further work in that area.
4. Remove meters and related equipment and deliver to a location as determined by the Owner or relocate as indicated on Drawings.

C. Paving and Slabs:

1. Sawcut asphaltic concrete paving and slabs as indicated to full depth of paving.
2. Provide neat sawcuts at limits of pavement removal as indicated.

D. Patching: Where removals leave holes and damaged surfaces exposed in the finished Work, patch and repair to match adjacent finished surfaces as to texture and finish.

E. Electrical:

1. When removing designated equipment, conduit and wiring may require rework to maintain service to other equipment.
2. Rework existing circuits, or provide temporary circuits as necessary during renovation to maintain service to existing lighting and equipment not scheduled to be renovated. Existing equipment and circuiting shown are based upon limited field surveys. Verify existing conditions, make all necessary adjustments, and record the Work on the Record Drawings. This shall include, but is not limited to, swapping and other adjustments to branch circuits and relocation of branch circuit breakers within panelboards as required to accomplish the finished work.

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3. Reuse of existing luminaires, devices, conduits, boxes, or equipment will be permitted only where specifically indicated.
4. Relocating Equipment: Run new wiring raceways, and boxes as indicated on the Drawings.

3.02 PROTECTION

A. Dust and Debris Control: Sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to vehicular traffic.

B. Traffic Control Signs: Where pedestrian and driver safety is endangered in the area of removal Work, use traffic barricades with flashing lights.

C. Existing Work:

1. Survey the site and examine the Drawings and Specifications to determine the extent of the Work before beginning any demolition.
2. Take necessary precautions to avoid damage to existing items scheduled to remain in place, to be reused, or to remain the property of Owner; any Contractor-damaged items shall be repaired or replaced as directed by Engineer.
3. Do not overload pavements to remain.

D. Protection of Personnel:

1. During demolition, continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site.
2. Provide temporary barricades and other forms of protection to protect Owner’s personnel and the general public from injury due to demolition Work.

3.03 BURNING

A. The use of burning at the Site for the disposal of refuse and debris will not be permitted.

3.04 RELOCATIONS

A. Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Clean all items to be relocated prior to reinstallation, to the satisfaction of Engineer. Repair items to be relocated which are damaged or replace damaged items with new undamaged items as approved by Engineer.

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3.05 BACKFILL

A. Do not use demolition debris as backfill material.

3.06 REUSE OF MATERIALS AND EQUIPMENT

A. Remove and store materials and equipment shown on the Drawings or listed in the Specifications to be reused or relocated to prevent damage, and reinstall as the Work progresses.

B. Properly store and maintain equipment and materials in same condition as when removed.

C. Store equipment and material designated to be reused in a location designated by Owner.

D. Equipment and material designated to be reused shall be cleaned, serviced and checked for proper operability before being put back into service.

E. Engineer will determine condition of equipment and materials prior to removal.

3.07 UNSALVAGEABLE MATERIAL

A. Concrete, masonry, and other noncombustible material, except concrete permitted to remain in place, shall be disposed of in an offsite approved facility.

B. Combustible material shall be disposed of off the Site.

3.08 CLEANUP

A. Debris and rubbish shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

END OF SECTION

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SECTION 03 30 10
STRUCTURAL CONCRETE

PART 1 GENERAL

1.01 GENERAL

A. All concrete work shall be in accordance with ACI 301 and as specified in this section.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Concrete Institute (ACI):
   a. 117, Specifications for Tolerances for Concrete Construction and Materials.
   b. 301-10, Specifications for Structural Concrete.
   c. 305.1, Specification for Hot Weather Concreting.
   d. 306.1, Specification for Cold Weather Concreting.
   e. SP-66, Detailing Manual.
2. ASTM International (ASTM):
   a. A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
   b. A615/A615M, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
   c. C31/C31M, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   d. C33/C33M, Standard Specification for Concrete Aggregates.
   e. C39/C39M, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   f. C94/C94M, Standard Specification for Ready-Mixed Concrete.
   g. C143/C143M, Standard Test Method for Slump of Hydraulic-Cement Concrete.
   h. C150/C150M, Standard Specification for Portland Cement.
   i. C227, Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method).
   j. C231/C231M, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
   k. C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete.
   l. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
   m. C494/C494M, Standard Specification for Chemical Admixtures for Concrete.

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n. C595/C595M, Standard Specification for Blended Hydraulic Cements.
o. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
p. C881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
q. C920, Specification for Elastomeric Joint Sealants.
r. C989, Standard Specification for Slag Cement for Use in Concrete and Mortars.
s. C1012/C1012M, Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution.
t. C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
u. C1077, Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.
v. C1218/C1218M, Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
w. C1260, Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method).
x. C1293, Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction.
y. C 1315, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
z. C1567, Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method).
aa. C1602/C1602M, Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
bb. D226, Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
cc. D227, Specification for Coal-Tar Saturated Organic Felt Used in Roofing and Waterproofing.
dd. D994, Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
ee. D1056, Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.
ff. D1751, Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
gg. D1752, Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

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hh. D2240, Standard Test Method for Rubber Property – Durometer Hardness.
ii. E329, Standard Specification for Agencies Engaged in Construction Inspection, Special Inspection, or Testing Materials Used in Construction.

3. Concrete Reinforcing Steel Institute (CRSI):
   a. Manual of Standard Practice.
   b. Recommended Practice for Placing Reinforcing Bars.
4. National Ready Mixed Concrete Association (NRMCA).

1.03 DEFINITIONS

A. Cold Weather: When ambient temperature is below 40 degrees F or is approaching 40 degrees F and falling.

B. Contractor's Licensed Design Engineer: Individual representing Contractor who is licensed to practice engineering as defined by statutory requirements of professional licensing laws in state or jurisdiction in which Project is to be constructed.

C. Defective Area: Surface defects that include honeycomb, rock pockets, indentations, and surface voids greater than 3/16-inch deep, surface voids greater than 3/4 inch in diameter, cracks in liquid containment structures and below grade habitable spaces that are 0.005-inch wide and wider, and cracks in other structures that are 0.010-inch wide and wider, spalls, chips, embedded debris, sand streaks, mortar leakage from form joints, deviations in formed surface that exceed specified tolerances and include but are not limited to fins, form pop-outs, and other projections.

D. Exposed Concrete: Concrete surface that can be seen inside or outside of structure regardless of whether concrete is above water, dry at all times, or can be seen when structure is drained.

E. Hot Weather: As defined in ACI 305.1.

F. New Concrete: Concrete less than 60 days old.

G. Top Bars: Horizontal bars placed such that 12 inches of fresh concrete is cast below in single placement.

1.04 DESIGN REQUIREMENTS

A. Design formwork in accordance with requirements of ACI 301 to provide specified concrete finishes.

B. Joints in forms shall not leak concrete mortar.

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C. Limit panel deflection to 1/240th of each component span to achieve tolerances specified.

1.05 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Formwork and Formwork Accessories: Unless otherwise specified, conform to requirements of ACI 301.
   b. Reinforcing steel prepared in accordance with CRSI Manual of Standard Practice and ACI SP-66 Detailing Manual.
   c. Bending lists.
   d. Placing drawings.
   e. Construction Joints, Expansion Joints and Control Joints: Layout and location for each type.
2. Mix Design:
   a. Contain proportions of materials and admixtures to be used on Project, signed by mix designer.
   b. Documentation of average strength for each proposed mix design in accordance with ACI 301.
   c. Manufacturer's Certificate of Compliance, in accordance with Section 01 43 33, Manufacturers' Field Services, for the following:
      1) Portland cement.
      2) Fly ash.
      3) Slag cement.
      4) Aggregates, including specified class designation for coarse aggregate.
      5) Admixtures.
      6) Concrete producer has verified compatibility of constituent materials in design mix.
   d. Test Reports:
      1) Cement: Chemical analysis report.
      2) Supplementary Cementitious Materials: Chemical analysis report and report of other specified test analyses.
      3) Water-Soluble Chloride-Ion Content in Hardened Concrete: Unless otherwise permitted, in accordance with ASTM C1218/C1218M at an age between 28 days and 42 days.
   e. Aggregates:
      1) Coarse Aggregate Gradation: List gradings and percent passing through each sieve.
      2) Fine Aggregate Gradation: List gradings and percent passing through each sieve.
      3) Percent of fine aggregate weight to total aggregate weight.

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4) Deleterious substances in fine aggregate per ASTM C33/C33M, Table 1.
5) Deleterious substances in coarse aggregate per ASTM C33/C33M, Table 3.
6) Test Reports:
a) Alkali Aggregate Reactivity: Aggregate shall be classified as nonpotentially reactive in accordance with Article Concrete Mix Design. Include documentation of test results per applicable standards.

f. Admixtures: Manufacturer's product data sheets for each admixture used in proposed mix designs.

3. Product Data: Specified ancillary materials.
4. Detailed plan for curing and protection of concrete placed and cured in cold weather. Details shall include, but not be limited to, the following:
   a. Procedures for protecting subgrade from frost and accumulation of ice or snow on reinforcement, other metallic embeds, and forms prior to placement.
   b. Procedures for measuring and recording temperatures of reinforcement and other embedded items prior to concrete placement.
   c. Methods for temperature protection during placement.
   d. Types of covering, insulation, housing, or heating to be provided.
   e. Curing methods to be used during and following protection period.
   f. Use of strength accelerating admixtures.
   g. Methods for verification of in-place strength.
   h. Documentation of embeds that must be at a temperature above freezing prior to placement of concrete.
   i. Procedures for measuring and recording concrete temperatures.
   j. Procedures for preventing drying during dry, windy conditions.
5. Detailed plan for hot weather placements including curing and protection for concrete placed in ambient temperatures over 80 degrees F. Plan shall include, but not be limited to, the following:
   a. Procedures for measuring, and recording temperatures of reinforcement and other embedded items prior to concrete placement.
   b. Use of retarding admixture.
   c. Methods for controlling temperature of reinforcement and other embedded items and concrete materials before and during placement.
   d. Types of shading and wind protection to be provided.
   e. Curing methods, including use of evaporation retardant.
   f. Procedures for measuring and recording concrete temperatures.
   g. Procedures for preventing drying during dry, windy conditions.
6. Concrete repair techniques.

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B. Informational Submittals:

1. Preinstallation Conference minutes.
2. Manufacturer's application instructions for bonding agent and bond breaker.
3. Manufacturer's Certificate of Compliance to specified standards:
   a. Bonding agent.
   b. Bond breaker.
   c. Repair materials.
4. Statement of Qualification:
   a. Batch Plant: Certification as specified herein.
   b. Mix designer.
   c. Installer.
   d. Testing agency.
5. Concrete Delivery Tickets:
   a. For each batch of concrete before unloading at Site.
   b. In accordance with ASTM C94/C94M, including requirements 14.2.1 through 14.2.10.
   c. Indicate amount of mixing water withheld and maximum amount that may be permitted to be added at Site.

1.06 QUALITY ASSURANCE

A. Concrete construction shall conform to requirements of ACI 117 and ACI 301, except as modified herein.

B. Qualifications:

1. Batch Plant: NRMCA Program for Certification of Ready-Mixed Concrete Production Facilities or approved equivalent program.
2. Mix Designer: Person responsible for developing concrete mixture proportions certified as NRMCA Concrete Technologist Level 2 or DOT certified mix designer in jurisdiction of the Work. Requirement may be waived if individual is Contractor's Licensed Design Engineer.
3. Flatwork Finisher: Unless otherwise permitted, at least one person on finishing crew shall be certified as an ACI Flatwork Finisher, or equivalent.
4. Testing Agency: Unless otherwise permitted, an independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 for testing indicated.
   a. Where field testing is required of Contractor, personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
   b. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

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C. Preinstallation Conference:

1. Required Meeting Attendees:
   a. Contractor, including pumping, placing and finishing, and curing subcontractors.
   b. Ready-mix producer.
   c. Admixture representative.
   d. Testing and sampling personnel.
   e. Engineer or Engineer's designee.
2. Schedule and conduct prior to incorporation of respective products into Project. Notify Engineer of location and time.
3. Agenda shall include:
   a. Admixture types, dosage, performance, and redosing at Site.
   b. Mix designs, test of mixes, and Submittals.
   c. Placement methods, techniques, equipment, consolidation, and form pressures.
   d. Slump and placement time to maintain slump.
   e. Finish, curing, and water retention.
   f. Protection procedures for weather conditions.
   g. Other specified requirements requiring coordination.
4. Conference minutes as specified in Section 01 31 19, Project Meetings.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Unload, store, and handle bars in accordance with CRSI publication "Placing Reinforcing Bars."

PART 2 PRODUCTS

2.01 GENERAL

A. Products shall be in accordance with requirements of ACI 301, unless otherwise noted.

2.02 FORMWORK

A. Form Materials:

1. For exposed areas, use hard plastic finished plywood, overlaid waterproof particle board, or steel in "new and undamaged" condition, of sufficient strength and surface smoothness to produce specified finish.
2. For unexposed areas, use new shiplap or plywood.
3. Earth cuts may be used for forming footings.

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B. Beveled Edge Corner Strips: Nonabsorbent material, compatible with form surface, fully sealed on all sides prohibiting loss of paste or water between the two surfaces.

C. Form Ties:

1. Material: Steel.
2. Spreader Inserts:
   a. Conical or spherical type.
   b. Design to maintain positive contact with forming material.
   c. Furnish units that will leave no metal closer than 1.5 inches to concrete surface when forms, inserts, and tie ends are removed.
3. Wire ties not permitted.

2.03 CONCRETE

A. Materials: Unless otherwise specified, in accordance with ACI 301.

1. Cementitious Materials:
   a. Cement:
      1) Portland Cement: Unless otherwise specified, conform to requirements of ASTM C150/C150M.
      2) Blended Hydraulic Cement:
         a) Unless otherwise specified, conform to requirements of ASTM C595/C595M.
         b) Portland cement used in blended hydraulic cement; conform to requirements of ASTM C150/C150M.
      3) Furnish from one source.
   b. Supplementary Cementitious Materials (SCM):
      1) Fly Ash (Pozzolan): Class F and Class C fly ash in accordance with ASTM C618, except as modified herein:
         a) ASTM C618, Table 1, Loss on Ignition: Unless permitted otherwise, maximum 3 percent.
      2) Slag Cement: In accordance with ASTM C989, Grades 100 or 120.
2. Aggregates: Unless otherwise permitted, furnish from one source for each aggregate type used in a mix design.
   a. Normal-Weight Aggregates:
      1) In accordance with ASTM C33/C33M, except as modified herein.
         a) Class Designation: 4S unless otherwise specified.
         b) Free of materials and aggregate types causing popouts, discoloration, staining, or other defects on surface of concrete.
         c) Alkali Silica Reactivity: See Article Concrete Mix Design.

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2) Fine Aggregates:
   a) Clean, sharp, natural sand.
   b) ASTM C33/C33M.
   c) Limit deleterious substances in accordance with ASTM C33/C33M, Table 1 and as follows:
      (1) Limit material finer than 75-µm (No. 200) sieve to 3 percent mass of total sample.
      (2) Limit coal and lignite to 0.5 percent.
3) Coarse Aggregate:
   a) Natural gravels, combination of gravels and crushed gravels, crushed stone, or combination of these materials containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension).
   b) Limit deleterious substances in accordance with ASTM C33/C33M, Table 3 for specified class designation.

3. Admixtures: Unless otherwise permitted, furnish from one manufacturer.
   a. Characteristics:
      1) Compatible with other constituents in mix.
      2) Contain at most, only trace amount chlorides in solution.
      3) Furnish type of admixture as recommended by manufacturer for anticipated temperature ranges.
   b. Air-Entraining Admixture: ASTM C260/C260M.
   c. Water-Reducing Admixture: ASTM C494/C494M, Type A or Type D.
   d. Retarding Admixture: ASTM C 494/C 494M, Type B.
   e. Accelerating Admixture: ASTM C 494/C 494M, Type C.
   f. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F or Type G.
   g. Plasticizing Admixture: ASTM C1017/C1017M, Type I or Type II.
   h. Do not use calcium chloride as an admixture.
   i. Admixtures with no standard, ASTM or other, designation may be used where permitted.
4. Water and Ice: Mixing water for concrete and water used to make ice shall be potable water, unless alternative sources of water are permitted.
   a. Water from alternative sources shall comply with requirements of ASTM C1602/C1602M, and concentration of chemicals in combined mixing water shall be less than:
      1) Chloride Content: 1,000 ppm.
      2) Sulfate Content as SO_4: 3,000 ppm.
      3) Alkalis as (Na_2O + 0.658 K_2O): 600 ppm.
      4) Total Solids by Mass: Less than 50,000 ppm.

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B. Concrete Mix Design:

1. General:
   a. See Supplement at the end of this section for mix design requirements for each class of concrete used on Project.
   b. Prepare design mixtures for each type and strength of concrete, selecting and proportioning ingredients in accordance with requirements of ACI 301, unless otherwise specified.
   c. Selection of constituent materials and products in mix design are optional, unless specified otherwise.
   d. Unless otherwise permitted, use water-reducing admixture or water-reducing admixture and high-range, water-reducing admixture, or plasticizing admixture in pumped concrete, in concrete with a water-cementitious materials ratio below 0.50.
   e. Unless otherwise permitted, use water-reducing admixture and high-range, water-reducing admixture, or plasticizing admixture in columns, piers, pilasters, and walls.
   f. Use water-reducing admixture or high-range, water-reducing admixture, or plasticizing admixture to achieve fresh properties that facilitate handling, placing, and consolidating of concrete, and specified hardened properties.
   g. Use water-reducing and retarding admixture when anticipated high temperatures, low humidity, or other adverse placement conditions can adversely affect fresh properties of concrete.
   h. Unless otherwise specified, desired fresh properties of concrete shall be determined by Contractor, and coordinated with concrete producer. Fresh properties of concrete shall remain stable to satisfaction of Contractor, for duration of placement and consolidation, and shall remain in conformance with requirements of Contract Documents.
   i. Contractor is encouraged to consider using environmentally sustainable concrete mix design technologies such as use of supplementary cementitious materials, aggregate packing, and self-consolidating concrete.
2. Potential alkali-aggregate reactivity of concrete:
   a. Do not use aggregates known to be susceptible to alkali-carbonate reaction (ACR).
   b. Aggregates shall have been tested to determine potential alkali-aggregate reactivity in concrete in accordance with ASTM C1260/C1260M or ASTM C1567.
      1) Aggregates that indicate expansion greater than 0.10 percent at 16 days after casting shall not be used unless they have been shown to be nondeleteriously reactive in accordance with ASTM C227 or ASTM C1293, with less than 0.04 percent expansion at 1 year for cement-aggregate combinations or less than 0.04 percent expansion at 2 years for combinations with pozzolan or slag.

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2) Alkali content of cement used in proposed concrete mixture shall not be greater than alkali content of cement used in test for potential alkali-aggregate reactivity.
3) Use low-alkali cement or incorporate pozzolans into concrete mixture as necessary to satisfy testing for potential alkali reactivity. Alternately, a chemical inhibitor such as a lithium based admixture may be proposed.

c. Use low alkali cement or incorporate pozzolans into the concrete mixture as necessary to satisfy testing for potential alkali reactivity. Alternately, a chemical inhibitor such as a lithium based admixture may be proposed. Submit documentation of control of alkali-aggregate reactivity for proposed admixtures.

3. Proportions:
   a. Design mix to meet aesthetic, durability, and strength requirements.
   b. Where fly ash is included in mix, minimum fly ash content shall be a minimum of 15 percent of weight of total cementitious materials.
   c. Slump Range at Site.
      1) Prior to submitting mix design, consult with concrete producer and select a target slump value at point of delivery, for each application of each design mix. Unless otherwise permitted, target slump value will then be enforced for duration of Project.
      2) Design mixes that include a high-range, water-reducing or a plasticizing admixture shall have a minimum slump of 2 inches prior to addition of admixture. Unless otherwise permitted, slump shall be 8 inches maximum at point of delivery, for concrete with a high-range, water-reducing admixture.
      3) Slump Tolerance: Meet requirements of ACI 117.
4. Combined Aggregate Gradation:
   a. Combined Gradation Limits: Fine aggregate shall be in range of 36 percent to 40 percent of total aggregate weight.

C. Concrete Mixing:

1. General: In accordance with ACI 301, except as modified herein.
2. Truck Mixers:
   a. For every truck, test slump of samples taken per ASTM C94/C94M, paragraph 12.5.1.
   b. Where specified slump is more than 4 inches, and if slump tests differ by more than 2 inches, discontinue use of truck mixer, unless causing condition is corrected and satisfactory performance is verified by additional slump tests.

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2.04 REINFORCING STEEL

A. Deformed Steel Reinforcing Bars: ASTM A615/A615M, Grade 60. Welding of reinforcing bars is not permitted.

B. Fabrication: Follow CRSI Manual of Standard Practice.

2.05 ANCILLARY MATERIALS

A. Bonding Agent: Unless otherwise specified, in accordance with the following:

1. ASTM C881/C881M, Type V.
2. Two-component, moisture insensitive, 100 percent solids epoxy.
3. Consult manufacturer for surface finish, pot life, set time, vertical or horizontal application, and forming restrictions.
4. Manufacturers and Products:
   a. BASF Building Systems Inc., Shakopee, MN; Concresive Standard LVI.
   b. Euclid Chemical Co., Cleveland, OH; Euco # 352 Epoxy System LV.
   c. Prime Resins, Conyers, GA; Prime Bond 3000 to 3900 Series.
   d. Sika Chemical Corp., Lyndhurst, NJ; Sikadur 32 Hi-Mod.

B. Bond Breaker:

1. Nonstaining type, providing positive bond prevention.
2. Manufacturers and Products:
   a. Dayton Superior Corporation, Kansas City, KS; EDOCO Clean Lift Bond Breaker.
   b. Nox-Crete Products Group, Omaha, NE; Silcoseal Select.

C. Tie Wire:

1. Black, soft-annealed 16-gauge wire.
2. Nylon-, epoxy-, or plastic-coated wire.

D. Bar Supports and Spacers:

1. Use precast concrete bar supports and side form spacers, unless noted otherwise. Do not use other types of supports or spacers.
2. Bar supports shall have sufficient strength and stiffness to carry loads without failure, displacement, or significant deformation. Space bar supports so minimum concrete cover is maintained for reinforcing between supports.

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E. Premolded Joint Filler:

1. Sponge Rubber:
   a. Neoprene, closed-cell, expanded; ASTM D1056, Type 2C5, with compression deflection, 25 percent deflection (limits), 119 kPa to 168 kPa (17 psi to 24 psi) minimum.
   b. Manufacturer and Product: Monmouth Rubber and Plastics Corporation, Long Branch, NJ; Durafoam DK515IHD.

F. Curing (and sealing) Compound:

1. Water-based, high-solids content, nonyellowing, curing compound meeting requirements of ASTM C1315 Type I, Class A.
2. Manufacturers and Products:
   a. BASF Construction Chemicals, Shakopee, MN; Kure 1315.
   b. Euclid Chemical Co., Cleveland, OH; Super Diamond Clear VOX.
   c. WR Meadows, Inc., Hampshire, IL; VOCOMP-30.
   d. Vexcon Chemical, Inc.; Philadelphia, PA; Starseal 1315.
   e. Dayton Superior; Safe Cure and Seal 1315 EF.

G. Evaporation Retardant:

1. Optional: Fluorescent fugitive dye color tint that disappears completely upon drying.
2. Manufacturers and Products:
   a. Master Builders Co., Cleveland, OH; Confilm.
   b. Euclid Chemical Co., Cleveland, OH; Eucobar.

H. Nonshrink Grout:

1. Nonmetallic, nongas-liberating.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
4. Test in accordance with ASTM C1107/C1107M:
   a. Fluid consistency 20 seconds to 30 seconds in accordance with ASTM C939.
   b. Temperatures of 40 degrees F, 80 degrees F, and 100 degrees F.
5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
6. Minimum strength of fluid grout, 3,500 psi at 1 day, 4,500 psi at 3 days, and 7,500 psi at 28 days.
7. Maintain fluid consistency when mixed in 1 yard to 9 yard loads in ready-mix truck.

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8. Manufacturers and Products:
   a. BASF Building Systems, Inc., Shakopee, MN; Master Flow 928.
   b. Five Star Products Inc., Fairfield, CT; Five Star Fluid Grout 100.
   c. Euclid Chemical Co., Cleveland, OH; Hi Flow Grout.
   d. Dayton Superior Corp., Kansas City, KS; Sure Grip High Performance Grout.
   e. L & M Construction Chemicals, Inc., Omaha, NE; Crystex.

I. Repair Material:

1. Contain only trace amounts of chlorides and other chemicals that can potentially cause steel to oxidize.
2. Where repairs of exposed concrete are required, prepare mockup using proposed repair materials and methods, for confirmation of appearance compatibility prior to use.
3. Obtain Manufacturer's Certificate of Compliance that products selected are appropriate for specific applications.
4. Repair mortar shall be Site mixed.
5. Prepare concrete substrate and mix, place, and cure repair material in accordance with manufacturer's written recommendations.
6. Manufacturers and Products:
   a. BASF Building Systems Inc., Shakopee, MN; EMACO S-Series products.
   b. Sika Chemical Corp., Lyndhurst, NJ; SikaTop-Series.

J. Crack Repair:

1. Obtain Letter of Certification from manufacturer's technical representative, that products selected are appropriate for the specific applications.
2. Prepare concrete substrate and mix, place, and cure repair material in accordance with manufacturer's written recommendations.
3. When crack repair is deemed by Engineer as requiring a structural repair, use part epoxy injection resin.
   a. Manufacturers:
      1) BASF Building Systems, Inc., Shakopee, MN.
      2) Euclid Chemical Co., Cleveland, OH.
      3) Prime Resins, Conyer, GA.
      4) Sika Chemical Corp., Lyndhurst, NJ.
4. Unless otherwise specified, use hydrophilic polyurethane resin.
   a. Manufacturers:
      1) Prime Resins, Conyer, GA.
      2) Sika Chemical Corp., Lyndhurst, NJ.

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2.06 SOURCE QUALITY CONTROL

A. Source Quality Control Inspection: Engineer shall have access to and have right to inspect batch plants, cement mills, and supply facilities of suppliers, manufacturers, and Subcontractors, providing products included in this section.

PART 3 EXECUTION

3.01 GENERAL

A. Meet requirements ACI 301, except as modified herein.

3.02 FORMWORK

A. Form Construction:

1. Construct forms and provide smooth-form finish.
2. Form 3/4-inch bevels at concrete edges, unless otherwise shown.
3. Make joints tight to prevent escape of mortar and to avoid formation of fins.
4. Brace as required to prevent distortion during concrete placement.
5. On exposed surfaces locate form ties in uniform pattern or as shown.
6. Construct so ties remain embedded in the member with no metal within 1 inch of concrete surface when forms, inserts, and tie ends are removed.

B. Double-Wall Construction (new wall cast against existing wall):

1. Joint Filler Attachment:
   a. Use attachments to secure premolded joint filler (or other Engineer approved bond breaker) to one wall only.
   b. Secure premolded joint filler without gaps and separations keeping concrete from second wall pour from penetrating thickness and space occupied by premolded joint filler.
2. Do not use form ties or other devices permanently penetrating premolded joint filler between walls or produce a rigid connection between walls.
3. Do not use formwork that leaks mortar.

C. Provide premolded joint filler or sealant to minimize transfer of movement from one structure to the other.

D. Form Removal:

1. Nonsupporting forms (walls and similar parts of Work) may be removed after cumulatively curing at not less than 50 degrees F for 24 hours from time of concrete placement if:
   a. Concrete is sufficiently hard so as not to sustain damage by form removal operations.
   b. Curing and protection operations are maintained.

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2. Remove forms with care to prevent scarring and damaging the surface.
3. Prior to form removal, provide thermal protection for concrete being placed under the requirements of cold weather concreting.

3.03 PLACING REINFORCING STEEL

A. Unless otherwise specified, place reinforcing steel in accordance with CRSI Recommended Practice for Placing Reinforcing Bars.

B. Splices and Laps:

1. Lap splice reinforcing: Refer to Structural General Notes in Drawings for additional information.
2. Tie splices with 18-gauge annealed wire as specified in CRSI Standard.

3.04 CONCRETE PLACEMENT INTO FORMWORK

A. Inspection: Notify Engineer and Special Inspector at least 1 work day in advance before starting to place concrete.

B. Placement into Formwork:

1. Reinforcement: Secure in position before placing concrete.
2. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 1.5 feet deep, except for slabs which shall be placed full depth. Place and consolidate successive layers prior to initial set of first layer to prevent cold joints.
3. Placement frequency shall be such that lift lines will not be visible in exposed and architectural concrete finishes.
4. Use placement devices, for example chutes, pouring spouts, and pumps as required to prevent segregation.
5. Vertical Free Fall Drop to Final Placement:
   a. Forms 8 Inches or Less Wide: 5 feet.
   b. Forms Wider than 8 Inches: 8 feet, except as specified.
6. For placements where drops are greater than specified, use placement device such that free fall below placement device conforms to required value.
   a. Limit free fall to prevent segregation caused by aggregates hitting steel reinforcement.
7. Provide sufficient illumination in the interior of forms so concrete deposition is visible, permitting confirmation of consolidation quality.

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8. Joints in Footings and Slabs:
    a. Ensure space beneath plastic waterstop completely fills with concrete.
    b. During concrete placement, make visual inspection of entire waterstop area.
    c. Limit concrete placement to elevation of waterstop in first pass, vibrate concrete under waterstop, lift waterstop to confirm full consolidation without voids, and place remaining concrete to full height of slab.
    d. Apply procedure to full length of waterstop.
9. Trowel and round off top exposed edges of walls with 1/4-inch radius steel edging tool.

C. Conveyor Belts and Chutes:

1. Design and arrange ends of chutes, hopper gates, and other points of concrete discharge throughout conveying, hoisting, and placing system for concrete to pass without becoming segregated.
2. Do not use chutes longer than 50 feet.
3. Wipe clean with device that does not allow mortar to adhere to belt.
4. Cover conveyor belts and chutes.

D. Retempering: Not permitted for concrete where cement has partially hydrated.

E. Pumping of Concrete:

1. Provide standby pump, conveyor system, crane and concrete bucket, or other system onsite during pumping, for adequate redundancy to ensure completion of concrete placement without cold joints in case of primary placing equipment breakdown.
2. Minimum Pump Hose (Conduit) Diameter: 4 inches.
3. Replace pumping equipment and hoses (conduits) that are not functioning properly.

F. Retempering: Not permitted for concrete where cement has partially hydrated.

G. Maximum Size of Concrete Placements:

1. Limit size of each placement to allow for strength gain and volume change as a result of shrinkage.
2. Locate expansion, control, and contraction, joints where shown.
3. Construction Joints: Unless otherwise shown or permitted, locate construction joints as follows:
    a. Locate construction joints as shown on Drawings or where approved in the joint location submittal.
    b. Locate expansion, control, and contraction joints where shown on Drawings.

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c. Provide vertical construction joints at maximum spacing of 40 feet unless shown or approved otherwise.
d. When vertical expansion, contraction or control joint spacing does not exceed 60 feet, intermediate construction joints are not required.
e. Uniformly space vertical construction joints within straight sections of walls, avoiding penetrations.

4. Consider beams, girders, brackets, column capitals, and haunches as part of floor or roof system and place monolithically with floor or roof system.
5. Should placement sequence result in cold joint located below finished water surface, install waterstop in joint.

H. Minimum Time between Adjacent Placements:

1. Construction or Control Joints: 7 days.
2. Construction joint between top of footing or slab, and column or wall: As soon as can safely be done without damaging previously cast concrete or interrupting curing thereof, but not less than 24 hours.
3. Expansion or Contraction Joints: 1 day.
4. For columns and walls with a height in excess of 10 feet, wait at least 2 hours before depositing concrete in beams, girders, or slabs supported thereon.
5. For columns and walls 10 feet in height or less, wait at least 1 hour prior to depositing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.

3.05 CONSOLIDATION AND VISUAL OBSERVATION

A. Consolidation Equipment and Methods: ACI 301.

B. Provide at least one standby vibrator in operable condition at placement Site prior to placing concrete.

C. Provide sufficient windows in forms or limit form height to allow for concrete placement through windows and for visual observation of concrete.

D. Vibrate concrete in vicinity of joints to obtain impervious concrete.

3.06 COLD WEATHER PLACEMENT

A. Unless otherwise permitted, shall be in accordance with requirements of ACI 306.1 and as follows:

1. Cold weather requirements shall apply when ambient temperature is below 40 degrees F or approaching 40 degrees F and falling.
2. Do not place concrete over frozen earth or against surfaces with frost or ice present. Frozen earth shall be thawed to acceptance of Engineer.

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3. Unless otherwise permitted, do not place concrete in contact with surfaces less than 35 degrees F; requirement is applicable to all surfaces including reinforcement and other embedded items.
4. Provide supplemental external heat as needed when other means of thermal protection are unable to maintain minimum surface temperature of concrete as specified in ACI 306.1.
5. Maintain minimum surface temperature of concrete as specified in ACI 306.1 for no less than 3 days during cold weather conditions.
6. Protect concrete from freezing until end of curing period and until concrete has attained a compressive strength of 3,500 psi or design compressive strength if less than 3,500 psi.

B. Provide maximum and minimum temperature sensors placed on concrete surfaces spaced throughout Work to allow monitoring of concrete surface temperatures representative of Work. Unless otherwise permitted, record surface temperature of concrete at least once every 12 hours during specified curing period.

C. External Heating Units: Do not exhaust heater flue gases directly into enclosed area as it causes concrete carbonation as a result of concentrated carbon dioxide.

D. Cure as specified.

3.07 HOT WEATHER PLACEMENT

A. Prepare ingredients, mix, place, cure, and protect in accordance with ACI 301, ACI 305.1, and as follows:

1. Maintain concrete temperature below 95 degrees F at time of placement, or furnish test data or other proof that admixtures and mix ingredients do not produce flash set plastic shrinkage, or cracking as a result of heat of hydration. Cool ingredients before mixing to maintain fresh concrete temperatures as specified or less.
2. Internal concrete temperature in structure shall not exceed 158 degrees F, and maximum temperature differential between center of section and external surfaces of concrete shall not exceed 35 degrees F.
3. Provide for windbreaks, shading, fog spraying, sprinkling, ice, wet cover, or other means as necessary to maintain concrete at or below specified temperature.
4. Cure as specified.

3.08 CONCRETE BONDING

A. Construction Joints at Existing Concrete:

1. Thoroughly clean and mechanically roughen existing concrete surfaces to roughness profile of 1/4 inch.
2. Saturate surface with water for 24 hours prior to placing new concrete.

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3.09 PREMOLDED JOINT FILLER INSTALLATION

A. Sufficient in width to completely fill joint space where shown.

B. Drive nails approximately 1 foot 6 inches on center through filler, prior to installing, to provide anchorage embedment into concrete during concrete placement.

C. Secure premolded joint filler in forms before concrete is placed.

3.10 FINISHING FORMED SURFACES

A. Provide surface finish 2.0 (SF-2.0) in accordance with ACI 301 and as herein specified.

B. Tie Holes: Unless otherwise specified, fill with specified repair material.

1. Prepare substrate and mix, place, and cure repair material per manufacturer's written recommendations.

C. Alternate Form Ties, Through-Bolts:

1. Mechanically roughen entire interior surface of through hole.
2. Apply bonding agent to roughened surface and drive elastic vinyl plug to half depth.
3. Dry pack entire hole from both sides of plug with nonshrink grout.
4. Use only enough water to dry pack grout.
5. Dry pack while bonding agent is still tacky.
6. If bonding agent has dried, remove bonding agent by mechanical means and reapply new coat of bonding agent.
7. Compact grout using steel hammer and steel tool to drive grout to high density.
8. Cure grout per grout manufacturer's written recommendations.

D. Repair defective areas of concrete.

1. Cut edges perpendicular to surface at least 1/2-inch deep. Do not feather edges. Soak area with water for 24 hours.
2. Patch with specified repair material.
3. Repair concrete surfaces using specified materials. Select system, submit for review, and obtain approval from Engineer prior to use.
4. Develop repair techniques with material manufacturer on surface that will not be visible in final construction prior to starting actual repair work and show how finish color will blend with adjacent surfaces. Obtain approval from Engineer.

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5. Obtain quantities of repair material and manufacturer's detailed instructions for use to provide repair with finish to match adjacent surface or apply sufficient repair material adjacent to repair to blend finish appearance.

6. Repair of concrete shall provide structurally sound surface finish, uniform in appearance or upgrade finish by other means until acceptable to Engineer.

3.11 FINISHING UNFORMED SURFACES

A. General:

1. Use manual screeds, vibrating screeds, or roller compacting screeds to place concrete level and smooth.
2. Do not use "jitterbugs" or other special tools designed for purpose of forcing coarse aggregate away from surface and allowing layer of mortar, which will be weak and cause surface cracks or delamination, to accumulate.
3. Do not dust surfaces with dry materials nor add water to surfaces.
4. Cure concrete as specified.

B. Slab Tolerances:

1. Exposed Slab Surfaces: Comprise of flat planes as required within tolerances specified.
2. Slab Finish Tolerances and Slope Tolerances: Crowns on floor surface not too high as to prevent 10-foot straightedge from resting on end blocks, nor low spots that allow block of twice the tolerance in thickness to pass under supported 10-foot straightedge.
3. Steel gauge block 5/16-inch thick.
4. Finish Slab Elevation: Where called for on plans, slope slabs to sumps. Floor shall adequately drain regardless of tolerances.
5. Thickness: Maximum 1/4 inch minus or 1/2 inch plus from thickness shown. Where thickness tolerance will not affect slope, drainage, or slab elevation, thickness tolerance may exceed 1/2 inch plus.

C. Interior Slab Finish: Provide trowel finish unless specified otherwise.

D. Exterior Slab Finish:

1. Provide broom finish unless specified otherwise.
2. Finish exposed edges with steel edging tool.
3. Mark sidewalks transversely at 5-foot intervals with jointing tool.

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3.12 EXPOSED METAL OBJECTS

A. Remove metal objects not intended to be exposed in as-built condition of structure including wire, nails, and bolts, by chipping back concrete to depth of 1 inch and then cutting or removing metal object.

B. Repair area of chipped-out concrete as specified for defective areas.

3.13 BLOCKOUTS AT PIPES OR OTHER PENETRATIONS

A. Where shown, install in accordance with requirements of Drawings.

3.14 PROTECTION AND CURING

A. Protect fresh concrete from direct rays of sunlight, drying winds, and wash by rain.

B. Keep concrete slabs continuously wet for a 7-day period. Intermittent wetting is not acceptable.

C. Use curing compound only where approved by Engineer.

D. Cure formed surfaces with curing compound applied in accordance with manufacturer's written instructions as soon as forms are removed and finishing is completed.

E. Remove and replace concrete damaged by freezing.

F. Repair areas damaged by construction, using specified repair materials and approved repair methods.

3.15 NONSHRINK GROUT

A. General: Mix, place, and cure nonshrink grout in accordance with grout manufacturer's written instructions.

B. Grouting Machinery Foundations:

1. Block out original concrete or finish off at distance shown below bottom of machinery base with grout. Prepare concrete surface by sandblasting, chipping, or by mechanical means to remove any soft material.
2. Set machinery in position and wedge to elevation with steel wedges, or use cast-in leveling bolts.
3. Form with watertight forms at least 2 inches higher than bottom of plate.
4. Fill space between bottom of machinery base and original concrete in accordance with manufacturer's written instructions.

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3.16 BACKFILL AGAINST STRUCTURES

A. Do not backfill against walls until concrete has obtained specified 28-day compressive strength.

B. Refer to General Structural Notes on the Drawings for additional requirements.

C. Unless otherwise permitted, place backfill simultaneously on both sides of structure, where such fill is required, to prevent differential pressures.

3.17 FIELD QUALITY CONTROL

A. General:

1. Provide adequate facilities for safe storage and proper curing of concrete test specimens onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
2. Unless otherwise specified, sample concrete for testing for making test specimens, from point of delivery.
3. When concrete is pumped, sample and test air content at point of delivery and at point of placement.
   a. For Each Concrete Mixture: Provided results of air content tests for first load of the day are within specified limits, testing need only be performed at point of delivery for subsequent loads of that concrete mixture except that testing should be performed at point of placement every 4 hours.
4. Evaluation will be in accordance with ACI 301 and Specifications.
5. Test specimens shall be made, cured, and tested in accordance with ASTM C31/C31M and ASTM C39/C39M.
6. Frequency of testing may be changed at discretion of Engineer.
7. Pumped Concrete: Take concrete samples for slump, ASTM C143/C143M, and test specimens, ASTM C31/C31M and ASTM C39/C39M, at placement (discharge) end of line.
8. If measured air content at delivery is greater than specified limit, check test of air content will be performed immediately on a new sample from delivery unit. If check test fails, concrete has failed to meet requirements of Contract Documents. If measured air content is less than lower specified limit, adjustments will be permitted in accordance with ASTM C94/C94M, unless otherwise specified. If check test of adjusted mixture fails, concrete has failed to meet requirements of Contract Documents. Concrete that has failed to meet requirements of Contract Documents shall be rejected.

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B. Concrete Strength Test:

1. Unless otherwise specified, one specimen at age of 7 days for information, and two 6-inch diameter or when permitted three 4-inch diameter test specimens at age of 28 days for acceptance.
2. Provide a minimum of one spare test specimen per sample. Test spare cylinder as directed by Engineer.

C. High Range Water Reducer (Superplasticizer) Admixture Segregation Test: Test each truck prior to use on job.

1. Segregation Test Objective: Concrete shall stay together when slumped. Segregation is assumed to cause mortar to flow out of mix even though aggregate may stay piled enough to meet slump test.
2. Test Procedure: Make slump test and check for excessive slump and observe to see if mortar or moisture flows from slumped concrete.
3. Reject concrete if mortar or moisture separates and flows out of mix.

D. Cold Weather Placement Tests:

1. During cold weather concreting, cast cylinders for field curing as follows. Use method that will produce greater number of specimens:
   a. Six extra test cylinders from last 100 cubic yards of concrete.
   b. Minimum three specimens for each 2 hours of placing time or for each 100 cubic yards.
2. These specimens shall be in addition to those cast for lab testing.
3. Protect test cylinders from weather until they can be placed under same protection provided for concrete of structure that they represent.
4. Keep field test cylinders in same protective environment as parts of structure they represent to determine if specified strength has been obtained.
5. Test cylinders in accordance with applicable sections of ASTM C31/C31M and ASTM C39/C39M.
6. Use test results to determine specified strength gain prior to falsework removal.

E. Slab Finish Tolerances and Slope Tolerances:

1. Support 10-foot long straightedge at each end with steel gauge blocks of thicknesses equal to specified tolerance.
2. Compliance with designated limits in four of five consecutive measurements is satisfactory, unless defective conditions are observed.

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3.18 MANUFACTURER'S SERVICES

A. Provide representative at Site in accordance with Section 01 43 33, Manufacturers' Field Services, for installation assistance, inspection, and certification of proper installation for concrete ingredients, mix design, mixing, and placement.

B. Concrete Producer Representative:

1. Concrete Producer Representative:
   a. Observe how concrete mixes are performing.
   b. Assist with concrete mix design, performance, placement, weather problems, and problems as may occur with concrete mix throughout Project, including instructions for redosing.
   c. Establish control limits on concrete mix designs.
   d. If redosing of admixtures is acceptable to Concrete Producer, provide equipment for control of redosing, at Site to maintain proper slump and air content if needed.
2. Admixture Manufacturer's Representative: Available for consultations as required to ensure proper installation and performance of specified products.
3. Bonding Agent Manufacturer's Representative: Available for consultations as required to ensure proper installation and performance of specified products.

3.19 SUPPLEMENTS

A. Requirements of concrete mix designs following "End of Section," are a part of this Specification and supplement requirements of Part 1 through Part 3 of this section:

1. Concrete Mix Design, Class 5000F1S1P0C2.

END OF SECTION

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CONCRETE MIX DESIGN, CLASS 5000F1S1P0C2

A. Mix Locations: Typical.

B. Exposure Categories and Classifications: F1S1P0C2.

C. Mix Properties:

1. Limit water to cementitious materials ratio (W/Cm) in mix design to maximum value of 0.40.
2. Minimum concrete compressive strength (f'c) shall be 5,000 psi at 28 days.
3. Air-entraining admixtures are prohibited in concrete mixtures and total air content shall not be greater than 3 percent, for the following:
   a. Slabs to receive hard-troweled finish.
4. Unless otherwise specified, provide air content based on nominal maximum size of aggregate as follows:

Nominal Maximum Aggregate Size in.‡	Air Content (%)*
3/8	7.5
1/2	7.0
3/4	6.0
1	6.0
1-1/2	5.5
2§	5.0
3§	4.5

‡See ASTM C33/C33M for tolerance on oversize for various nominal maximum size designations.
*Tolerance of air content is +1-1/2 percent.
§Air contents apply to total mixture. When testing concretes, however, aggregate particles larger than 1-1/2 inches are to be removed by sieving and air content will be measured on sieved fraction (tolerance on air content as delivered applies to this value). Air content of total mixture is computed from value measured on the sieved fraction passing the 1-1/2-inch sieve in accordance with ASTM C231/C231M.

5. Limit supplementary cementitious materials measured as a percent of weight of total cementitious materials in mix design, as follows:
   a. Fly Ash and other Pozzolans: 25 percent.
      Slag Cement: 50 percent.
6. Provide cementitious materials in accordance with one of the following:
   a. ASTM C150/C150M Type II; inclusion of supplementary cementitious materials in design mix is optional.

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b. ASTM C150/C150M types other than Type II, plus supplementary cementitious materials in accordance with one of the following:
   1) Tricalcium Aluminate Content of Total Cementitious Materials: Maximum 8 percent by weight.
   2) Provide documentation of test results in accordance with ASTM C1012/C1012M, for combinations of cementitious materials providing sulfate resistance with expansion less than 0.10 percent at 6 months.
c. ASTM C595/C595M Type IP or Type IS (less than 70), tested to comply with moderate sulfate resistance option (MS).

7. Unless otherwise permitted, minimum cementitious materials content in mix design shall be as follows:
   a. 515 pounds per cubic yard for concrete with 1-1/2-inch nominal maximum size aggregate.
   b. 535 pounds per cubic yard for 1-inch nominal maximum size aggregate.
   c. 560 pounds per cubic yard for 3/4-inch nominal maximum size aggregate.
   d. 580 pounds per cubic yard for 1/2-inch nominal maximum size aggregate.
   e. 600 pounds per cubic yard for 3/8-inch nominal maximum size aggregate.
   f. Unless otherwise permitted, limit cementitious materials content to 100 pounds per cubic yard greater than specified minimum cementitious materials content in mix design.
8. Limit water-soluble, chloride-ion content in hardened concrete to 0.10 percent, unless otherwise specified.
   a. Limits are stated in terms of chloride ions in percent by weight of cement.
   b. Unless otherwise permitted, provide documentation from concrete tested in accordance with ASTM C1218/C1218M at an age between 28 days and 42 days.

D. Refer to PART 1 through PART 3 of this section for additional requirements.

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SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. The Aluminum Association, Inc. (AA): The Aluminum Design Manual.
2. American Galvanizers Association (AGA):
   a. Inspection of Hot-Dip Galvanized Steel Products.
   b. Quality Assurance Manual.
3. American Iron and Steel Institute (AISI): Stainless Steel Types.
4. American Ladder Institute (ALI): A14.3, Ladders - Fixed - Safety Requirements.
5. American National Standards Institute (ANSI).
6. American Society of Safety Engineers (ASSE): A10.11, Safety Requirements for Personnel and Debris Nets.
7. American Welding Society (AWS):
   a. D1.1/D1.1M, Structural Welding Code - Steel.
   b. D1.2/D1.2M, Structural Welding Code - Aluminum.
   c. D1.6/D1.6M, Structural Welding Code - Stainless Steel.
8. ASTM International (ASTM):
   a. A36/A36M, Standard Specification for Carbon Structural Steel.
   b. A48/A48M, Specification for Gray Iron Castings.
   c. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   d. A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
   e. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   f. A143/A143M, Standard for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
   g. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   h. A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
   i. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.

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j. A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
k. A276, Standard Specification for Stainless Steel Bars and Shapes.
l. A283/A283M, Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
m. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
n. A325, Standard Specification for Structural Bolts, Steel, Heat Treated 120/105 ksi Minimum Tensile Strength.
o. A380, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
p. A384/A384M, Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
q. A385/A385M, Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).
r. A489, Standard Specification for Carbon Steel Lifting Eyes.
s. A500/A500M, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
t. A501, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
u. A563, Standard Specification for Carbon and Alloy Steel Nuts.
v. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
w. A780/A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
x. A786/A786M, Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
y. A793, Standard Specification for Rolled Floor Plate, Stainless Steel.
z. A967, Standard Specification for Chemical Passivation Treatments for Stainless Steel Parts.
aa. A992/A992M, Standard Specification for Structural Steel Shapes.
bb. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
cc. B308/B308M, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
dd. B429/B429M, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
ee. B632/B632M, Standard Specification for Aluminum-Alloy Rolled Tread Plate.

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ff. C881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
gg. D1056, Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
hh. F436, Standard Specification for Hardened Steel Washers.
ii. F468, Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.
jj. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
kk. F594, Standard Specification for Stainless Steel Nuts.
ll. F844, Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
mm. F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

9. International Code Council Evaluation Service (ICC-ES):
   a. AC01, Acceptance Criteria for Expansion Anchors in Masonry Elements.
   b. AC106, Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements.
   c. AC193, Acceptance Criteria for Mechanical Anchors in Concrete Elements.
   d. AC308, Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements.
   e. AC70, Acceptance Criteria for Fasteners Power-driven into Concrete, Steel and Masonry Elements.
10. NSF International (NSF): 61, Drinking Water System Components—Health Effects.
11. Occupational Safety and Health Administration (OSHA):
   a. 29 CFR 1910.27, Fixed Ladders.
   b. 29 CFR 1926.105, Safety Nets.
   c. 29 CFR 1926.502, Fall Protection Systems Criteria and Practices.
12. Specialty Steel Industry of North America (SSINA):
   a. Specifications for Stainless Steel.
   b. Design Guidelines for the Selection and Use of Stainless Steel.
   c. Stainless Steel Fabrication.
   d. Stainless Steel Fasteners.

1.02 DEFINITIONS

A. Anchor Bolt: Cast-in-place anchor; concrete or masonry.

B. Concrete Anchor: Post-installed concrete anchors listed in this Specification.

C. Corrosive Area: Containment area or area exposed to delivery, storage, transfer, or use of chemicals.

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D. Exterior Area: Location not protected from weather by building or other enclosed structure.

E. 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.

F. 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.

G. Masonry Anchor: Post-installed masonry anchors listed in this Specification.

H. Submerged: Location at or below top of wall of open water-holding structure, such as basin or channel, or wall, ceiling or floor surface inside a covered water-holding structure, or exterior belowgrade wall or roof surface of water-holding structure, open or covered.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Metal fabrications, 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. Samples: Color samples of abrasive stair nosings.

B. Informational Submittals:

1. Concrete and Masonry Post-Installed Anchors:
   a. Manufacturer’s product description and printed installation instructions.
   b. Current ICC-ES Report for each type of post-installed anchor to be used.
   c. Adhesive Anchor Installer Certification.
2. U-Channel Concrete Inserts:
   a. Manufacturer’s product description.
   b. Allowable load tables.
3. Ladders: Letter of certification that ladder meets OSHA 29 CFR 1910.27 requirements.
4. Passivation method for stainless steel members.

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1.04 QUALITY ASSURANCE

A. Qualifications:

1. Adhesive Anchor Installer: Trained to install adhesive anchors in accordance with manufacturer's printed installation instructions.
2. Galvanized Coating Applicator: Company specializing in hot-dip galvanizing after fabrication and following procedures of Quality Assurance Manual of the American Galvanizers Association.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Insofar as practical, factory assemble specified items. Assemblies, because of 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 as a result of metal banding and rough handling. Use padded slings and straps.

D. Store fabricated items in dry area, not in direct contact with ground.

E. Store adhesives anchors at service temperature ranges recommended by manufacturer.

PART 2 PRODUCTS

2.01 GENERAL

A. Unless otherwise indicated, meet the following requirements:

Item	**ASTM Reference**
Steel Wide Flange Shapes	A992/992M
Other Steel Shapes and Plates	A36/A36M
Steel Pipe	A501 or A53/A53M, Type E or S, Grade B
Hollow Structural Sections (HSS)	A500/A500M, Grade B
Stainless Steel:	
Bars and Angles	A276, AISI Type 316 (316L for welded connections)

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Item	ASTM Reference
Shapes	A276, AISI Type 304 (304L for welded connections)
Steel Plate, Sheet, and Strip	A240/A240M, AISI Type 316 (316L for welded connections)
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 36, 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 through 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/A48M, Class 35

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.

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2.02 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:
   a. Single unit construction with corrugated sleeve.
   b. Top of sleeve shall be self-threading to provide adjustment of threaded anchor bolt projection.
   c. Material: High-density polyethylene.
   d. Manufacturer: Sinco Products, Inc., Middletown, CT, (800) 243-6753.
2. Fabricated Steel: ASTM A36/A36M.

2.03 POST-INSTALLED CONCRETE ANCHORS

A. General:

1. AISI Type 316 stainless, hot-dip galvanized, or zinc-plated steel, as shown in Fastener Schedule at end of this section.
2. Current ICC-ES Report indicating acceptance per IBC 2006 and IBC 2009 for anchors at structural applications in cracked concrete.
3. Anchors shall be suitable for long-term loads, as well as for wind and seismic loads.
4. Acceptable for use in potable water structures by EPA and local health agencies or NSF 61.
5. Torque-Controlled Expansion Anchors (Wedge Anchors):
   a. Wedge anchors used in sustained tension applications (such as overhead or cantilevered applications) shall have current ICC-ES Report that demonstrates compliance with ICC-ES AC193 for cracked concrete.
   b. Manufacturers and Products:
      1) ITW Ramset/Red Head, Addison, IL; Trubolt+ Wedge Anchor (ESR-2427).
      2) Hilti, Inc., Tulsa, OK; Kwik-Bolt–TZ (KB-TZ) Anchors (ESR-1917).
      3) Powers Fasteners, Brewster , NY; Power-Stud +SD2 or +SD1 Anchors (ESR-2502 and ESR-2818).
      4) Simpson Strong-Tie Co., Inc., Pleasanton, CA; Strong-Bolt Anchors (ESR-1771).
      5) Wej-It Corp., Tulsa, OK; ANKRtite CCAT Wedge Anchor (ESR-2777).

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6. Displacement-Controlled Expansion Anchors (Drop-in Anchors):
   a. Self-drilling anchors, snap-off or flush type, zinc-plated.
   b. Nondrilling Anchors: Flush type for use with zinc-plated or stainless steel bolt, or stud type with projecting threaded stud.
   c. Manufacturers and Products:
      1) ITW Ramset/Red Head, Addison, IL; Multi-Set II Drop-In and Self Drill Anchor.
      2) Hilti, Inc., Tulsa, OK; Hilti HDI Drop-In Anchor.
      3) Powers Fasteners, Brewster, NY; Steel Drop-In Anchor.
      4) Simpson Strong-Tie Co., Inc., Pleasanton, CA; Drop-In Anchor.
7. Self-Tapping Concrete Screw Anchors:
   a. When used in sustained tension applications (such as overhead or cantilevered applications) shall have current ICC-ES Report that demonstrates compliance with ICC-ES AC193 for cracked concrete.
   b. Manufacturers and Products:
      1) Powers Fasteners, Brewster, NY; Wedge-Bolt+ (ESR-2526).
      2) Powers Fasteners, Brewster, NY; Vertigo+ Rod Hanger Screw Anchor (ESR-2989).
      3) Powers Fasteners, Brewster, NY; Snake+ Flush Mount Screw Anchor (ESR-2272).
      4) Hilti, Inc., Tulsa, OK; HUS-EZ Screw Anchor (ESR-3027).
      5) Simpson Strong-Tie Co., Inc., Pleasanton, CA; Titen HD Screw Anchor (ESR-2713).

B. Adhesive Anchors (Epoxy Anchors):

1. If approved by Engineer, adhesive anchors used in sustained tension applications (such as overhead or cantilevered applications) shall have current ICC-ES Report that demonstrates compliance with ICC-ES AC308 for cracked concrete.
2. 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 galvanized or stainless steel wire cloth screen tube to fit threaded rod.
3. Adhesive:
   a. Two-component, insensitive to moisture, designed to be used in adverse freeze/thaw environments.
   b. Cure Temperature, Pot Life, and Workability: Compatible for intended use and anticipated environmental conditions.

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c. Mixed Adhesive: Nonsag light paste consistency with ability to remain in 1-inch diameter overhead drilled hole without runout.
d. Meet requirements of ASTM C881/C881M.

4. Packaging and Storage:
   a. Disposable, self-contained cartridge system capable of dispensing both components in proper mixing ratio and fitting into manually or pneumatically operated caulking gun.
   b. Store adhesive cartridges and adhesive components on pallets or shelving in covered storage area.
   c. Container Markings: Include manufacturer's name, product name, batch number, mix ratio by volume, product expiration date, ANSI hazard classification, and appropriate ANSI handling precautions.
   d. Dispose of when:
      1) Shelf life has expired.
      2) Stored other than in accordance with manufacturer's instructions.
5. Manufacturers and Products:
   a. Hilti, Inc., Tulsa, OK; HIT Doweling Anchor System, HIT RE 500 SD (ESR-2322).
   b. Simpson Strong-Tie Co., Inc., Pleasanton, CA; SET-XP Epoxy Adhesive Anchors(ESR-2508).
   c. Powers Fasteners, Brewster NY, PE1000+ Adhesive anchoring system (ESR-2583).

2.04 U-CHANNEL CONCRETE INSERTS

A. Rolled ASTM A240/A240M, AISI Type 316 stainless steel, 0.105-inch thick, 1-5/8 inches wide by 1-3/8 inches deep, with stainless steel anchors at 10-inch maximum spacing, styrofoam fillers, and end caps.

B. Nut and Bolt Hardware: Type 316 stainless steel, 5/8-inch minimum diameter, unless indicated otherwise. Manufacturer's standard to match insert.

C. Manufacturers and Products:

1. Power-Strut, Wayne, MI; PS 349 Series.
2. B-Line Systems, Inc., Highland, IL; B32 Series.
3. Halfen Anchoring Systems, Converse, TX; Channel Type 4141HTA.

2.05 ACCESSORIES

A. Antiseizing Lubricant for Stainless Steel Threaded Connections:

1. Suitable for potable water supply.
2. Resists washout.

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3. Manufacturers and Products:
   a. Bostik, Middleton, MA; Neverseez.
   b. Saf-T-Eze Div., STL Corp., Lombard, IL; Anti-Seize.

2.06 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/D1.1M, Section 5.
4. Aluminum: Meet requirements of AWS D1.2/D1.2M.
5. Stainless Steel: Meet requirements of AWS D1.6/D1.6M.
6. Complete welding before applying finish.

D. Painting:

1. Shop prime with rust-inhibitive primer as specified in Section 09 90 00, Painting and Coating, 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, as specified in Section 09 90 00, Painting and Coating, unless indicated otherwise.
3. Do not apply protective coating to galvanized steel anchor bolts or galvanized steel welded anchor studs, unless indicated otherwise.

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E. Electrolytic Protection: Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals, as specified in Section 09 90 00, Painting and Coating, unless indicated otherwise.

F. Fitting: Where movement of fabrications is required or shown, cut, fit, and align items for smooth operation. Make corners square and opposite sides parallel.

G. Accessories: Furnish as required for a complete installation. Fasten by welding or with stainless steel bolts or screws.

2.07 SOURCE QUALITY CONTROL

A. Visually inspect all fabrication welds and correct deficiencies.

1. Steel: AWS D1.1/D1.1M, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.
2. Aluminum: AWS D1.2/D1.2M.
3. Stainless Steel: AWS D1.6/D1.6M.

PART 3 EXECUTION

3.01 INSTALLATION OF METAL FABRICATIONS

A. General:

1. Install metal fabrications plumb and 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.

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3.02 CAST-IN-PLACE ANCHOR BOLTS

A. Locate and hold anchor bolts in place with templates at 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.

3.03 CONCRETE AND MASONRY POST-INSTALLED ANCHORS

A. Begin installation only after concrete or masonry to receive anchors has attained design strength.

B. Install in accordance with manufacturer's instructions.

C. Provide minimum embedment, edge distance, and spacing as follows, unless indicated otherwise by anchor manufacturer's instructions or shown otherwise on Drawings:

Anchor Type	**Minimum Embedment (Bolt Diameters)**	**Minimum Edge Distance (Bolt Diameters)**	**Minimum Spacing (Bolt Diameters)**
Expansion	9	6	12
Adhesive	9	9	13.5

D. Use only drill type and bit type and diameter recommended by anchor manufacturer. Clean hole of debris and dust with brush and compressed air per manufacturer's printed installation instructions.

E. When embedded steel or rebar is encountered in drill path, slant drill to clear obstruction. If drill must be slanted more than 10 degrees to clear obstruction, notify Engineer for direction on how to proceed.

F. Adhesive Anchors:

1. Do not install adhesive anchors when temperature of concrete is below 40 degrees F or above 100 degrees F, unless cold temperature adhesives, compliant with ACI 308 are used. Refer to the respective ICC-ES report and manufacturer's printed installation instructions.
2. Remove water from hole with oil-free compressed air. Damp or water filled holes may be allowed only if approved in manufacturer's printed installation instructions and ICC-ES report.

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3. For hollow-unit masonry, install screen tube in accordance with manufacturer's printed installation instructions.
4. Do not disturb anchor during recommended curing time.
5. Do not exceed maximum torque as specified in manufacturer's printed installation instructions.

3.04 U-CHANNEL CONCRETE INSERTS

A. Provide as indicated for pipe supports and where otherwise shown on Drawings.

B. Except for interior dry areas, use plastic clips or similar dielectric material to isolate channel anchors from concrete reinforcing steel.

3.05 ELECTROLYTIC PROTECTION

A. Aluminum:

1. Coat surfaces of aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals, as specified in Section 09 90 00, Painting and Coating, unless indicated otherwise.
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 touchup 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 using cleaning and passivation methods in accordance with requirements of ASTM A380 and ASTM A967.
4. Brushes used to remove foreign substances shall utilize only stainless steel or nonmetallic bristles.
5. After treatment, visually inspect surfaces for compliance.

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3.06 PAINTING

A. Painted Galvanized Surfaces: Prepare as specified in Section 09 90 00, Painting and Coating.

B. Field Painting of Shop Primed Surfaces: Prepare surfaces and field finish in accordance with Section 09 90 00, Painting and Coating.

3.07 FIELD QUALITY CONTROL

A. Contractor-Furnished Quality Control:

1. Inspection and testing required in Section 01 45 16.13, Contractor Quality Control.
2. Manufacturer's Certificate of Compliance per Section 01 61 00, Common Product Requirements, for test results, or calculations, or drawings that ensure material and equipment design and design criteria meet requirements of Section 01 61 00, Common Product Requirements

3.08 MANUFACTURER'S SERVICES

A. Anchor Installation: Conduct site training of installation personnel for proper installation, handling, and storage of mechanical and adhesive anchor systems. Notify Engineer of time and place for sessions.

3.09 FASTENER SCHEDULE

A. Unless indicated otherwise on Drawings, provide fasteners as follows:

Service Use and Location	**Product**	**Remarks**
1. Anchor Bolts Cast Into Concrete for Structural Steel, Metal Fabrications and Castings		
Interior Dry Areas	Hot-dip galvanized steel headed anchor bolts, unless indicated otherwise	
Exterior and Interior Wet Areas	Stainless steel headed anchor bolts	
Submerged and Corrosive Areas	Stainless steel headed anchor bolts with fusion bonded coating	See Section 09 90 00, Painting and Coating

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Service Use and Location	Product	Remarks
2. Anchor Bolts Cast Into Concrete for Equipment Bases		
Interior Dry Areas	Stainless steel headed anchor bolts, unless otherwise specified with equipment	
Submerged, Exterior, Interior Wet, and Corrosive Areas	Stainless steel headed anchor bolts with fusion bonded coating, unless otherwise specified with equipment	See Section 09 90 00, Painting and Coating
3. Drilled Anchors for Metal Components to Cast-in-Place Concrete (e.g., Ladders, Handrail Posts, Electrical Panels, and Equipment)		
Interior Dry Areas	Zinc-plated or stainless steel wedge or expansion anchors	
Submerged, Exterior, Interior Wet, and Corrosive Areas	Adhesive stainless steel anchors	
4. Connections for Steel Fabrications and Wood Components		
Exterior and Interior Wet and Dry Areas	Stainless steel bolted connections	
5. Connections of Aluminum Components		
Submerged, Exterior and Interior Wet and Dry Areas	Stainless steel bolted connections, unless otherwise specified with equipment	
6. All Others		
Exterior and Interior Wet and Dry Areas	Stainless steel fasteners	

B. Antiseizing Lubricant: Use on stainless steel threads.

C. Do not use adhesive anchors to support fire-resistive construction or where ambient temperature will exceed 120 degrees F.

END OF SECTION

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SECTION 05 52 16
ALUMINUM RAILINGS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Aluminum Association, Incorporated (AA): DAF45, Designation System for Aluminum Finishes.
2. American Concrete Institute (ACI) 318, Building Code Requirements for Structural Concrete.
3. American Iron and Steel Institute (AISI).
4. ASTM International (ASTM):
   a. A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
   b. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
   c. E894, Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings.
   d. E935, Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
   e. E985, Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.
5. International Code Council (ICC): International Building Code (IBC).
6. Occupational Safety and Health Act (OSHA): 29 CFR 1910, Code of Federal Regulations.

1.02 DEFINITIONS

A. ICC Evaluation Services Report: ICC report on evaluation of manufactured concrete anchor systems.

B. Railings: This term includes guardrail systems, handrail systems, platform railing systems, ramp-rail systems, and stair-rail systems. Railings may be comprised of a framework of vertical, horizontal, or inclined members, grillwork or panels, accessories, or combination thereof.

C. Special Inspection: As defined by the ICC IBC.

D. Toeboards: Vertical barrier at floor level usually erected on railings along exposed edges of floor or wall openings, platforms, or ramps to prevent miscellaneous items from falling through.

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1.03 DESIGN REQUIREMENTS

A. Structural Performance of Railing Systems: Design, test, fabricate, and install railings to withstand the following structural loads without exceeding allowable design working stress or allowable deflection. Apply each load to produce maximum stress and deflection in railing system components.

1. Railing System: Capable of withstanding the following load cases applied:
   a. Concentrated load of 200 pounds applied at any point and in any direction in accordance with ICC IBC and OSHA.
   b. Uniform load of 50 pounds per linear foot applied in any direction in accordance with ICC IBC.
   c. Concentrated load need not be assumed to act concurrently with uniform loads in accordance with ICC IBC.
2. Calculated lateral deflection at top of posts shall not exceed 1 inch.

1.04 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Project-specific scaled plans and elevations of railings and detail drawings. Include railing profiles, sizes, connections, anchorage, size and type of fasteners, and accessories.
   b. Manufacturer’s literature and catalog data of railing and components.
   c. Design Data: Calculations or test data using specified design performance loads and including the following:
      1) Bending stress in, and deflection of, posts in accordance with ASTM E985 as modified herein.
      2) Design of post base connection.
      3) Documentation that concrete anchors have been designed in accordance with one of the following:
         a) ACI 318, Appendix D.
         b) ICC Evaluation Services Report for selected anchor.
2. Samples:
   a. Rail sections, 6 inches long showing each type of proposed connection, proposed finish, and workmanship.
   b. Each fitting including wall brackets, castings, toeboard, and rail expansion joints.

B. Informational Submittals:

1. Manufacturer’s assembly and installation instructions.
2. Special Inspection: Manufacturer’s instructions for Special Inspection of post-installed anchors.

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3. Test Reports: Test data may supplement load calculations providing data covers complete railing system, including anchorage:
   a. Test data for railing and components showing load and deflection as a result of load, in enough detail to prove railing is strong enough and satisfies national, state, local standards, regulations, code requirements, and OSHA 29 CFR 1910, using design loads specified. Include test data for the following:
      1) Railing and post connections.
      2) Railing wall connections.
      3) Railing expansion joint connections.
      4) Railing system gate assembly, including latch, gate stop, and hinges. Both gate latch and stop to support required loads applied independent of each other.
   b. Testing of anchorages shall be in accordance with ASTM E894 and ASTM E935 using applied loads in accordance with ICC IBC.
   c. Deflection Criteria: In accordance with ASTM E985 and design loads specified, except as follows: maximum calculated lateral deflection at top of posts shall not exceed 1 inch.
   d. Aluminum Rail Piping: Test data showing yield strength of pipe as delivered equals or exceeds specified values.
4. Manufacturer’s written recommendations describing procedures for maintaining railings including cleaning materials, application methods, and precautions to be taken in use of cleaning materials.

1.05 QUALITY ASSURANCE

A. Qualifications: Calculations required for design data shall be stamped by a registered civil or structural engineer licensed in state where Project will be constructed.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package and wrap railings to prevent scratching and denting during shipment, storage, and installation. Maintain protective wrapping to the extent possible until railing is completely installed.

B. Delivery:

1. Shop assemble into practical modules of lengths not exceeding 24 feet for shipment.
2. Deliver toeboards loose for field assembly.
3. Deliver clear anodized railing pipe and posts with protective plastic wrap.

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1.07 ENVIRONMENTAL REQUIREMENTS

A. Thermal Movements: Allow for thermal movement resulting from the following maximum range in ambient temperature in design, fabrication, and installation of railings to prevent buckling, opening up of joints, over stressing of components, connections and other detrimental effects. Base design calculation on actual surface temperature of material as a result of both solar heat gain and night time sky heat loss. Temperature change is difference between high or low temperature and installation temperature.

1. Temperature Change Range: 70 degrees F, ambient; 100 degrees F, material surfaces.

PART 2 PRODUCTS

2.01 ALUMINUM RAILINGS

A. General:

1. Furnish pre-engineered and prefabricated railing systems as shown on Drawings.
2. Railing systems using pop rivets or glued railing construction are not permitted.
3. Sand cast accessories and components are not permitted.
4. Fasteners shall be AISI Type 316 stainless steel, unless otherwise noted.

B. Rails, Posts, and Formed Elbows:

1. Extruded Alloy 6105-T5, 6061-T6, or equivalent.
2. Tensile Strength: 38,000 psi, minimum.
3. Yield Strength: 35,000 psi, minimum.
4. Wall Thickness: 0.145 inch, minimum.
5. Posts and railings shall be nominal 1-1/2-inch diameter (1.90-inch outside diameter).

C. Accessories:

1. Fittings and Accessories:
   a. Extruded, machined bar stock, permanent mold castings, or die castings of sufficient strength to meet load requirements.
   b. Gauge metal components are not acceptable for load-resisting components.
   c. Fittings shall match color of pipe in railings.
2. Miscellaneous Extruded Aluminum Parts: Alloys 6063-T6, 6061-T6, or 6105 T5 aluminum, or equivalent, and of adequate strength for all loads.

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3. Castings for Railings:
   a. Cast Al-mag with sufficient strength to meet load and test requirements.
   b. Anodizable grade finish with excellent resistance to corrosion when subjected to exposure of sodium chloride solution intermittent spray and immersion.
4. Post Anchorages:
   a. Refer to standard details for types of post anchorages and minimum requirements.
   b. Bolts at anchorages shall be minimum 1/2-inch diameter.
5. Wall Brackets: Adjustable wall fitting, with provision for minimum three 3/8-inch diameter AISI Type 316 stainless steel bolts or concrete anchors.
6. Rail Terminals (including Wall Returns): Aluminum wall fitting with provision for three 3/8-inch Type 304 fasteners.
7. Railing System Gate:
   a. Extruded aluminum rail components.
   b. Hardware Manufacturers and Products:
      1) Julius Blum & Co., Inc., Carlstadt, NJ; No. 782/3 gate hinges with springs, and No. 784 gate latch and stop.
      2) CraneVeyor Corp., South El Monte, CA; No. C4370b gate hinges with spring, No. C4369 gate latch, and No. C4368 gate stop.
      3) Moultrie Manufacturing Co., Moultrie, GA; Part No. W60006.
8. Railing Picket Panels and Clamps:
   a. 1/2-inch Schedule 40 aluminum pipe (picket).
   b. Extruded aluminum 1-1/2-inch by 7/8-inch by 1/8-inch channel.
   c. Furnish neoprene plug for each end of picket.
   d. Fasteners: Stainless steel.
9. Toeboards:
   a. Molded or extruded Alloy 6063-T6 or 6061-T6 aluminum.
   b. Provide slotted holes for expansion and contraction where required.
10. Fasteners: Stainless steel.

D. Finishes:

1. Pipe and Post: In accordance with AA DAF45, designation AA-M32-C22-A41.
2. Cast Fittings and Toeboards: In accordance with AA DAF45, designation AA-M10-C22-A41.

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2.02 ANCHOR BOLTS, FASTENERS, AND CONCRETE ANCHORS

A. Locknuts, Washers, and Screws:

1. Elastic Locknuts, Steel Flat Washers, Round Head Machine Screws (RHMS): AISI Type 316 stainless steel.
2. Flat Washers: Molded nylon.

B. Bolts and Nuts for Bolting Railing to Metal Beams: ASTM A193/A193M and ASTM A194/A194M, Type 316 stainless steel.

C. Concrete Anchors:

1. Stainless steel, AISI Type 316.
2. Post-installed anchors in accordance with Section 05 50 00, Metal Fabrications, unless otherwise specified herein.
3. Bolt Diameter: 1/2-inch, minimum.

2.03 FABRICATION

A. Shop Assembly:

1. Post Spacing: Maximum 6-foot horizontal spacing.
2. Railing Posts Bolted to Metal or Concrete:
   a. In lieu of field cutting, provide approved fitting with sufficient post overlap, containing provisions for vertical adjustment.
   b. Field fit-up is required.
3. Free of burrs, nicks, and sharp edges when fabrication is complete.
4. Welding is not permitted.

B. Shop/Factory Finishing:

1. Use same alloy for uniform appearance throughout fabrication for railings.
2. Railing and Post Fittings: Match fittings with color of pipe in railing.

C. Shop Assembly:

1. Shop assemble rails, posts, and formed elbows with a close tolerance for tight fit.
2. Fit dowels tightly inside posts.

D. Repair of Defective Work: Remove stains and replace defective Work.

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PART 3 EXECUTION

3.01 GENERAL

A. Field fabrication of aluminum railing systems is not permitted.

B. Where required, provide railing posts longer than needed and field cut to exact dimensions required in order to satisfy vertical variations on actual structure.

C. Install railing with base that provides plus or minus 1/4-inch vertical adjustment inside base fitting. If adjustment is required in field and exceeds plus or minus 1/4-inch, reduce post length not to exceed beyond bottom of lowest set-screw or bolt in base fitting.

D. Modification to supporting structure is not permitted where railing is to be attached.

E. Protection from Entrapped Water:

1. Make provisions in exterior and interior installations subject to high humidity to drain water from railing system.
2. For posts mounted in concrete, bends, and elbows occurring at low points, drill weep holes of 1/4-inch diameter at lowest possible elevations, one hole per post or rail. Drill hole in plane of rail.

3.02 RAILING INSTALLATION

A. Assembly and Installation: Perform in accordance with manufacturer’s written recommendations for installation.

B. Expansion Joints:

1. Maximum intervals of 54 feet on center and at structural joints.
2. Slip joint with internal sleeve extending 2 inches beyond each side of joint. Provide 1/2-inch slip joint gap to allow for expansion.
3. Fasten to one side using 3/8-inch diameter set-screw. Place set-screw at bottom of pipe.
4. Locate joints within 12 inches of posts. Locate expansion joints in rails that span expansion joints in structural walls and floors supporting the posts.

C. Posts and Rails:

1. Surface Mounted Posts:
   a. Bolt post baseplate connectors firmly in place.
   b. Shims, wedges, grout, and similar devices for railing post alignment not permitted.

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2. Set posts plumb and aligned to within 1/8 inch in 12 feet.
3. Set rails horizontal or parallel to slope of steps to within 1/8 inch in 12 feet.
4. Install posts and rails in same plane.
5. Remove projections or irregularities and provide a smooth surface for sliding hands continuously along top rail.
6. Use offset rail for use on stairs and platforms if post is attached to web of stringers or structural platform supports.
7. Support 1-1/2-inch rails directly above stairway stringers with offset fittings.

D. Toeboard:

1. Provide at railings, except where 4 inch or higher concrete curbs are installed, at gates, or at stairways unless shown otherwise.
2. Accurately measure in field for correct length; after railing post installation cut and secure to posts.
3. Dimension between bottom of toeboard and walking surface not to exceed 1/4 inch.
4. Install plumb and aligned to within 1/8 inch in 12 feet.

E. Railing System Gate: Install in accordance with manufacturer's installation instructions.

3.03 FIELD FINISHING

A. Corrosion Protection: Prevent galvanic action and other forms of corrosion caused from direct contact with concrete and dissimilar metals by coating metal surfaces as specified in Section 09 90 00, Painting and Coating.

3.04 FIELD QUALITY CONTROL

A. Post-installed anchors supporting railing systems require special inspection.

B. Contractor-Furnished Quality Control: Inspection and testing as required in Section 01 45 16.13, Contractor Quality Control.

3.05 CLEANING

A. Wash railing system thoroughly using clean water and soap. Rinse with clean water.

B. Do not use acid solution, steel wool, or other harsh abrasive.

C. If stain remains after washing, restore in accordance with railing manufacturer's recommendations or replace stained railings.

END OF SECTION

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SECTION 09 90 00
PAINTING AND COATING

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. NSF International (NSF): 61-92, Drinking Water System Components-Health Effects.
2. Occupational Safety and Health Act.
3. Steel Structures Painting Council.
4. National Association of Corrosion Engineers (NACE): Manual for Painter Safety.

1.02 ABBREVIATIONS

ANSI	American National Standards Institute
AWWA	American Water Works Association
FRP	Fiberglass Reinforced Plastic
HC1	Hydrochloric Acid
MDFT	Minimum Dry Film Thickness
MDFTPC	Minimum Dry Film Thickness Per Coat
mil	Thousandths of an Inch
MIL-P	Military Specification - Paint
NACE	National Association of Corrosion Engineers
OSHA	Occupational Safety and Health Act
PSDS	Paint System Data Sheet
SFPG	Square Feet Per Gallon
SFPGPC	Square Feet Per Gallon Per Coat
SP	Surface Preparation
SSPC	Steel Structures Painting Council

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1.03 SUBMITTALS

A. Product Data: Furnish the following:

1. Data Sheets:
   a. For each paint system used herein, furnish a Paint System Data Sheet (PSDS), Technical Data Sheets, and paint colors available (where applicable) for each product used in the paint system, except for products applied by equipment manufacturers. A sample PSDS form is appended to the end of this section.
   b. Submit required information on a system-by-system basis.
   c. Also provide copies of paint system submittals to the coating applicator.
   d. Indiscriminate submittal of manufacturer's literature only is not acceptable.

B. Samples: Furnish the following:

1. Reference Panel:
   a. Prior to start of surface preparation, furnish a 4-inch by 4-inch steel panel for each grade of sandblast specified herein, prepared to specified requirements.
   b. Provide panel representative of the steel used and prevent from deterioration of surface quality.
   c. Upon approval by Engineer, preserve panel as a reference source for inspection.

C. Quality Control Submittals: Furnish the following:

1. Applicator's Experience: List of references substantiating this requirement as specified.
2. Factory Applied Coatings: Manufacturer's certification stating factory applied coating system meets or exceeds requirements specified herein.
3. If the manufacturer of finish coating differs from that of shop primer, provide both manufacturers’ written confirmation that materials are compatible.

1.04 QUALITY ASSURANCE

A. Applicator's Experience: Minimum 5 years' practical experience in application of specified products.

1.05 PAINT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in unopened containers that plainly show, at time of use, designated name, date of manufacture, color, and manufacturer.

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B. Shipping:

1. Where precoated items are to be shipped to the jobsite, protect coating from damage. Batten coated items to prevent abrasion.
2. Use nonmetallic or padded slings and straps in handling.
3. Items will be rejected for excessive damage.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not apply paint in extreme heat, temperatures below 40 degrees F, nor in dust, smoke-laden atmosphere, damp or humid weather.

B. Do not perform abrasive blast cleaning whenever relative humidity exceeds 85 percent, nor whenever surface temperature is less than 5 degrees F above dewpoint of ambient air. Strictly adhere to coating manufacturer's recommendations.

1.07 WARRANTY

A. The Contractor and coating manufacturer shall jointly and severally warrant to the Owner and guarantee the work under this section against defective workmanship and materials for a period of 1 year commencing on the date of final acceptance of the work.

PART 2 PRODUCTS

2.01 PAINT AND COATINGS MANUFACTURERS

A. The letter code will be found following the generic descriptions of materials outlined in the Specifications. General office addresses are given; contact them for information regarding their representative nearest the project site.

1. MANUFACTURER CODE A - COATINGS MANUFACTURERS (Able to supply most heavy-duty industrial coatings and architectural paints):
   a. TNEMEC Corporation.
   b. Ameron Protective Coatings, Brea, CA.
   c. Carboline Coatings Company, St. Louis, MO.
   d. Devoe & Raynolds, Louisville, KY.
   e. Porter-International, Louisville, KY.
   f. Valspar Corporation, Azusa, CA.
2. MANUFACTURER CODE B - PAINT MANUFACTURERS (Able to supply most architectural and institutional paints):
   a. TNEMEC Corporation.
   b. Ameritone, Long Beach, CA.
   c. Fuller/O'Brien Paint Company, San Francisco, CA.
   d. Benjamin Moore Paints, New York, NY.

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e. Pratt & Lambert, Inc., Buffalo, NY.
f. Sherwin Williams, Cleveland, OH.

3. Fusion Bonded Coating Applicators Code E:
   a. Industrial Coating, Baltimore, MD.
   b. Livingstone Coating Corp., Charlotte, MD.
   c. Southern Steel, Tampa, FL.
   d. West Coast SOCA, Lakeland, FL.

2.02 PAINT MATERIALS

A. Products shall comply with federal, state, and local requirements limiting the emission of volatile organic compounds. Specific information may be secured through the local office of the Air Pollution Control Officer.

B. Materials Including Primer and Finish Coats: Produced by same paint manufacturer.

C. Thinners, Cleaners, Driers, and Other Additives: As recommended by paint manufacturer of the particular coating.

D. Paint products as follows are listed according to their approximate order of appearance in the paint systems. The letter designating the manufacturer code refers to Article PAINT AND COATINGS MANUFACTURERS.

Product	Definition
Polyamide, Anti-Corrosive, Epoxy Primer	Converted epoxy primer containing rust-inhibitive pigments MANUFACTURER CODE: A
Coal-Tar Epoxy	Amine or polyamide type; 70% volume solids minimum, suitable for immersion service MANUFACTURER CODE: A
Organic Zinc Rich Primer	Converted epoxy, epoxy/phenolic or urethane type, minimum 10 lbs; metallic zinc content per gallon MANUFACTURER CODE: A
Rust-Inhibitive Primer	Single-package steel primers with anti-corrosive pigment loading MANUFACTURER CODE: A-B
Alkyd Enamel	Optimum quality, gloss finish, medium long oil MANUFACTURER CODE: A-B

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Product	Definition
Bituminous Paint	Single-component, coal-tar pitch based MANUFACTURER CODE: A
Polyurethane Enamel	Two-component, aliphatic or acrylic based polyurethane; high gloss finish MANUFACTURER CODE: A-B
Concrete Stain	Acrylic, water repellent, penetrating stain MANUFACTURER CODE: B
Acrylic Sealer	Clear acrylic MANUFACTURER CODE: B
Fusion Bonded Coating	100 percent solids, thermosetting, fusion bonded, dry powder epoxy or polyurethane resin, suitable for the intended service
Fusion Bonded, TFE Lube, or Grease Lube	Tetrafluoroethylene, liquid coating; No. 62-4621-4830-5 as manufactured by 3M Co., St. Paul, MN; or open gear grease as supplied by McMaster-Carr Co., Elmhurst, IL; RL 736 as manufactured by Amrep, Marietta, GA

2.03 COLORS

A. Provide as selected by Engineer.

B. Formulate with colorants free of lead, lead compounds, or other materials which might be affected by presence of hydrogen sulfide or other gas likely to be present at the Project.

C. Proprietary identification of colors is for identification only. Any authorized manufacturer may supply matches.

2.04 TESTING GAUGES

A. Furnish a magnetic type dry film thickness gauge, to test coating thickness specified in mils, as manufactured by:

1. Nordson Corp., Anaheim, CA, Mikrotest;
2. Or equal.

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B. Furnish an electrical holiday detector, low voltage, wet sponge type to test finish coat, except zinc primer, high-build elastomeric coatings, and galvanizing, for holidays and discontinuities as manufactured by:

1. Tinker and Rasor, San Gabriel, CA, Model M-1;
2. Or equal.

C. Furnish a high voltage holiday detector for elastomeric coatings in excess of 25 mils dry film thickness. Unit to be as recommended by the coating manufacturer.

PART 3 EXECUTION

3.01 GENERAL

A. Surface Preparation Inspection:

1. Inspect and provide substrate surfaces prepared in accordance with these Specifications and the printed directions and recommendations of paint manufacturer whose product is to be applied.
2. Provide Engineer minimum 3 days' advance notice prior to start of surface preparation work or coating application work.
3. Perform such work only in presence of Engineer, unless Engineer grants prior approval to perform such work in Engineer's absence.

B. For coatings subject to immersion, obtain full cure for completed system. Consult coatings manufacturer's written instructions for these requirements. Do not immerse coating for any purpose until completion of curing cycle.

C. The intention of these Specifications is for new, interior and exterior concrete, and metal surfaces to be painted, whether specifically mentioned or not, except as modified herein. Concealed structural steel surfaces shall receive prime coat only unless modified herein. Exterior concrete surfaces will not be painted unless specifically indicated herein.

D. Do not apply paint in temperatures exceeding manufacturer's recommended maximum or minimum allowable, or in dust, smoke-laden atmosphere, damp or humid weather.

E. Do not perform abrasive blast cleaning whenever relative humidity exceeds 85 percent, or whenever surface temperature is less than 5 degrees F above dewpoint of ambient air.

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3.02 SURFACES NOT REQUIRING PAINTING

A. Unless otherwise stated herein or shown, the following areas or items will not require painting:

1. Concrete and masonry surfaces.
2. Nonferrous and corrosion-resistant ferrous alloys such as copper, bronze, monel, aluminum, chromium plate, atmospherically exposed weathering steel, and stainless steel, except where:
   a. Required for electrical insulation between dissimilar metals.
   b. Aluminum and stainless steel are embedded in concrete or masonry, or aluminum is in contact with concrete or masonry.
   c. Color coding of equipment and piping is required.
3. Nonmetallic materials such as glass, PVC, wood, porcelain, and plastic (FRP) except as required for architectural painting or color coding.
4. Prefinished electrical and architectural items such as motor control centers, switchboards, switchgear, panelboards, transformers, disconnect switches, acoustical tile, cabinets, elevators, building louvers, wall panels, etc.; color coding of equipment is required.
5. Nonsubmerged electrical conduits attached to unpainted concrete surfaces.
6. Cathodic protection anodes.
7. Items specified to be galvanized after fabrication unless specified elsewhere or subject to immersion.
8. Insulated piping and/or insulated piping with jacket will not require exterior coating, except as required for architectural painting or color coding.

B. Prepare manufactured items and materials that are “factory” galvanized and coat as specified hereinafter for the exposure condition of the item and for architectural purposes, unless otherwise specified herein.

3.03 PROTECTION OF MATERIALS NOT TO BE PAINTED

A. Remove, mask, or otherwise protect hardware, lighting fixtures, switchplates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted.

B. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces.

C. Protect working parts of mechanical and electrical equipment from damage. Mask openings in motors to prevent paint and other materials from entering.

D. Mask openings in motors to prevent paint and other materials from entering the motors.

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3.04 APPLICATION SAFETY

A. Perform painting in accordance with recommendations of the following:

1. Paint manufacturer's instructions.
2. NACE, contained in the publication, Manual for Painter Safety.
3. Federal, state, and local agencies having jurisdiction.

B. Contractor will be solely and completely responsible for conditions of the jobsite, including safety of all persons (including employees) and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours. Safety provisions will conform to U.S. Department of Labor, Occupational Safety and Health Act, any equivalent state law, and all other applicable federal, state, county, and local laws, ordinances, and codes.

C. Contractor will comply with all safety training requirements promulgated or required for this Project.

3.05 PAINT MIXING

A. Multiple Component Coatings:

1. Prepare using all the contents of the container for each component as packaged by paint manufacturer.
2. No partial batches will be permitted.
3. Do not use multiple-component coatings that have been mixed beyond their pot life.
4. Provide small quantity kits for touchup painting and for painting other small areas.
5. Mix only components specified and furnished by paint manufacturer.
6. Do not intermix additional components for reasons of color or otherwise, even within the same generic type of coating.

B. Keep paint materials sealed when not in use.

C. Where more than one coat of a material is applied within a given system, alternate color to provide a visual reference that the required number of coats have been applied.

3.06 SHOP BLAST CLEANING

A. Notify Engineer at least 7 days prior to start of shop blast cleaning to allow for inspection of the work during surface preparation and shop application of paints. Work shall be subject to Engineer's approval before shipment to jobsite.

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B. Items such as structural steel, metal doors and frames, metal louvers, and similar items as reviewed by Engineer may be shop prepared and primed. Centrifugal wheel blast cleaning is an acceptable alternate to shop blast cleaning. Blast clean and prime work in accordance with these Specifications.

C. Finish Painting at Jobsite: As specified herein.

3.07 FIELD SANDBLASTING

A. Perform sandblasting for items and equipment where specified and as required to restore damaged surfaces previously shop or field blasted and primed. Materials, equipment, procedures shall meet requirements of Steel Structures Painting Council.

3.08 PREPARATION OF SURFACES

A. Metal Surface Preparation:

1. General:
   a. Submit samples prior to surface preparation blasting.
   b. Conform to current Steel Structures Painting Council (SSPC) Specifications as follows:
      1) Solvent Cleaning: SP 1.
      2) Hand Tool Cleaning: SP 2.
      3) Power Tool Cleaning: SP 3.
      4) White Metal Blast Cleaning: SP 5.
      5) Commercial Blast Cleaning: SP 6.
      6) Brush-Off Blast Cleaning: SP 7.
      7) Pickling: SP 8.
      8) Near-White Blast Cleaning: SP 10.
      9) Power Tool Cleaning to Bare Metal: SP 11.
   c. Where OSHA or EPA regulations preclude standard abrasive blast cleaning, wet or vacu-blast methods may be required. Follow coatings manufacturers' recommendations for wet blast additives and first coat application.
   d. Hand tool clean areas that cannot be cleaned by power tool cleaning.
2. Blast Cleaning Requirements:
   a. Comply with applicable federal, state, and local, air pollution and environmental control regulations for blast cleaning and disposition of spent aggregate and debris.
   b. Alternatives to standard abrasive blast cleaning methods subject to Engineer review.

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3. DeLavaud Process Ductile Iron Pipe:
   a. Use SSPC SP grades as guide only.
   b. For high performance (epoxy) coatings, follow recommendations of pipe and coating manufacturers.
   c. The surface preparation and application of the primer and finish coats shall be performed by the pipe manufacturer.
   d. For conventional (alkyd) coatings, clean asphalt varnish supplied on pipe and apply one full coat of a tar stop before two full coats of the color coats specified.

B. Concrete Surface Preparation:

1. Do not begin until 30 days after concrete has been placed.
2. Remove grease, oil, dirt, salts or other chemicals, loose materials or other foreign matter by solvent, detergent, or other suitable cleaning methods.
3. Brushoff blast clean concrete surfaces to remove loose concrete and to provide a tooth for binding. If brushoff blasting is impractical, surface may be acid etched with muriatic acid solution.
4. Unless otherwise required for proper adhesion, ensure surfaces are dry prior to painting.

C. Plastic Surface Preparation:

1. Hand sand with medium grit sandpaper to provide tooth for coating system.
2. Large areas may be power sanded or brushoff blasted, provided sufficient controls are employed so surface is roughened without removing excess material.

3.09 APPLICATION OF PAINT

A. General:

1. Inspection: Schedule with Engineer in advance for cleaned surfaces and all coats prior to succeeding coat.
2. Apply coatings in accordance with paint manufacturer's recommendations. Allow sufficient time between coats to assure thorough drying of previously applied paint.
3. Fusion Bonded Coatings Method Application: Electrostatic, fluidized bed, or flocking.

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4. Paint units to be bolted together and to structures prior to assembly or installation.
5. Extent of Coating (Immersion): Coatings shall be applied to all internal vessel and pipe surfaces, nozzle bores, flange gasket sealing surfaces, carbon steel internals, and stainless steel internals, unless otherwise specified.

B. Shop Primed or Factory Finished Surfaces:

1. Inspection: Schedule with Engineer in advance for shop primed or factory finished items delivered to jobsite for compliance with Specifications.
2. Hand or power sand areas of chipped, peeled, or abraded coating, feathering the edges. Follow with a spot primer using specified primer.
3. For two-package or converted coatings, consult coatings manufacturer for specific procedures as relates to manufacturer's products.
4. Prior to application of finish coats, clean shop primed surfaces free of dirt, oil, and grease and apply mist coat of specified primer, 1-mil dry film thickness.
5. After welding, prepare and prime holdback areas as required for specified paint system. Apply primer in accordance with manufacturer's instructions.

C. Manufacturer Applied Paint Systems:

1. Repair abraded areas on factory finished items in accordance with the equipment manufacturer's directions.
2. Carefully blend repaired areas into original finish.
3. Fusion Bonded Coatings: Provide appropriate liquid repair kits for field use.

D. Film Thickness:

1. Coverage is listed as either total minimum dry film thickness in mils (MDFT) or the spreading rate in square feet per gallon (SFPG). Per coat determinations are listed as MDFTPC or SFPGPC.
2. Number of Coats: Minimum required irrespective of coating thickness. Additional coats may be required to obtain minimum required paint thickness, depending on method of application, differences in manufacturers' products, and atmospheric conditions.
3. Maximum film build per coat shall not exceed coating manufacturer's recommendations.

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4. Film Thickness Measurements and Electrical Inspection of Coated Surfaces:
   a. Perform with properly calibrated instruments.
   b. Recoat and repair as necessary for compliance with the Specifications.
   c. All coats will be subject to inspection by Engineer and coating manufacturer's representative.
5. Visually inspect concrete, nonferrous metal, plastic, and wood surfaces to ensure proper and complete coverage has been attained.
6. Give particular attention to edges, angles, flanges, and other similar areas, where insufficient film thicknesses are likely to be present, and ensure proper millage in these areas.
7. Thickness Testing:
   a. After repaired and recoated areas have dried sufficiently, final tests will be conducted by the Engineer.
   b. Measure coating thickness specified in mils with a magnetic type dry film thickness gauge as specified.
   c. Test finish coat, except zinc primer, galvanizing, and elastomeric coatings in excess of 25 mils dry, for holidays and discontinuities with an electrical holiday detector, low voltage, wet sponge type as specified.
   d. Holiday detect coatings in excess of 25 mils dry with high voltage units recommended by the coating manufacturer.
   e. Check each coat for correct millage. Do not make measurement before a minimum of 8 hours after application of coating.

E. Porous Surfaces, Such As Concrete, Masonry:

1. Prime Coat:
   a. May be thinned to provide maximum penetration and adhesion.
   b. Type and Amount of Thinning: Determined by paint manufacturer and dependent upon surface density and type of coating.
2. Surfaces Specified to Receive Water Base Coating: Damp, but free of running water, just prior to application of coating.

F. Damaged Coatings, Pinholes, and Holidays:

1. Feather edges and repair in accordance with recommendations of paint manufacturer.
2. Repair fusion bonded coatings as recommended by original applicator. Applicator shall provide liquid repair kits for this purpose as recommended by coating manufacturer.
3. Apply finish coats, including touchup and damage-repair coats, in a manner which will present a uniform texture and color-matched appearance.

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G. Unsatisfactory Application:

1. If item has improper finish color or insufficient film thickness, clean and topcoat surface with specified paint material to obtain specified color and coverage. Obtain specific surface preparation information from coating manufacturer.
2. Hand or power sand visible areas of chipped, peeled, or abraded paint, and feather the edges. Follow with primer and finish coat in accordance with the Specifications. Depending on extent of repair and appearance, a finish sanding and topcoat may be required.
3. Evidence of runs, bridges, shiners, laps, or other imperfections shall be cause for rejection.
4. Repair defects in coating system per written recommendations of coating manufacturer.
5. Leave all staging up until Engineer has inspected surface or coating. Replace staging removed prior to approval by Engineer.

3.10 CLEANUP

A. Place cloths, paint waste, rags, and all related materials that might constitute a fire hazard in closed metal containers and remove these materials on a daily basis from the construction site. These materials are considered RCRA regulated materials and are not to be stored on City of Key West property.

B. Upon completion of the work, remove staging, scaffolding, and containers and remove these materials on a daily basis from the construction site. These materials are considered RCRA regulated materials and are not to be stored on City of Key West property.

C. Completely remove paint spots, oil, or stains upon adjacent surfaces and floors and leave entire job clean.

3.11 PROTECTIVE COATINGS SYSTEMS

A. System No. 2 Submerged, Buried, or Encased Metal – Corrosive Environment:

Surface Prep.	**Paint Material**	**Min. Coats, Cover**
Abrasive Blast, or Centrifugal Wheel Blast (SP 5)	Prime in accordance with manufacturer's recommendations	
	Coal-Tar Epoxy	2 coats, 16 MDFTPC

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B. System No. 5 Exposed Metal - Moderately Corrosive:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 10)	Inorganic Zinc Epoxy (Primer Coat)	1 coat, 3 MDFT
	Polyamide Epoxy, High Solids (Mid Coat)	1 coat, 5 MDFT
	Polyurethane Enamel (Top Coat)	2 coats, 3 MDFTPC

C. System No. 8 Buried Metal:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast or Centrifugal Wheel Blast (SP 10-91)	Cold Applied, Plasticized Coal Tar Pitch Coating (e.g., KOP-COAT Bitumastic No. 50)	2 coasts, 15 MDFTPC

D. System No. 11 Galvanized Metal Repair:

Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1)	Organic Zinc Rich Primer	1 coat, 3 MDFT
Followed by Hand Tool (SP 2), Power Tool (SP 3), or Brushoff Blast (SP 7)		

E. System No. 27 Aluminum and Dissimilar Metal Insulation:

Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1)	Wash Primer	1 coat, 0.4 MDFT
	Bituminous Paint	1 coat, 10 MDFT

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F. System No. 29 Fusion Bonded Coating:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 10-91) or Acid Pickling (SP 8-91)	Fusion Bonded 100 Percent Solids Epoxy or Polyurethane	1 or 2 coats, 7 MDFTPC

3.12 PAINT APPLICATION SCHEDULE

A. Unless otherwise shown or specified in these Specifications, paint or coat the work in accordance with the following application schedule. In the event of discrepancies or omissions in the following, request clarification from the Engineer before starting work in question. [Note: Coatings for piping and fittings are specified in Section 40 27 05, Pipe Corrosion Protection.]

B. System No. 2 Submerged, Buried, or Encased Metal - Use on the following items or areas:

1. New metal surfaces below a plane 1 foot above maximum liquid surface, metal surfaces above maximum liquid surface which are a part of immersed equipment, buried surfaces, concrete embedded surfaces of metallic items, such as wall pipes, pipes, pipe sleeves, access manholes, gate guides and thimbles, and structural steel, except reinforcing steel and the following specific surfaces:
   a. Interior and exterior surfaces of buried valve appurtenances including valve boxes, extension tubes, gear cases, extension rod, etc.
   b. Interior and exterior surfaces of couplings, solid sleeves, and related equipment.
   c. Exterior surfaces of buried valves.

C. System No. 5 Exposed Metal - Moderately Corrosive: Use on the following items or areas:

1. All exposed ferrous metal surfaces located inside or outside of structures or exposed to weather, including structural steel, equipment, piping, and piping appurtenances, etc.
2. Exposed ferrous metal surfaces of valves, operators, and piping specialties.

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D. System No. 8 Buried Metal: Use on the following items or areas:

1. Buried, below grade portions of steel items associated with pipeline joint restraint devices, fasteners and appurtenances including tie-rods, nuts, bolts, and related fasteners.

E. System No. 11 Galvanized Metal Repair: Use on the following items or areas:

1. Galvanized surfaces which are abraded, chipped, or otherwise damaged.

F. System No. 27 Aluminum and Dissimilar Metal Insulation: Use on concrete embedded aluminum surfaces, aluminum surfaces in contact with concrete or grout, and at connections of dissimilar metals.

G. System No. 29 Fusion Bonded Coating: Use on the following items:

1. Anchor bolts and concrete anchors as specified in Section 05 50 00, Metal Fabrications.
2. Interior surfaces of ferrous metal valves (buried or submerged) as specified in Section 40 27 02, Valves and Operators.

3.13 MANUFACTURERS' SERVICES

A. Furnish paint manufacturer's representative to visit jobsite at intervals during surface preparation and painting as may be required for product application quality assurance, and to determine compliance with manufacturer's instructions and these Specifications, and as may be necessary to resolve field problems attributable to, or associated with, manufacturer's products furnished under this Contract.

3.14 SUPPLEMENTS

A. The supplement listed below, following “End of Section,” is part of this Specification.

1. Paint System Data Sheet.

END OF SECTION

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PAINT SYSTEM DATA SHEET

Attached products' Technical Data Sheet (if applicable) to this sheet for each paint system submittal.

Paint System Number (from Spec.):
Paint System Title (from Spec.):
Coatings Supplier:
Representative:
Surface Preparation:

Paint Material (Generic)	**Product Name/Number (Proprietary)**	**Min. Coats Coverage**

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SECTION 26 05 01
ELECTRICAL

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway Transportation Officials (AASHTO).
2. ASTM International (ASTM):
   a. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   b. A240/A240M, Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
   c. A1011/A1011M, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   d. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
   e. C857, Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
3. Electronic Industries Association (EIA/TIA): 569, Commercial Building Standard for Telecommunications Pathways and Spaces.
4. Federal Specifications (FS):
   a. W-C-596, Connector, Electrical, Power, General Specification for.
   b. W-S-896, Switch, Toggle (Toggle and Lock), Flush Mounted (General Specification).
5. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   a. C62.41, Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
   b. PC62.41.1, Draft Guide on the Surge Environment in Low-Voltage (1,000 V and less) AC Power Circuits.
   c. 112, Standard Test Procedure for Polyphase Induction Motors and Generators.
   d. 114, Standard Test Procedures for Single-Phase Induction Motors.
6. International Electrical Testing Association (NETA): ATS, Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
7. National Electrical Contractor’s Association, Inc. (NECA): 1, Standard Practices for Good Workmanship in Electrical Contracting.

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8. National Electrical Manufacturers Association (NEMA):
   a. C80.1, Rigid Steel Conduit-Zinc Coated.
   b. C80.3, Electrical Metallic Tubing-Zinc Coated.
   c. C80.6, Intermediate Metal Conduit-Zinc Coated (IMC).
   d. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
   e. CC1, Electrical Power Connectors for Substations.
   f. ICS 1, Industrial Control and Systems: General Requirements.
   g. ICS 2, Industrial Control and Systems: Controllers, Contactors, and Overload Relays Rated Not More Than 2,000 Volts AC or 750 Volts DC.
   h. ICS 2.3, Industrial Control and Systems: Instructions for the Handling, Installation, Operation and Maintenance of Motor Control Centers.
   i. MG 1, Motors and Generators.
   j. PB 1, Panelboards.
   k. RN 1, Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
   l. ST 20, Dry Type Transformers for General Applications.
   m. TC 2, Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
   n. TC 3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.
   o. WC 55, Instrumentation Cables and Thermocouple Wire.
   p. WC 70, Standard for Non-Shielded Power Cables Rated 2000 V or Less for the Distribution of Electrical Energy.
   q. WC 71, Standard for Non-Shielded Cables Rated 2,001-5,000 Volts for use in the Distribution of Electrical Energy.
   r. WC 74, 5-46 KV Shielded Power Cable for use in the Transmission and Distribution of Electric Energy.
   s. WD 1, General Color Requirements for Wiring Devices.
9. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
10. Underwriters Laboratories, Inc. (UL):
   a. 1, Flexible Metal Conduit.
   b. 6, Electrical Rigid Metal Conduit—Steel.
   c. 13, Power-Limited Circuit Cables.
   d. 44, Thermoset Insulated Wires and Cables.
   e. 62, Flexible Cord and Fixture Wire.
   f. 67, Panelboards.
   g. 98, Enclosed and Dead-Front Switches.
   h. 198C, High Interrupting Capacity Fuses, Current Limiting Types.
   i. 198E, Class R Fuses.
   j. 360, Liquid-Tight Flexible Steel Conduit.
   k. 486A, Wire Connectors and Soldering Lugs for Use with Copper Conductors.
   l. 486C, Splicing Wire Connectors.

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m. 489, Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures.
n. 508, Industrial Control Equipment.
o. 510, Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
p. 514B, Fittings for Cable and Conduit.
q. 674, Electric Motors And Generators for use in Division 1 Hazardous (Classified) Locations.
r. 854, Service-Entrance Cables.
s. 1059, Terminal Blocks.
t. 1561, Dry-Type General Purpose and Power Transformers.
u. 2111, Overheating Protection for Motors.

1.02 DEFINITIONS

A. AHJ: Authority Having Jurisdiction.

B. MCOV: Maximum Allowable Continuous Operating Voltage.

C. MOV: Metal Oxide Varistor.

D. SASD: Silicon Avalanche Suppressor Diode.

E. SVR: Surge Voltage Rating.

F. TVSS: Transient Voltage Surge Suppressor.

1.03 SUBMITTALS

A. Action Submittals:

1. Boxes and device plates.
2. Junction and pullboxes.
3. Terminal blocks.
4. Support and framing channels.
5. Conduit, fittings, and accessories.
6. Conductors, cable, and accessories.
7. Grounding materials.
8. Main circuit breaker.
9. Mini power center.
10. Arc flash warning labels.

B. Informational Submittals:

1. Field test reports.
2. Signed permits indicating Work is acceptable to regulatory authorities having jurisdiction.

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1.04 APPROVAL BY AUTHORITY HAVING JURISDICTION

A. Provide the Work in accordance with current edition of NFPA 70, National Electrical Code (NEC). Where required by the Authority Having Jurisdiction (AHJ), material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ, in order to provide a basis for approval under the NEC.

B. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have the appropriate UL listing mark or label by a Nationally Recognized Testing Laboratory.

1.05 ENVIRONMENTAL CONDITIONS

A. The following areas are classified hazardous, Class I, Division 2, Group D, due to the potential for accumulation of hazardous concentrations of combustible gases, and for exposure to corrosive environment. Use materials and methods required for such areas.

1. Inside storm water wet well.
2. Inside storm water diversion structure.
3. Inside storm water vortex separator.
4. Enclosed, below grade valve and metering vaults with closed piping systems containing storm water.

B. The following areas are classified nonhazardous and wet. Use materials and methods required for such areas.

1. Outdoor abovegrade areas not covered above.

1.06 QUALIFICATIONS

A. PVC-Coated, Rigid Steel Conduit Installer: Must be certified by conduit manufacturer as having received minimum 2 hours of training on installation procedures and manufacturer’s on-site verification that the proper equipment for bending, threading, and installation of PVC-coated steel conduit is at the site. The manufacturer shall inspect all repairs to the coating and provide the Owner with written assurance that all repairs have been completed in a manner that will maintain the integrity of the factory coating.

PART 2 PRODUCTS

2.01 GENERAL

A. Products shall comply with all applicable provisions of NFPA 70.

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B. Like Items of Equipment: End products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer's service.

C. Hazardous Areas: Products shall be acceptable to the regulatory authority having jurisdiction and in accordance with NFPA 70 (NEC) for the class, division, and group of hazardous area indicated.

D. Equipment Finish: Manufacturer's standard finish color, except where specific color is indicated.

2.02 JUNCTION AND PULL BOXES

A. Conduit Bodies Used as Junction Boxes: As specified under Article Conduit and Fittings.

B. Large Cast Metal Box:

1. NEMA 250, Type 4, suitable for 24-hour submersion under a 6-foot head of water.
2. Box: Cast ferrous metal, electrogalvanized finished, with factory-bossed, drilled and tapped conduit entrances and exterior mounting lugs. No field drilling allowed.
3. Cover: Nonhinged screws.
4. Gasket: Neoprene.
5. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
6. Manufacturers and Products, Surface Mounted Nonhinged Type: O-Z/Gedney; Series YF-SUB6P.

2.03 TERMINAL BLOCKS

A. UL 486E and UL 1059.

B. Size components to allow insertion of necessary wire sizes.

C. Capable of termination of control circuits entering or leaving equipment, panels, or boxes.

D. Screw clamp compression, dead front barrier type, with current bar providing direct contact with wire between compression screw and yoke.

E. Yoke, current bar, and clamping screw of high strength and high conductivity metal.

F. Yoke shall guide all strands of wire into terminal.

G. Current bar shall ensure vibration-proof connection.

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H. Terminals:

1. Capable of wire connections without special preparation other than stripping.
2. Capable of jumper installation with no loss of terminal or rail space.
3. Individual, rail mounted.

I. Marking system, allowing use of preprinted or field-marked tags.

J. Manufacturers:

1. Weidmuller, Inc.
2. Ideal.
3. Electrovert USA Corp.

2.04 SUPPORT AND FRAMING CHANNELS

A. PVC Coated Framing Channel: Carbon steel framing channel with 40-mil polyvinyl chloride coating.

B. Stainless Steel Framing Channel: Rolled, ASTM A167, Type 316 stainless steel, 12-gauge minimum.

C. Extruded Aluminum Framing Channel:

1. Material: Extruded from Type 6063-T6 aluminum alloy.
2. Fittings fabricated from Alloy 5052-H32.

D. Manufacturers:

1. B-Line Systems, Inc.
2. Unistrut Corp.
3. Aickinstrut.

2.05 CONDUIT AND FITTINGS

A. PVC-Coated Rigid Galvanized Steel Conduit:

1. Meet requirements of NEMA RN 1.
2. Material:
   a. Meet requirements of NEMA C80.1 and UL 6.
   b. Exterior Finish : PVC coating, 40 mils nominal thickness, bond to metal shall have tensile strength greater than PVC.
   c. Interior finish: Urethane coating, 2 mils nominal thickness.
3. Threads: Hot-dipped galvanized and factory coated with urethane.
4. Bendable without damage to either interior or exterior coating.
5. Robroy Form 8, no substitutions allowed.

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B. Flexible Metal, Liquid-Tight Conduit:

1. UL 360 listed for 105 degrees C insulated conductors.
2. Material: Galvanized steel, with an extruded PVC jacket.

C. Fittings:

1. Provide bushings, grounding bushings, conduit hubs, conduit bodies, couplings, unions, conduit sealing fittings, drain seals, drain/breather fittings, expansion fittings, and cable sealing fittings, as applicable.
2. PVC-Coated Rigid Galvanized Steel Conduit:
   a. Meet requirements of UL 514B.
   b. Fittings: Rigid galvanized steel type, PVC-coated by conduit manufacturer.
   c. Conduit Bodies: Cast metal hot-dipped galvanized or urethane finish. Cover shall be of same material as conduit body. PVC-coated by conduit manufacturer.
   d. Finish: 40-mil PVC exterior, 2-mil urethane interior.
   e. Overlapping pressure sealing sleeves.
   f. Conduit Hangers, Attachments, and Accessories: PVC-coated.
   g. Manufacturers:
      1) Robroy Industries.
      2) Ocal.
   h. Expansion Fitting Manufacturer and Product: Ocal; Ocal-Blue XJG.
3. Flexible Metal, Liquid-Tight Conduit:
   a. Metal insulated throat connectors with integral nylon or plastic bushing rated for 105 degrees C.
   b. Insulated throat and sealing O-rings.

2.06 CONDUIT ACCESSORIES

A. Identification Devices:

1. Raceway Tags:
   a. Material: Permanent, nonferrous metal.
   b. Shape: Round.
   c. Raceway Designation: Pressure stamped, embossed, or engraved.
   d. Tags relying on adhesives or taped-on markers not permitted.

B. Raceway Band:

1. Slip-on Type:
   a. Provide heat-shrinkable, black, medium-wall polyolefin tubing with factory-applied adhesive/sealant. Select product size based upon raceway outside diameter.
   b. Manufacturer and Product: 3M; Type IMCSN, medium wall cable sleeve.

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2. Wrap-around Type:
   a. Provide 4-inch width, 20-mil thickness, nonprinted black PVC corrosion protection tape with primer.
   b. Manufacturer and Product: 3M; Type Scotchrap 51 with Scotchrap Pipe Primer.

2.07 CONDUCTORS AND CABLES

A. Conductors 600 Volts and Below:

1. Conform to applicable requirements of NEMA WC 71, WC 72, and WC 74.
2. Conductor Type:
   a. 120- and 277-Volt Lighting, No. 10 AWG and Smaller: Solid copper.
   b. 120-Volt Receptacle Circuits, No. 10 AWG and Smaller: Solid copper.
   c. All Other Circuits: Stranded copper.
3. Insulation: Type XHHW.

B. Type 1, Multiconductor Control Cable:

1. Conductors:
   a. No. 14 AWG, seven-strand copper.
   b. Insulation: 15-mil PVC with 4-mil nylon.
   c. UL 1581 listed as Type THHN/THWN rated VW-1.
   d. Conductor group bound with spiral wrap of barrier tape.
   e. Color Code: In accordance with ICEA S-58-679, Method 1, Table 2.
2. Cable: Passes the ICEA T-29-520 210,000 Btu per hour Vertical Tray Flame Test.
3. Cable Sizes:

No. of Conductors	**Max. Outside Diameter (Inches)**	**Jacket Thickness (Mils)**
3	0.41	45
5	0.48	45
7	0.52	45
12	0.72	60
19	0.83	60
25	1.00	60
37	1.15	80

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4. Manufacturers:
   a. Okonite Co.
   b. Southwire.

C. Type 3, No. 16 AWG, Twisted, Shielded Pair, Instrumentation Cable: Single pair, designed for noise rejection for process control, computer, or data log applications meeting NEMA WC 55 requirements.

1. Outer Jacket: 45-mil nominal thickness.
2. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer overlapped to provide 100 percent coverage.
3. Dimension: 0.31-inch nominal OD.
4. Conductors:
   a. Bare soft annealed copper, Class B, seven-strand concentric, meeting requirements of ASTM B8.
   b. 20 AWG, seven-strand tinned copper drain wire.
   c. Insulation: 15-mil nominal PVC.
   d. Jacket: 4-mil nominal nylon.
   e. Color Code: Pair conductors, black and red.
5. Manufacturers:
   a. Okonite Co.
   b. Alpha Wire Corp.
   c. Belden.

D. Accessories:

1. Tape:
   a. General Purpose, Flame Retardant: 7 mils, vinyl plastic, Scotch Brand 33, rated for 90 degrees C minimum, meeting requirements of UL 510.
   b. Flame Retardant, Cold and Weather Resistant: 8.5 mils, vinyl plastic, Scotch Brand 88.
   c. Arc and Fireproofing:
      1) 30 mils, elastomer.
      2) Manufacturers and Products:
         a) 3M; Scotch Brand 77, with Scotch Brand 69 glass cloth tapebinder.
         b) Plymount; Plyarc 53, with Plyglas 77 glass cloth tapebinder.
2. Identification Devices:
   a. Sleeve-type, permanent, PVC, yellow or white, with legible machine-printed black markings.
   b. Manufacturer and Products: Raychem; Type D-SCE or ZH-SCE.

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3. Connectors and Terminations:
   a. Nylon, Self-Insulated Crimp Connectors:
      1) Manufacturers and Products:
         a) Thomas & Betts; Sta-Kon.
         b) Burndy; Insulug.
         c) ILSCO.
4. Self-Insulated, Freespring Wire Connector (Wire Nuts):
   a. Plated steel, square wire springs.
   b. UL Standard 486C.
   c. Manufacturers and Products:
      1) Thomas & Betts.
      2) Ideal; Twister.
5. Cable Lugs:
   a. In accordance with NEMA CC 1.
   b. Rated 600 volts of same material as conductor metal.
   c. Uninsulated Crimp Connectors and Terminators:
      1) Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
      2) Manufacturers and Products:
         a) Thomas & Betts; Color-Keyed.
         b) Burndy; Hydent.
         c) ILSCO.
   d. Uninsulated, Bolted, Two-Way Connectors and Terminators:
      1) Manufacturers and Products:
         a) Thomas & Betts; Locktite.
         b) Burndy; Quiklug.
         c) ILSCO.
6. Cable Ties:
   a. Nylon, adjustable, self-locking, and reusable.
   b. Manufacturer and Product: Thomas & Betts; TY-RAP.
7. Heat Shrinkable Insulation:
   a. Thermally stabilized, crosslinked polyolefin.
   b. Manufacturer and Product: Thomas & Betts; SHRINK-KON.

2.08 GROUNDING

A. Ground Rods: Provide copper-clad steel with minimum diameter of 3/4-inch, and length of 10 feet.

B. Ground Conductors: As shown on Drawings.

C. Connectors:

1. Exothermic Weld Type:
   a. Outdoor Weld: Suitable for exposure to elements or direct burial.
   b. Manufacturers: Erico Products, Inc.; Cadweld and Cadweld Exolon, no substitutions allowed.

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2. Compression Type:
   a. Compress-deforming type; wrought copper extrusion material.
   b. Single indentation for conductors 6 AWG and smaller.
   c. Double indentation with extended barrel for conductors 4 AWG and larger.
   d. Single barrels prefilled with oxide-inhibiting and antiseizing compound.
   e. Manufacturers:
      1) Burndy Corp.
      2) Thomas and Betts Co.
      3) ILSCO.
3. Mechanical Type:
   a. Split-bolt, saddle, or cone screw type; copper alloy material.
   b. Manufacturers:
      1) Burndy Corp.
      2) Thomas and Betts Co.

D. Grounding Wells:

1. H-20 rated ground rod box complete with cast iron riser ring and H-20 traffic rated cover marked GROUND ROD.
2. Manufacturers and Products:
   a. Christy Co./Old Castle: No. G5.
   b. Lightning and Grounding Systems, Inc.: I-R Series.

2.09 MINI-POWER CENTER (MPC)

A. General: Transformer, primary and secondary main circuit breakers, and secondary panelboard section enclosed in NEMA 250, Type 3R, 316 stainless steel enclosure painted white.

B. Transformer:

1. Insulation Class and Temperature Rise: Manufacturer’s standard.
2. Core and Coil: Encapsulated.
3. Full capacity, 2-1/2 percent voltage taps, two above and two below normal voltage.
4. Primary Voltage: 480V, single phase.
5. Secondary Voltage: 120V, single phase.

C. Panelboard: Full, UL 489, short-circuit current rated.

1. Type: Thermal-magnetic, quick-make, quick-break, indicating, with noninterchangeable molded case circuit breakers.
2. Number and Breaker Ampere Ratings: As indicated.

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D. Exterior Finish:

1. In accordance with Section 09 90 00, Painting and Coating.
2. Color: White.

E. Manufacturers:

1. Eaton.
2. General Electric Co.
3. Square D Co.

2.10 CIRCUIT BREAKER, INDIVIDUAL, 0 TO 600 VOLTS

A. UL 489 listed for use at location of installation.

B. Minimum Interrupt Rating: 42,000 amps rms symmetrical at 480 volts.

C. Thermal-magnetic, quick-make, quick-break, indicating type showing ON/OFF and TRIPPED indicating positions of operating handle.

D. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

E. Locking: Provisions for padlocking handle.

F. Enclosure: As shown.

G. Interlock: Enclosure and switch shall interlock to prevent opening cover with breaker in the ON position.

H. Exterior Finish:

1. In accordance with Section 09 90 00, Painting and Coating.
2. Color: White.

I. Manufacturers:

1. Eaton.
2. General Electric Co.
3. Square D Co.

2.11 NAMEPLATES

A. Material: Laminated plastic.

B. Attachment Screws: Stainless steel.

C. Color: White. Engraved to a black core.

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D. Letter Height:

1. Pushbuttons/Selector Switches: 1/8 inch.
2. Other Electrical Equipment: ¼ inch.

2.12 SIGNS AND LABELS

A. Sign size, lettering, and color shall be in accordance with NEMA Z535.4.

PART 3 EXECUTION

3.01 GENERAL

A. Install materials and equipment in accordance with manufacturer's instructions and recommendations.

B. Install materials and equipment in hazardous areas in a manner acceptable to regulatory authority having jurisdiction for the class, division, and group of hazardous areas shown.

C. Electrical Drawings show general locations of equipment, devices, and raceways, unless specifically dimensioned. Contractor shall be responsible for actual location of equipment and devices and for proper routing and support of raceways, subject to approval of Engineer.

D. Check approximate locations of raceways and other electrical system components shown on Drawings for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, notify Engineer in writing.

E. Install work in accordance with NECA Standard of Installation, unless otherwise specified.

F. Keep openings in boxes and equipment closed during construction.

G. Lay out work carefully in advance. Do not cut or notch any structural member without specific approval of Engineer. Carefully perform cutting, channeling, chasing, or drilling of platform, walls, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment. Following such work, restore surfaces to original condition.

H. Realign equipment not properly aligned and correct unlevelness.

I. Properly anchor electrical equipment found to be inadequately anchored.

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J. Tighten accessible bolted connections, including wiring connections, with calibrated torque wrench/screw driver to manufacturer's recommendations, or as otherwise specified in NETA ATS.

K. Clean contaminated surfaces with cleaning solvents as recommended by manufacturer.

L. Provide proper lubrication of applicable moving parts.

M. Electrical Enclosures:

1. Remove foreign material and moisture from enclosure interior.
2. Vacuum and wipe clean enclosure interior.
3. Remove corrosion found on metal surfaces.
4. Repair or replace, as determined by Engineer door and panel sections having dented surfaces.
5. Repair or replace, as determined by Engineer poor fitting doors and panel sections.
6. Repair or replace improperly operating latching, locking, or interlocking devices.
7. Replace missing or damaged hardware.

3.02 COMBINING CIRCUITS INTO COMMON RACEWAY

A. Drawings show each homerun circuit to be provided. Do not combine power or control circuits into common raceways without prior authorization of Engineer

3.03 DEMOLITION

A. General Demolition:
1. Where shown, de-energize and disconnect nonelectrical equipment for removal by others.
2. Where shown, de-energize, disconnect, and remove electrical equipment.
3. Remove affected circuits and raceways back to serving panelboard or control panel. Where affected circuits are consolidated with others, remove raceways back to first shared condulet or box. Where underground or embedded raceways are to be abandoned, remove raceway to 1 inch below surface of structure or 12 inches belowgrade and restore existing surface.

3.04 CLEANING AND TOUCHUP PAINTING

A. Cleaning: Throughout the Work, clean interior and exterior of devices and equipment by removing debris and vacuuming.

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B. Touchup Paint:

1. Touchup scratches, scrapes and chips on exterior and interior surfaces of devices and equipment with finish matching type, color, and consistency and type of surface of original finish.
2. If extensive damage is done to equipment paint surfaces, refinish entire equipment in a manner that provides a finish equal to or better than factory finish, that meets requirements of Specification, and is acceptable to Engineer.

3.05 PROTECTION FOLLOWING INSTALLATION

A. Protect materials and equipment from corrosion, physical damage, and effects of moisture on insulation.

B. Cap conduit runs during construction with manufactured seals.

C. Close openings in boxes or equipment during construction.

D. Energize space heaters furnished with equipment.

3.06 SERVICE ENTRANCE EQUIPMENT AND METERING

A. Unless otherwise specified or shown, schedule and coordinate work of serving utility as required to provide electric service to the Work.

3.07 JUNCTION AND PULL BOXES

A. Install where shown and where necessary to terminate, tap-off, or redirect multiple conduit runs.

B. Install pull boxes where necessary in raceway system to facilitate conductor installation.

C. Use conduit bodies as junction and pull boxes where no splices are required and their use is allowed by applicable codes.

D. Installed boxes shall be accessible.

E. Do not install on finished surfaces.

F. Install plumb and level.

G. Support boxes independently of conduit by attachment to building structure or structural member.

H. Mounting Hardware: Stainless steel.

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I. Location/Type:

1. Outdoor: NEMA 250, Type 4X, stainless steel.
2. Underground Conduit: Direct-buried.

3.08 SUPPORT AND FRAMING CHANNELS

A. Install where required for mounting and supporting electrical equipment and raceway systems.

B. Channel Type - Outdoor: PVC coated, stainless steel or rigid aluminum.

C. Treat PVC coated carbon steel channel cut ends prior to installation with cold galvanizing process, and PVC patch.

3.09 PANELBOARDS AND MINI-POWER CENTERS

A. Install securely, plumb, in-line and square with support structures.

B. Install top of cabinet 6 feet above floor, unless otherwise shown.

C. Provide typewritten circuit directory for each panelboard.

3.10 CONDUIT AND FITTINGS

A. General:

1. Crushed or deformed raceways not permitted.
2. Maintain raceway entirely free of obstructions and moisture.
3. Immediately after installation, plug or cap raceway ends with watertight and dust-tight seals until time for pulling in conductors.
4. Sealing Fittings: Provide drain seal in vertical raceways where condensate may collect above sealing fitting.
5. Avoid moisture traps where possible. When unavoidable in exposed conduit runs, provide junction box and drain fitting at conduit low point.
6. Group raceways installed in same area.
7. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways.
8. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes.
9. Install watertight fittings in outdoor, underground, or wet locations.
10. Paint threads and cut ends, before assembly of fittings or PVC-coated galvanized conduit with zinc-rich paint or liquid galvanizing compound.
11. Metal conduit to be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.
12. Do not install raceways in concrete equipment pads, foundations, or beams.

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13. Horizontal raceways installed under slabs shall lie completely under slab, with no part embedded within slab.
14. Install concealed, embedded, and buried raceways so that they emerge at right angles to surface and have no curved portion exposed.
15. Install conduits for fiber optic cables, telephone cables, and Category 5 data cables in strict conformance with the requirements of EIA/TIA 569.

B. Conduit Application:

1. Diameter:
   a. Minimum Trade Size: 3/4 inch.
   b. Material: PVC-coated rigid galvanized steel.

C. Connections:

1. For dry type transformers, instrumentation, and other equipment where flexible connection is required to minimize vibration:
   a. Flexible metal, liquid-tight conduit.
   b. Length: 18 inches minimum, 60 inches maximum, sufficient to allow movement or adjustment of equipment.
2. Outdoor areas, process areas exposed to moisture, and areas required to be oiltight and dust-tight: Flexible metal, liquid-tight conduit.

D. Penetrations:

1. Make at right angles, unless otherwise shown.
2. Notching or penetration of structural members, including footings and beams, not permitted.

E. Support:

1. Support from structural members only, at intervals not exceeding NFPA 70 requirements, and in any case not exceeding 8 feet. Do not support from piping, pipe supports, or other raceways.
2. Multiple Adjacent Raceways: Provide ceiling trapeze. For trapeze-supported conduit, allow 10 percent extra space for future conduit.
3. Application/Type of Conduit Strap:
   a. PVC-Coated Rigid Steel Conduit: PVC-coated metal or stainless steel.
4. Provide and attach wall brackets, strap hangers, or ceiling trapeze as follows:
   a. Wood: Wood screws.
   b. Hollow Masonry Units: Toggle bolts.

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c. Concrete or Brick: Expansion shields, or threaded studs driven in by powder charge, with lock washers and nuts.
d. Steelwork: Machine screws.
e. Location/Type of Hardware: Stainless steel.

F. Bends:

1. Install concealed raceways with a minimum of bends in the shortest practical distance.
2. Make bends and offsets of longest practical radius.
3. Install with symmetrical bends or cast metal fittings.
4. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.
5. Make bends in parallel or banked runs from same center or centerline with same radius so that bends are parallel.
6. Factory elbows may be installed in parallel or banked raceways if there is change in plane of run and raceways are same size.
7. Flexible Conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.

G. PVC-Coated Rigid Steel Conduit:

1. Install in accordance with manufacturer’s instructions.
2. All tools and equipment used in the cutting, bending, threading, and installation of PVC-coated rigid steel conduit shall be designed to limit damage to the PVC coating.
3. Provide PVC boot to cover all exposed threading.

H. Termination at Enclosures:

1. Cast Metal Enclosure: Provide manufacturer’s premolded insulating sleeve inside metallic conduit terminating in threaded hubs.
2. Nonmetallic, Cabinets, and Enclosures: Terminate conduit in threaded conduit hubs, maintaining enclosure integrity.
3. Sheet Metal Boxes, Cabinets, and Enclosures:
   a. PVC-Coated Rigid Galvanized Steel Conduit: Provide PVC-coated, liquid-tight, metallic connector.
4. Free-Standing Enclosures: Terminate metal conduit entering bottom with grounding bushing; provide a grounding jumper extending to equipment ground bus or grounding pad.

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I. Underground Raceways:

1. Grade: Maintain minimum grade of 4 inches in 100 feet, either from one manhole, handhole, or pull box to the next, or from a high point between them, depending on surface contour.
2. Cover: Maintain minimum 2-foot cover above conduit, unless otherwise shown.
3. Make routing changes as necessary to avoid obstructions or conflicts.
4. Couplings: In multiple conduit runs, stagger so couplings in adjacent runs are not in same transverse line.
5. Union type fittings not permitted.
6. Spacers:
   a. Provide preformed, nonmetallic spacers, designed for such purpose, to secure and separate parallel conduit runs in a trench.
   b. Install at intervals not greater than that specified in NFPA 70 for support of the type conduit used, but in no case greater than 10 feet.
7. Support conduit so as to prevent bending or displacement during backfilling.
8. Installation with Other Piping Systems:
   a. Crossings: Maintain minimum 12-inch vertical separation.
   b. Parallel Runs: Maintain minimum 12-inch separation.
   c. Installation over valves or couplings not permitted.
9. Metallic Raceway Coating: Along entire length, coat with raceway coating.

J. Empty Raceways:

1. Provide permanent, removable cap over each end.
2. Provide nylon pull cord.
3. Identify, as specified in Article Identification Devices, with waterproof tags attached to pull cord at each end, and at intermediate pull point.

K. Identification Devices:

1. Raceway Tags:
   a. Identify origin and destination.
   b. Install at each terminus, near midpoint, and at minimum intervals of every 50 feet of exposed raceway, whether in ceiling space or surface mounted.
   c. Provide corrosion-resistant wire for attachment.
2. Warning Tape: Install approximately 18 inches above underground or concrete-encased raceways. Align parallel to, and within 12 inches of, centerline of runs.

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L. Raceway Band:

1. Install wherever metallic conduit emerges from concrete slabs. Not required with PVC-coated RGS conduit. Center band at slab surface and install according to manufacturer's instructions.
   a. Slip-on Type: Clean conduit surface at installation location. Cut tubing to 4-inch minimum lengths and slip onto raceway prior to slab placement and termination of conduit. Heat-shrink onto conduit.
   b. Wrap-around Type: Use where slip-on access to conduit is not possible. Clean conduit surface at installation location. Apply primer. Apply wraps to provide two layers of tape. Neatly finish tape end to prevent unraveling.

3.11 CONDUCTORS AND CABLES

A. Conductor storage, handling, and installation shall be in accordance with manufacturer's recommendations.

B. Do not exceed manufacturer's recommendations for maximum pulling tensions and minimum bending radii.

C. Conduit system shall be complete prior to drawing conductors. Lubricate prior to pulling into conduit. Lubrication type shall be as approved by conductor manufacturer.

D. Terminate all conductors and cables, unless otherwise shown.

E. Do not splice conductors, unless specifically indicated or approved by Engineer.

F. Bundling: Where single conductors and cables in manholes, handholes, vaults, cable trays, and other indicated locations are not wrapped together by some other means, bundle conductors from each conduit throughout their exposed length with cable ties placed at intervals not exceeding 12 inches.

G. Wiring within Equipment and Local Control Panels: Remove surplus wire, dress, bundle, and secure.

H. Power Conductor Color Coding:

1. No. 6 AWG and Larger: Apply general purpose, flame retardant tape at each end, and at accessible locations wrapped at least six full overlapping turns, covering an area 1-1/2 to 2 inches wide.
2. No. 8 AWG and Smaller: Provide colored conductors.

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3. Colors:
   a. Neutral Wire:
      1) White;120/240 and 120/208 volt systems
      2) Gray; 277/480 volt systems.
   b. Live Wires, 120/240-Volt, Single-Phase System: Black, red.
   c. Live Wires, 120/208-Volt, Three-Phase System: Black, red, or blue.
   d. Live Wires, 277/480-Volt, Three-Phase System: Brown, orange, or yellow.
   e. Ground Wire: Green.

I. Circuit Identification:

1. Circuits Appearing in Circuit Schedules: Identify power, instrumentation, and control conductor circuits, using circuit schedule designations, at each termination and in accessible locations such as manholes, handholes, panels, switchboards, motor control centers, pull boxes, and terminal boxes.
2. Circuits Not Appearing in Circuit Schedules: Assign circuit name based on device or equipment at load end of circuit. Where this would result in same name being assigned to more than one circuit, add number or letter to each otherwise identical circuit name to make it unique.
3. Method: Identify with sleeves. Taped-on markers or tags relying on adhesives not permitted.

J. Connections and Terminations:

1. Install wire nuts only on solid conductors.
2. Install nylon self-insulated crimp connectors and terminators for instrumentation and control circuit conductors.
3. Tape insulate all uninsulated connections.
4. Install crimp connectors and compression lugs with tools approved by connector manufacturer.

3.12 GROUNDING

A. Grounding shall be in compliance with NFPA 70 and as shown.

B. Ground electrical service neutral at service entrance equipment to supplementary grounding electrodes.

C. Ground each separately derived system neutral to nearest effectively grounded building structural steel member or separate grounding electrode.

D. Bond together system neutrals, service equipment enclosures, exposed noncurrent-carrying metal parts of electrical equipment, metal raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.

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E. Shielded Instrumentation Cables:

1. Ground shield to ground bus at power supply for analog signal.
2. Expose shield minimum 1 inch at termination to field instrument and apply heat shrink tube.
3. Do not ground instrumentation cable shield at more than one point.

F. Equipment Grounding Conductors: Provide in all conduits containing power conductors and control circuits above 50 volts.

G. Ground Rods: Install full length with conductor connection at upper end. Install one ground rod in each handhole.

H. Visual and Mechanical Inspection:

1. Equipment and circuit grounds in pump control panel and RTU assemblies for proper connection and tightness.
2. Ground bus connections in pump control panel and RTU assemblies for proper termination and tightness.
3. Effective transformer core and equipment grounding.
4. Accessible connections to grounding electrodes for proper fit and tightness.
5. Accessible exothermic-weld grounding connections to verify that molds were fully filled and proper bonding was obtained.

I. Ground Wells:

1. Install riser ring and cover flush with surface or grade.
2. Place 12 inches of crushed rock in bottom of each well.

3.13 FIELD QUALITY CONTROL

A. Tests shall be performed in accordance with the requirements of Section 01 91 14, Equipment Testing and Facility Startup.

B. General:

1. Test equipment shall have an operating accuracy equal to, or greater than, requirements established by NETA ATS.
2. Test instrument calibration shall be in accordance with NETA ATS.
3. Perform inspection and electrical tests after equipment has been installed.
4. Perform tests with apparatus de-energized whenever feasible.
5. Inspection and electrical tests on energized equipment are to be:
   a. Scheduled with Owner prior to de-energization.
   b. Minimized to avoid extended period of interruption.

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C. Tests and inspection shall establish that:

1. Electrical equipment is operational within industry and manufacturer's tolerances.
2. Installation operates properly.
3. Equipment is suitable for energization.
4. Installation conforms to requirements of Contract Documents and NFPA 70.

D. Perform inspection and testing in accordance with NETA ATS, industry standards, and manufacturer's recommendations.

E. Adjust mechanisms and moving parts for free mechanical movement.

F. Verify nameplate data for conformance to Contract Documents.

G. Realign equipment not properly aligned and correct unlevelness.

H. Properly anchor electrical equipment found to be inadequately anchored.

I. Tighten accessible bolted connections, including wiring connections, with calibrated torque wrench to manufacturer's recommendations, or as otherwise specified.

J. Clean contaminated surfaces with cleaning solvents as recommended by manufacturer.

K. Provide proper lubrication of applicable moving parts.

L. Investigate and repair or replace:

1. Electrical items that fail tests.
2. Active components not operating in accordance with manufacturer's instructions.
3. Damaged electrical equipment.

M. Electrical Enclosures:

1. Remove foreign material and moisture from enclosure interior.
2. Vacuum and wipe clean enclosure interior.
3. Remove corrosion found on metal surfaces.
4. Repair or replace, as determined by Engineer, door and panel sections having damaged surfaces.
5. Replace missing or damaged hardware.

N. Provide certified test report(s) documenting the successful completion of specified testing. Include field test measurement data.

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O. Test the following equipment and materials:

1. Grounding electrodes.

P. Controls:

1. Test control and signal wiring for proper termination and function.
2. Test local control panels and other control devices for proper terminations, configuration and settings, and functions.
3. Demonstrate control, monitoring, and indication functions in presence of Owner and Engineer.

3.14 NAMEPLATES, SIGNS, AND LABELS

A. Arc Flash Protection Warning Signs and Labels:

1. Field mark Main Circuit Breaker, Automatic Transfer Switch, Pump Control Panel, Generator Circuit Breaker/Control Panel and Mini Power Center to warn qualified persons of potential arc-flash hazards. Locate marking so to be clearly visible to persons before working on energized equipment.
2. Calculate arc flash boundary and energy in accordance with NFPA 70E and IEEE 1584. Determine level of personnel protective equipment (PPE) required. Warning label on equipment shall include flash hazard boundary, energy level, PPE level and description, shock hazard, bolted fault current, and equipment name.
3. Use available short circuit current obtained from the electrical utility (KEYS Energy).

B. Equipment Nameplates:

1. Provide a nameplate to label electrical equipment including Main Circuit Breaker, Automatic Transfer Switch, Pump Control Panel, Generator, Mini Power Center, terminal junction boxes, and control stations.
2. Main Circuit Breaker, Automatic Transfer Switch, Pump Control Panel, and Mini Power Center nameplates shall include equipment designation, service voltage, and phases.
3. Generator and terminal junction box nameplates shall include equipment designation.
4. Pump Control Panel and control station nameplates shall include name and number of equipment powered or controlled by that device.

END OF SECTION

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SECTION 26 32 13.13
DIESEL ENGINE GENERATOR SET

PART 1 GENERAL

1.01 SUBMITTALS

A. Action Submittals:

1. Dimensioned outline drawing showing plan and elevations of the proposed engine generator set and drive system, including concrete anchorage locations.
2. Engine and generator weights.
3. Catalog information and technical description of the proposed engine generator set. Include proposed materials for the block, heads, valves, rings, cylinders, pistons, crankshaft, and major bearings and wear surfaces.
4. Complete list of accessories provided.
5. Performance curves showing engine efficiency (fuel consumed per kWh output), gross fuel consumption rate, and kW output at design rated output, one-half load, and one-quarter load. Account for design altitude and temperature corrections and for engine parasitic loads.
6. Generator transient and subtransient reactances in per unit.
7. Generator output waveform and telephone interference factor (TIF).
8. Electrical Schematic and Wiring Diagrams:
   a. Generator control panel.
   b. Main generator.
   c. Voltage regulator.
   d. Battery charging system.
   e. Governing system.
   f. Interconnection wiring diagram for automatic transfer switch specified in Section 26 36 23, Automatic Transfer Switch.
9. Control panel instrument identification inscriptions.
10. Block heater size and voltage.
11. Sub base fuel storage tank and enclosure.
12. Sample colors selection for generator enclosure.
13. Generator sizing analysis for pump station site.
14. Complete structural drawings signed and sealed by professional engineer registered in the State of Florida.

B. Informational Submittals:

1. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.
2. Description of parts and service availability.

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3. Certification, copies of analyses, or test reports demonstrating appropriate vibration analysis and design in all modes.
4. Factory Test Report.
5. Manufacturer's Certificate of Performance.
6. Manufacturer's Certificate of Proper Installation.

1.02 QUALITY ASSURANCE

A. Authority Having Jurisdiction (AHJ):

1. Provide the Work in accordance with the current edition of NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have the appropriate listing mark by a Nationally Recognized Testing Laboratory.

1.03 SPECIAL GUARANTEE

A. Provide manufacturer's extended guarantee or warranty, with Owner named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at the option of the Owner, removal and replacement of Work specified in this Specification section found defective during a period of 5 years after the date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work as specified in the General Conditions.

1.04 EXTRA MATERIALS

A. Furnish, tag, and box for shipment and storage the following spare parts and special tools:

Item	Quantity
Diesel fuel line filter elements	1 complete set per unit
Lubricating oil filter elements with gasket	2 complete sets per unit
Air cleaner filter element	1 complete set per unit
Auxiliary fuel and jacket water pump packing/seals	1 complete set per unit
Cooling fan drive belt (if applicable)	2 complete sets per unit

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Item	Quantity
Hydrometer	1 each
Two-pronged battery voltmeter	1 each
Special tools required to maintain or dismantle engine generator set	1 complete set for each different size unit
Spare fuses, if used in the control panel	1 complete set per unit
Spare selector switches, pushbuttons and indicator lights, if used in the control panel	1 complete set per unit
Spare main control board and controller cable, if used in the control panel	1 complete set per unit

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Materials and equipment specified in this Section shall be products of:

1. Detroit Diesel

2.02 SERVICE CONDITIONS

A. Altitude: 50 feet above sea level.

B. Ambient Temperature at Air Intake: 98 degrees F maximum.

C. Ambient Temperature at Engine Generator Set: 98 degrees F maximum.

2.03 ENGINE GENERATOR SET VIBRATION DESIGN

A. Meet applicable Diesel Engine Manufacturer’s Association (DEMA) vibration standards.

B. Use vibration analytical techniques to determine the shaft critical speeds, and to develop bearing design and shaft balancing to mitigate vibration.

C. Apply torsional analysis and design to mitigate torsional vibration.

D. The engine and generator, individually, shall not exhibit vibration in any plane exceeding 10 mils at continuous rating point, when measured at the attachment points to the common steel subbase.

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2.04 ENGINE

A. General:

1. Manufacturer's standard design, unless otherwise specified.
2. Engine parts designed with adequate strength for specified duty.
3. Meet requirements of the DEMA Standard Practices for Stationary and Gas Engines.
4. Engines shall be EPA-certified diesel engines meeting Tier 2 and 3 requirements as required by unit size.

B. Type and Rating: Diesel Cycle, 4-stroke type. Ratings shown on the Drawings are minimum size based on the following load analysis:

1. 480Y/277V, 3-Phase, 4-Wire:
   a. Step 1: 10 kVA miscellaneous loads.
   b. Step 1: 60 horsepower motor (Full Voltage Across-The-Line).
   c. Step 2: 60 horsepower motor (Full Voltage Across-The-Line).
   d. Maximum voltage drop of 20 percent per step.

C. Starting System:

1. Type: Automatic, using a 12-volt or 24-volt battery-driven starter acting in response to the control panel.
2. Batteries:
   a. 200 amp-hour capacity at 12-volt, minimum.
   b. Capable of providing cranking current at 0 degrees F.
   c. Housed in an acid-resistant frame for mounting on a concrete pad adjacent to the engine.
   d. Located such that maintenance and inspection of the engine is not hindered.
3. Battery Charger:
   a. Float type, with taper charging capability, a float range of 2.17 volts/cell, and an equalization range of 2.33 volts/cell, minimum.
   b. Include ammeter, voltmeter, fused ac input and dc output, pilot light, current failure relay, low/high dc voltage alarm relay, and surge suppressors.
   c. Alarm relay dry contacts rated 5 amps at 120V ac.
   d. Suitable for operation from 120-volt, 60-Hz power source.

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D. Fuel and Governing System:

1. Transfer Pump:
   a. Engine-driven.
   b. Capable of pumping fuel from sub base storage tank to the engine.
   c. Suitable for operation with a 12-foot suction lift.
2. Fuel Oil Filter: Replaceable element type.
3. Fuel Connections to Engine: Flexible hose, suitable for application.
4. Governor:
   a. Electro-mechanical or electro-hydraulic type.
   b. Regulates speed as required to hold generating frequency within tolerable limits and within 5 percent of nominal design speed.
   c. Accessories:
      1) Manual speed control device.
      2) Positive overspeed trip switch.

E. Jacket Water Cooling System:

1. Engine-mounted radiator with jacket water pump, fan assembly, fan guard, and duct flange outlet.
2. Engine thermostat to regulate engine water temperature as recommended by the manufacturer.
3. Jacket Water Heaters:
   a. Suitable for operation on 120-volt, 60-Hz current.
   b. Maintain engine water temperature at 120 degrees F with an ambient temperature of 50 degrees F.
   c. Thermostatically controlled.
4. Engine Cooling Liquid: Mixture of water and permanent type antifreeze to protect the system.

F. Lubrication System:

1. Type: Full-pressure.
2. Accessories:
   a. Pressure switch to initiate shutdown on low oil pressure.
   b. Oil filter with replaceable element.
   c. Bayonet type oil level stick.
   d. Valved oil drain extension.
3. Oil Cooling System: Water-cooled heat exchanger utilizing jacket water.

G. Exhaust System:

1. Muffler: Rated for critical silencing.
2. Exhaust Pipe: ASTM A335, Grade P11, standard wall, with fittings selected to match piping materials.

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3. Pipe Connections: Welded.
4. Engine Connection:
   a. Flanged, flexible, corrugated, stainless steel expansion fitting, specifically suited for diesel exhaust service.
   b. Length as required for flexibility and expansion in the piping arrangement shown.

H. Air Intake System: Equipped with a dry type air cleaner with filter service indicator.

2.05 GENERATOR

A. General:

1. Meet requirements of NEMA MG 1.
2. Synchronous salient-pole type with amortisseur winding in rotor.
3. Stator Windings:
   a. Skewed for smooth voltage waveform.
   b. Reconnectable, 12 lead.

B. Ratings:

1. Kilowatt, power factor, frequency and voltage ratings as shown on Drawings.
2. Overspeed Capability: 150 percent.
3. Waveform Deviation from Sine Wave: 5 percent maximum.
4. Telephone Interference Factor: 50 maximum.
5. Total Harmonic Factor: 3 percent maximum.

C. Insulation System:

1. Class F in accordance with NEMA MG 1.
2. Vacuum impregnated, epoxy varnish.
3. Fungus resistant in accordance with MIL E-4970A.

D. Excitation System: Brushless, statically excited type.

E. Voltage Regulation:

1. Solid state, three-phase sensing type.
2. Adjustable output voltage level to plus or minus 5 percent.

F. Voltage and Frequency Regulation Performance:

1. Steady State Voltage Regulation: Less than plus or minus 1 percent from no load to continuous rating point.

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2. NEMA MG 1 Defined Transient Voltage Dip:
   a. Less than 20 percent at rapid application of rated load.
   b. Recovery to rated voltage and frequency within 2 seconds following initial load application.
3. Steady State Frequency Regulation: Plus or minus 1.5-Hz overload range.

G. Short Circuit Capabilities: Sustain 250 percent of rated current for 10 seconds for an external three-phase bolted fault without exceeding rated temperatures.

H. Generator Enclosures:

1. Sound Attenuated Weatherproof Nonwalkin Enclosure:
   a. The enclosure shall be weatherproof enclosure, with entire package listed under UL 2200. The package shall comply with the requirements of the National Electrical Code for all wiring, materials and component spacing. Housing shall provided ample airflow for generator set operation at rated load and ambient temperature of 110 degrees F. The generator housing shall comply with the Florida Building Code. Additionally, the design wind speed for the generator housing shall be 200 mph.
   b. The housing shall have hinged access doors as required to maintain easy access for all operating and service functions. All doors shall be lockable, and include retainers to hold the door open during service. Access doors shall not be wider than 30 inches to allow opening of door on platform walkway. Enclosure roof shall be cambered to prevent rainwater accumulation. Openings shall be screened to prevent access of rodent into enclosure. All electrical power and control interconnections shall be made within perimeter of the enclosure.
   c. The enclosure shall be marine grade aluminum alloy construction with Type 316 stainless steel hardware; a minimum thickness of 14-gauge shall be used for all component parts. Enclosure color to be selected by Owner. Submit color samples at time of submittal for Owner selection.
   d. Painting of hoses, clamps, wiring harnesses, and other nonmetallic service parts shall not be acceptable. Fasteners used shall be corrosion resistant.
   e. A factory mounted exhaust silencer shall be installed inside the enclosure. The exhaust shall exit the enclosure through rain collar and terminate with a rain cap. Exhaust connections to the generator set shall be through seamless flexible connections. The roof of the enclosure shall be strengthened to support the exhaust silencer recommended by the manufacturer for the application.

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f. Enclosure dimensions with sub base fuel storage tank shall not exceed the dimensions shown on the Drawings.
g. Unit shall be provided with sound attenuation. The sound attenuation material shall be affixed to the walls and ceiling of the enclosure. The sound rating of the unit shall not exceed 72dB at 50 feet.
h. The enclosure shall cover the entire top of the subbase fuel storage tank.
i. A factory mounted red mushroom-head Emergency Stop Switch shall be installed on the exterior of the enclosure. The Emergency Stop Switch shall be located on the same end of the generator enclosure as the access panel for the control panel.

2. Finish: In accordance with 09 90 00, Painting and Coating. Submit color samples at time of submittal for Owner selection.
3. Enclosure Manufacturers:
   a. Con-Fab, Inc.
   b. Phonix Products.
   c. Victory Industrial Products.
   d. Or equal.

I. Subbase Fuel Storage Tank:

1. Tank and generator shall be elevated in the installation. Verify base support points of generator/tank set to match structural support being provided.
2. Provide a base fuel storage tank for each engine generator, designed to be installed under the engine generator base. The tank shall be double wall, complete with rupture basin, easy access filling line, and shall meet UL142 and NFPA 30 requirements. The tank shall be provided with low and high fuel level alarm, and a mechanical fuel level measurement system to allow the operator to determine the volume of fuel that is contained in the tank. The fuel gauge shall be installed adjacent to the fuel fill port of the tank. The fuel gauge and fuel fill port shall be mounted in the side of the enclosure as shown on the Drawings, with a lockable cover. The low fuel alarm shall provide a spare isolated contact for remote monitoring. The contact shall be rated 5 amps at 120V.
3. The fuel storage tank shall be product of a manufacturer regularly engaged in the manufacture of double wall fuel storage tanks. Provide fuel supply lines to the engine-mounted pump and return line to the tank.

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4. The primary and secondary tanks shall be fabricated from 1/4-inch steel and shall be designed, tested, and labeled per UL requirements to support a generator weight of 60,000 pounds. Lifting lugs shall be approved by UL with a 4 to 1 safety factor. The primary and secondary fuel tanks shall be tested at 3 psi air pressure as outlined in UL 142.
5. All tank outlets shall be Type 304 Schedule 40 stainless steel threaded pipe and shall exit the top of the tank only. Provide one 4-inch and two 2-inch spare NPT connections for future use. Provide an engine supply pick-up tube with supply and return fittings located near the engine fuel connections.
6. The tank shall be elevated off the concrete pad that provides a 2-inch air space to control moisture accumulation. The tank shall include earthquake/hurricane tie-down restraint points and drilling for grounding attachments.
7. The outer tanks shall be abrasive blasted per SSPC-SP10, then painted with one coat of a high build polyester glass flake to a minimum of 12 to 15 mils thickness, and a finish coat of an aliphatic polyurethane with a minimum of 3 mils. The tanks shall be constructed with no sharp edges to ensure uniform coating coverage on all surfaces. Finish color shall match enclosure.
8. Updraft and emergency venting systems shall be provided by tank manufacturer. The primary vent shall be extended on a riser to the exterior of the enclosure. Provide a watertight roof penetration and updraft vent cap.
9. Provide a stub-up area through the tank for all electrical power and control wiring required. The stub-up area shall be sized to include spare conduits.
10. The tank shall be provided with fill box which incorporates a 7-gallon spill containment reservoir, hand pump with check valve to return fuel to the tank, 2-inch fill line with tight fill adapter, angle check valve assembly, and manual ball valve. The fill box shall be lockable and constructed of stainless steel. Refer to Drawings for fill connection location.
11. Tank Capacity: Provide 500-gallon tank for generator set.

J. Main Circuit Breaker:

1. Type: Molded case.
2. Current Rating: Sized to carry the rated output of the generator set. Circuit breaker shall be 100 percent rated and suitable for service entrance.
3. Interrupt Rating: 42,000 amps rms symmetrical.
4. Trips: Thermal-magnetic with inverse time characteristics and adjustable magnetic pickup.

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5. Enclosure:
   a. Rating: NEMA 250, Type 12.
   b. Mounted with vibration isolation from engine generator set.

2.06 BASEPLATE

A. Mount engine generator set on a rigid common steel base frame.

B. Base frame shall be stiffened to minimize deflections.

C. Holes shall be provided in base frame for anchorage to concrete as shown on Drawings.

2.07 VIBRATION ISOLATORS

A. Performance: Limit vibration transmissibility to 10 percent at each frequency.

B. Manufacturer: Korfund; Series L.

2.08 FACTORY FINISHING

A. Engine Generator Set and Instrument Panel: Factory-applied primer and two finish coats of the manufacturer's standard heat-resistant engine paint.

2.09 AUTOMATIC LOAD TRANSFER CONTROL

A. Automatic run controls shall be suitable for remote interface and control by an automatic transfer switch. Engine generator set shall start and run upon closure of a remote dry contact in accordance with Section 26 36 23, Automatic Transfer Switch.

2.10 CONTROL SYSTEM

A. Control Panel:

1. Rating: NEMA 250, Type 4X.
2. Material: Steel.
3. Instrument Identification: Face label or engraved, black, laminated plastic nameplate with white 1/4-inch high letters, attached with Type 422 stainless steel screws.

B. Instrumentation:

1. Type: Suitable for engine-mounted vibration environment.
2. Mounting: Nonshock mounted.
3. Alarm and Signal Contacts: Rated 5 amps at 120V ac, dry.

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4. Fault Indication Lamps: Push-to-test type.
5. Meters: 3.5-inch, 240-degree scale, plus or minus 2 percent accuracy.

C. Operator Controls and Indicators:

1. HANDCRANK/STOP/AUTO/ENGINE TEST selector switch.
2. Generator voltage adjustment.
3. Voltmeter PHASE SELECTOR switch.
4. Ammeter PHASE SELECTOR switch.
5. Voltmeter.
6. Ammeter.
7. FREQUENCY meter.
8. Engine OIL PRESSURE indicator.
9. Engine jacket WATER TEMPERATURE indicator.
10. Fuel PRESSURE indicator.
11. RUNNING TIME indicator.
12. DC battery voltage.
13. Red Mushroom-Head Emergency Stop Switch with break glass cover mounted on the exterior of the generator enclosure near the intake end.

D. Alarm Indicators with Manual Pushbutton RESET:

1. Low oil pressure.
2. High jacket water temperature.
3. Engine overspeed.
4. Engine overcrank.
5. Low/High dc voltage.

E. External Interfaces:

1. Furnish DPDT relay outputs upon occurrence of the following alarm conditions:
   a. Generator FAIL.
   b. Generator LOW FUEL LEVEL.
   c. Generator Overcrank.
   d. Generator Overspeed.
   e. Generator Low Oil.
   f. Generator High Temperature.
2. Furnish a SPDT relay output for GENERATOR ON (Generator RUNNING) status.
3. Output: Dry contact rated 5 amps at 120V ac.
4. Accept the following remote dry contacts from the RTU:
   a. Generator Override (Remote Start/Stop).
   b. Generator Disable.
5. Accept remote dry start contact closure from automatic transfer switch, rated 10 amps at 32V dc.

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F. Functional Requirements:

1. Recranking Lockout: When engine fires, starting control shall automatically disconnect cranking control to prevent recranking for a preset period of time after engine stop.
2. Overcranking Lockout: Initiate after four cranking cycles of 10 seconds on and 10 seconds off.
3. Engine Shutdown upon Any of the Following Conditions:
   a. Engine overspeed.
   b. High jacket water temperature.
   c. Low oil pressure.
   d. Generator Disable from RTU.
   e. Emergency stop from Emergency Stop Switch.
4. Air Inlet Damper Opening: Upon engine start sequence initiation, a normally open, dry contact, rated 5 amps at 120V ac, from the engine start circuit shall close to provide a signal to open air inlet dampers.

G. Special Requirements:

1. Mount battery charger in control panel.
2. Mount battery charger instrumentation on face of control panel and match generator instrumentation.

2.11 FACTORY TESTS

A. General: Conform to NFPA 110.

B. Steady Load Test: Test engine generator set at steady load run of 60 minutes minimum duration at 100 percent full-rated load.

C. Transient Load Test: Conduct transient load test to demonstrate ability to meet the load pickup and load release requirements specified.

D. Harmonic Test: Conduct at full load conditions.

E. Record and Report:

1. Strip chart recording and full harmonic analysis measuring up to the 50th harmonic for both voltage and current and three phases simultaneously.
2. Transient response.
3. Load/speed stability.
4. Engine fuel consumption.
5. Power output.

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PART 3 EXECUTION

3.01 LIFT AND INSTALLATION

A. Install generator set on elevated platform as shown on the Drawings.

B. Level and securely mount engine generator set in accordance with the manufacturer's recommendations.

C. Where applicable, mount engine generator set on vibration isolators in accordance with isolator manufacturer's recommendations.

3.02 FIELD FINISHING

A. Touchup damaged coating with paint system compatible to existing.

3.03 FIELD TESTS

A. General: Conform to NFPA 110.

B. Performance Test:

1. Perform upon completion of installation.
2. Operate 2 hours minimum.
3. Manufacturer's representative shall make necessary adjustments.
4. Demonstrate ability of engine generator set to carry specified loads.
5. Demonstrate engine generator set safety shutdowns and specified controls and functions.

C. Test Report: Record and report the following:

1. Electric load on generator.
2. Fuel consumption.
3. Exhaust temperature.
4. Ambient air temperature.
5. Safety shutdown performance results.

D. Post-Test Requirements:

1. Make final adjustments.
2. Replace fuel and oil filters.
3. Check belt drive tensions.
4. Demonstrate proper operation of equipment, including automatic operation with control from automatic transfer switch, to Engineer and Owner.

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3.04 MANUFACTURER'S SERVICES

A. Manufacturer's Representative: Present at Site or classroom designated by Owner, for minimum person-days listed below, travel time excluded:

1. 1 person-day for installation assistance and inspection.
2. 1 person-day for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.
3. 1/2 person-day for prestartup classroom or Site training.
4. 1/2 person-day for facility startup.
5. 1/2 person-day for post-startup training of Owner's personnel. Training shall not commence until an accepted detailed lesson plan for each training activity has been reviewed by Owner.

B. See Section 01 43 33, Manufacturers' Field Services and Section 01 91 14, Equipment Testing and Facility Startup.

END OF SECTION

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SECTION 26 36 23
AUTOMATIC TRANSFER SWITCH

PART 1 GENERAL

1.01 SUBMITTALS

A. Action Submittals:

1. Descriptive product information.
2. Dimensional drawings.
3. Control diagrams.
4. Conduit entrance locations.
5. Equipment ratings.

B. Informational Submittals:

1. Factory test reports.
2. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.
3. Manufacturer's Certificate of Compliance, in accordance with Section 01 43 33, Manufacturers' Field Services.

1.02 QUALITY ASSURANCE

A. Authority Having Jurisdiction (AHJ):

1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

1.03 EXTRA MATERIALS

A. Furnish, tag, and box for shipment and storage the following spare parts and special tools:

Item	Quantity
Spare Fuses	1 complete set
Spare selector switches, pushbuttons, and indicator lights	1 complete set
Spare main control board	1 complete set
Spare controller cable	1 complete set

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PART 2 PRODUCTS

2.01 MANUFACTURERS

A. ASCO.

B. Russelectric.

C. Eaton.

2.02 GENERAL

A. In accordance with applicable standards of NFPA 70, NEMA ICS 1, NEMA ICS 2, NEMA ICS 6, IEEE C37.90.1, and UL 1008.

B. Nationally Recognized Testing Laboratory labeled as suitable for use as Service Entrance equipment.

C. Transfer switch consisting of inherently double-throw power switch unit with interconnected control module.

D. Rated 100 percent, in amperes, for total system transfer of motor, electric heating, discharge lamp loads, and tungsten-filament lamp loads.

1. Switches rated 400 amperes and below suitable for 100 percent tungsten-filament lamp loads.

E. Main and arcing contacts visible for inspection with cabinet door and barrier covers removed.

F. Terminal plate with pressure contacts for solidly connected neutral conductors.

G. Suitable for 480 volts, three-phase, three-wire electrical service. Switch shall be suitable for electric service having a short circuit current at line terminals of 42,000 amperes rms symmetrical.

H. Switch Rating: As shown on Drawings, continuous amperes in nonventilated enclosure.

I. Current carrying capacity of arcing contacts shall not be used to determine the transfer switch rating.

J. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

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K. Operating Conditions:

1. Ambient Temperature: Maximum 50 degrees C.
2. Equipment to be fully rated without any derating for operating conditions listed above.

2.03 ENCLOSURE

A. Type: Nonventilated NEMA 250, Type 4X 316 stainless steel painted white with enclosure grounding terminal.

B. Dead front, front accessible wall mounted cabinet with 14-gauge welded construction.

C. Continuously hinged single door, with handle and lock cylinder.

D. Finish: Baked enamel applied over rust-inhibiting, phosphated base coating.

1. Exterior and Interior Color: Provide white finish as approved by Engineer.
2. Unpainted Metal Parts: Plated for corrosion resistance.

2.04 TRANSFER SWITCH

A. Type: Electrically operated, mechanically held, double-throw, three-pole switching.

B. Momentarily energized, single-electrically operated mechanism energized from source to which load is to be transferred.

C. Locking mechanism to maintain constant contact pressure.

D. Mechanical interlock switch to ensure only one of two possible switch positions.

E. Silver alloy contacts protected by arcing contacts.

F. Main and arcing contacts visible when door is open and barrier covers removed.

G. Manual operating handle for transfer in either direction under either loaded or unloaded conditions.

H. Internal control wire connections made with ring or spade type terminals, lock washers, and sleeve type marking labels.

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2.05 CONTROL MODULE

A. Completely enclosed and mounted separately from the transfer switch unit.

B. Microprocessor for sensing and logic control with inherent digital communications capability.

C. Plug-in, industrial grade interfacing relays with dust covers.

D. Connected to transfer switch by wiring harness having keyed disconnect plug.

E. Plug-in printed circuit boards for sensing and control logic.

F. Adjustable solid state under voltage sensors for all three phases of normal and for one phase of standby source:

1. Pickup 85 to 100 percent nominal.
2. Dropout 75 to 98 percent of pickup setting.

G. Adjustable Frequency Sensors for Standby Source:

1. Pickup 90 to 100 percent nominal.
2. Dropout 87 to 89 percent of pickup setting.

H. Control Module with Adjustable Time Delays:

1. 0.5- to 6-second engine start delay.
2. 0- to 5-minute load transfer to emergency delay.
3. 0- to 30-minute retransfer to normal delay.
4. 0- to 30-minute unload running time delay.
5. Switch to bypass any of the above time delays during testing.

I. External Interface with Generator: Form-C start contacts, rated 10 amperes, 32-volt dc, for two-wire engine control, wired to terminal block.

J. External Interface with RTU: Two Form-C contacts, rated 10 amperes, 120-volt, wired to terminal block for ATS positions (Normal and Generator).

K. Exerciser, adjustable in 15-minute increments, 7-day dial clock to simulate normal power failure and transfer load to generator, complete with door mounted NO LOAD and LOAD selector switch.

L. In-phase monitor to control transfer when both sources are within acceptable phase angle limits, or adjustable pneumatic type time delay relay for time-delay-in neutral position.

M. Adjustable 0 to 5 minutes time delay relay for engine starting signal.

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2.06 INDICATORS

A. Type: Manufacturer's standard.

B. Green lens to indicate switch position for normal power source.

C. Red lens to indicate switch position for standby power source.

D. White lens to indicate normal power source is available within parameters established by pickup and dropout settings.

E. Amber lens to indicate standby power source is available within parameters established by pickup and dropout settings.

F. Provide one normally open and one normally closed, 5 amperes, 120-volt contact for remote indication when transfer switch is in either position.

2.07 FACTORY TESTS

A. Test to Ensure Correct:

1. Operation of individual components.
2. Sequence of operation.
3. Transfer time, voltage, frequency, and time delay settings.

B. Dielectric strength test per NEMA ICS 1.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure enclosure to structural steel channels attached to wall surface.

3.02 FIELD TEST

A. Perform Automatic Transfer Test by:

1. Simulating loss of normal power.
2. Return to normal power.
3. Simulating loss of generator power.
4. Simulating single-phase conditions for normal and generator sources.

END OF SECTION

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SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.01 DEFINITIONS

A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.

B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.

C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2-inch caliper to a depth of 6 inches below subgrade.

D. Project Limits: Areas, as shown or specified, within which Work is to be performed.

1.02 SCHEDULING AND SEQUENCING

A. Prepare Site only after adequate erosion and sediment controls are in place.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Clear and grub areas actually needed for Site improvements within limits shown or specified.

B. Do not injure or deface vegetation that is not designated for removal.

3.02 LIMITS

A. As needed to construct the improvements, but not to extend beyond Project limits.

B. Remove rubbish, trash, and junk from entire area within Project limits.

3.03 TEMPORARY REMOVAL OF INTERFERING PLANTINGS

A. Remove and store shrubs and trees that are not designated for removal but do interfere with construction or could be damaged by construction activities.

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B. Photograph and document location, orientation, and condition of each plant prior to its removal. Record sufficient information to uniquely identify each plant removed and to assure accurate replacement.

3.04 TEMPORARY REMOVAL AND REPLACEMENT OF RIPRAP

A. Remove and store riprap that interferes with construction. After installation of the proposed improvements, replace the riprap in a condition similar to existing.

3.05 CLEARING

A. Clear areas within limits shown or specified.

B. Cut stumps not designated for grubbing flush with ground surface.

C. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

3.06 GRUBBING

A. Grub areas within limits shown or specified or as needed to construct improvements.

3.07 TREE REMOVAL OUTSIDE CLEARING LIMITS

A. Remove within Project Limits: Dead, dying, leaning, or otherwise unsound trees that may strike and damage Project facilities in falling.

B. Cut stumps off flush with ground, remove debris, and if disturbed, restore surrounding area to its original condition.

3.08 DISPOSAL

A. Clearing and Grubbing Debris:

1. Dispose of debris offsite.
2. Burning of debris onsite will not be allowed.
3. Woody debris may be chipped. Chips may be sold to Contractor’s benefit or used for landscaping onsite as mulch or uniformly mixed with topsoil, provided that resulting mix will be fertile and not support combustion. Maximum dimensions of chipped material used onsite shall be 1/4 inch by 2 inches. Dispose of chips that are unsaleable or unsuitable for landscaping or other uses with unchipped debris.
4. Limit offsite disposal of clearing and grubbing debris to locations that are approved by federal, state, and local authorities, and that will not be visible from Project.

END OF SECTION

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SECTION 31 23 13
SUBGRADE PREPARATION

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
   a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft^3 (600 kN-m/m^3)).
   b. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).

1.02 DEFINITIONS

A. Optimum Moisture Content: As defined in Section 31 23 23.15, Trench Backfill.

B. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, excavation to grade, and scarification and compaction of subgrade.

C. Relative Compaction: As defined in Section 31 23 23.15, Trench Backfill.

D. Subgrade: Layer of existing soil after completion of clearing, grubbing, and excavation prior to placement of structures.

E. Proof-Rolling: Testing of subgrade by compactive effort to identify areas that will not support the future loading without excessive settlement.

1.03 SEQUENCING AND SCHEDULING

A. Complete applicable Work specified in Sections 02 41 00, Demolition; 31 10 00, Site Clearing; and 31 23 16, Excavation, prior to subgrade preparation.

1.04 QUALITY ASSURANCE

A. Notify Engineer when subgrade is ready for compaction or proof-rolling or whenever compaction or proof-rolling is resumed after a period of extended inactivity.

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PART 2 PRODUCTS

2.01 BASE ROCK

A. Base rock shall be crushed gravel or crushed rock, free from dirt, clay balls, and organic material and conforming to size No. 89 gradation as specified in the FDOT Standard Specifications for Road and Bridge Construction or similar accepted material and shall be imported if necessary at the Contractor's own expense. Lime rock screenings or material resulting from trench excavation, except for lime rock which has been crushed and graded to size as specified, will not be accepted for base rock.

PART 3 EXECUTION

3.01 GENERAL

A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.

B. Bring subgrade to proper grade and cross-section and uniformly compact surface.

C. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.

D. Maintain prepared ground surface in finished condition until next course is placed.

3.02 COMPACTION

A. Granular Fill under Structures: Compact the upper 12 inches of subgrade to minimum of 100 percent relative compaction as determined in accordance with ASTM D1557. After compaction of subgrade, place a minimum of 6 inches of base rock in conformance with Section 911 of the FDOT Standard Specifications for Road and Bridge Construction and thoroughly compact with a mechanical vibrating or power tamper.

3.03 MOISTURE CONDITIONING

A. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.

B. Wet Subgrade: Aerate material by blading, discing, harrowing, or other methods, to hasten drying process.

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3.04 TESTING

A. Proof-roll subgrade to detect soft or loose subgrade or unsuitable material, as determined by Engineer.

3.05 CORRECTION

A. Soft or Loose Subgrade:

1. Adjust moisture content and recompact, or
2. Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from the excavation, as specified in Section 31 23 23.15, Trench Backfill.

B. Unsuitable Material: Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from the excavation, as specified in Section 31 23 23.15, Trench Backfill.

END OF SECTION

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SECTION 31 23 16
EXCAVATION

PART 1 GENERAL

1.01 QUALITY ASSURANCE

A. Provide adequate survey control to avoid unauthorized overexcavation.

1.02 WEATHER LIMITATIONS

A. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.03 SEQUENCING AND SCHEDULING

A. Demolition: Complete applicable Work specified in Section 02 41 00, Demolition, prior to excavating.

B. Clearing, Grubbing, and Stripping: Complete applicable Work specified in Section 31 10 00, Site Clearing, prior to excavating.

C. Dewatering: Conform to applicable requirements of Section 31 23 19.01, Dewatering, prior to initiating excavation.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.

B. Do not overexcavate without written authorization of Engineer.

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C. It shall be the Contractor's responsibility to make exploratory excavations as required to verify location, size, and elevation of existing utilities that may interfere with installation of the new pipe lines. Contractor shall perform this Work well in advance of trenching and pipe laying, but a minimum of 300 feet ahead. The Contractor shall cal "48 hours before digging" the underground utilities location center at 1-800-432-4770.

3.02 UNCLASSIFIED EXCAVATION

A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

3.03 SHORING, SHEETING, AND BRACING OF TRENCHES

A. Sheet and brace the trench when necessary to prevent caving during excavation in unstable material, or to protect adjacent structures, property, workers, and the public. Increase trench widths accordingly by the thickness of the sheeting. Maintain sheeting in-place until the pipe has been placed and backfilled at the pipe zone. Shoring and sheeting shall be removed, as the backfilling is done, in a manner that will not damage the pipe or permit voids in the backfill. All sheeting, shoring, and bracing of trenches shall conform to the safety requirements of the federal, state, or local public agency having jurisdiction. The most stringent of these requirements shall apply.

3.04 TRENCH WIDTH

A. Minimum Width of Trenches:

1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
   a. Less than or equal to 15-inch Outside Diameter or Width: 18 inches.
   b. Greater than 15-inch Outside Diameter or Width: 24 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.
2. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench: 18 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between.
3. Increase trench widths by thicknesses of sheeting.

B. Maximum Trench Width: Unlimited, unless otherwise shown or specified, or unless excess width will cause damage to existing facilities, adjacent property, or completed Work.

C. Confine trench widths to dedicated rights-of-way or construction easements, unless special written agreements have been made with the affected property owner.

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3.05 STOCKPILING EXCAVATED MATERIAL

A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.

B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.

C. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads or streets.

D. Do not stockpile excavated material adjacent to trenches and other excavations, unless excavation side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.

E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.06 DISPOSAL OF SPOIL

A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite, in a county-approved disposal facility.

B. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk as specified in Section 31 10 00, Site Clearing, for clearing and grubbing debris.

END OF SECTION

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SECTION 31 23 19.01
DEWATERING

PART 1 GENERAL

1.01 SUBMITTALS

A. Quality Control Submittals: Copies of any authorization and permits required to perform work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall be responsible for design, installation, and operation of a dewatering system to keep excavations and trenches free of water.

B. Remove and control water during periods when necessary to properly accomplish Work.

C. Prior to beginning work, the Contractor shall develop a dewatering method and submit it to the Engineer and the Owner. The Contractor's dewatering method shall take into account limitations in the existing operating conditions of the Owner's sewage collection and pumping facilities. Final acceptance of the Contractor's dewatering method will be based on demonstrated performance of the system to satisfy the requirements of dewatering as specified herein.

D. The Contractor shall not discharge water into the storm sewer system. The Contractor shall discharge water into the sanitary sewer system and pretreatment with a suitably sized settling tank from Rain for Rent, or similar vendor is to be provided to prevent excess sand or trench materials from entering the system. The Contractor shall provide an acceptable plan to receive approval from the City of Key West prior to discharging into the sanitary sewer system.

E. The Contractor shall be responsible and bear the cost for any breakdowns and associated repair costs if they are directly attributed to his dewatering operation.

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F. If the dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system, then loosening of the foundation material, instability of the slopes, or damage to the foundations or structures may occur, or other additional work or handling of materials may be required of the Contractor. The supply of all labor, materials, and equipment, and the performance of all work necessary to carry out additional work resulting from such inadequacy, premature shutdown, or failure of the dewatering system shall be undertaken by the Contractor to the satisfaction of the Engineer, and at no additional expense to the Owner.

G. Dewatering shall be considered incidental to the construction and included in the applicable unit prices stated in the Proposal.

3.02 DEWATERING SYSTEMS

A. Contractor shall design, furnish, install, operate, and maintain dewatering systems of sufficient size and capacity to permit excavation and subsequent construction in dry and to lower and maintain groundwater level a minimum of 2 feet below the lowest point of excavation. Continuously maintain excavations free of water, regardless of source, and until backfilled to final grade.

B. For excavations and trenches, dewatering systems shall include equipment and appurtenances installed outside structural limits and sufficiently below lowest point of excavation when possible, or to maintain specified groundwater elevation.

C. Design and Operate Dewatering Systems:

1. To prevent loss of ground as water is removed.
2. To avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.
3. To relieve artesian pressures and resultant uplift of excavation bottom.

3.03 DISPOSAL OF WATER

A. Obtain discharge permit for water disposal from authorities having jurisdiction.

B. Treat water collected by dewatering operations, as required by regulatory agencies, prior to discharge.

C. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property. Drainage of trench water through the pipeline under construction is prohibited.

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D. Remove solids from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency.

3.04 WELL POINT REMOVAL

A. If well points are used, after removing the well point dewatering system, well point holes shall be filled with sand which shall be washed into the hole. Well point holes located in asphalt pavement surfaces or concrete pavements shall be filled with sand to the subgrade and the remaining portion of holes shall be filled with nonshrink grout.

3.05 CLEANING OF WASTEWATER PUMP STATION WET WELLS

A. After all work has been completed, and before final acceptance, the Contractor shall clean the wet wells of the wastewater pump stations that receive flow from the sanitary sewers into which the Contractor discharged water from his dewatering operations. The Contractor is advised that the cleaning can only be performed during periods of low wastewater flow into the stations. The Contractor shall coordinate the cleaning with the Owner at least two weeks in advance of the cleaning operations.

B. The sanitary sewers discharge into Pump Station B.

C. Cleaning of the wet wells shall be considered incidental to the construction and included in the applicable unit prices stated in the Proposal.

3.06 ALTERNATE METHODS OF CONSTRUCTION

A. A combination of extremely porous substrata and relatively high ground water table exist at the sites of the proposed work. It is recognized that it may be very difficult and costly to dewater excavations. In view of this, the foregoing requirements for dewatering may be waived if the Contractor, at his option, chooses to employ an alternate method of construction. Prior to his selection of an alternate method of construction, the Contractor shall demonstrate that all reasonable means to dewater the excavation have been employed without success and shall obtain the concurrence of the Owner that the method selected is applicable to the conditions existing in the particular area. Concurrence by the Owner of the method selected, shall by no means relieve the Contractor of his obligation to install the system in accordance with the Contract Documents and to provide a completed functioning system.

B. Any alternate method of construction proposed by the Contractor shall include provision such that the trenches shall be undercut a minimum of 8 inches. The resulting excavation shall then be backfilled with approved pipe bedding material.

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C. No additional payment will be made to the Contractor for excavation, backfill, sheeting, or any costs incurred for work or materials, or any other costs incurred, as a result of alternate methods of construction selected by the Contractor, but the prices established in the Proposal shall be full payment for the various items of work to be done.

D. The alternate method of construction, if selected by the Contractor, shall in no way be construed as relieving the Contractor of his basic responsibility for satisfactory completion of the work in accordance with these Contract Documents.

END OF SECTION

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SECTION 31 23 23.15
TRENCH BACKFILL

PART 1 GENERAL

1.01 DEFINITIONS

A. Bedding Material: Granular material upon which pipes, conduits, cables, or duct banks are placed.

B. Imported Material: Material obtained by Contractor from source(s) offsite.

C. Lift: Loose (uncompacted) layer of material.

D. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe, conduit, cable or duct bank.

E. Prepared Trench Bottom: Graded trench bottom after excavation and installation of stabilization material, if required, but before installation of bedding material.

F. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D1557. Corrections for oversize material may be applied to either as-compacted field dry density or maximum dry density, as determined by Engineer.

G. Optimum Moisture Content: shall be determined by the ASTM standard specified to determine the maximum dry density for relative compaction. Field moisture content shall be determined on the basis of the fraction passing the 3/4-inch sieve.

H. Selected Backfill Material: Material available onsite that Engineer determines to be suitable for a specific use.

I. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Well-graded does not define any numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.

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1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings: Manufacturer's descriptive literature for marking tapes.

B. Quality Control Submittals:

1. Certified Gradation Analysis: Submit not less than 30 days prior to delivery for imported materials or anticipated use for excavated materials, except for trench stabilization material that will be submitted prior to material delivery to Site.

PART 2 PRODUCTS

2.01 GEOTEXTILE

A. Geotextile shall be a pervious sheet of polyester, polyethylene, nylon, or polypropylene filaments, woven or nonwoven, and formed into a uniform pattern. The geotextile shall have the following minimum properties (except when a range is given) when measured in accordance with the referenced standard:

PHYSICAL PROPERTY	TEST METHOD	REQUIREMENTS
Grab Tensile Strength (lbs) minimum	ASTM D4632	200
Elongation (%)	ASTM D4632	60
Apparent Opening Size U.S. Sieve No.	ASTM D4632	30-70
Permeability (cm/sec)	ASTM D4632	0.35
Trapezoid Tear Strength (lbs) minimum	ASTM D4632	75
Ultraviolet Degradation (minimum)	ASTM D4632	80 percent strength retention after 500 hours

B. The geotextile shall be finished so that the filaments will retain their relative position with respect to each other. The edges of woven fabric shall be finished to prevent the outer material from pulling away from the fabric.

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C. The Contractor shall provide manufacturer's certificate of compliance attesting that the geotextile meets the requirements of these Specifications. Provide mill certificates stating the length and width of fabric contained on each roll.

2.02 MARKING TAPE

A. Detectable:

1. Solid aluminum foil, visible on unprinted side, encased in protective high visibility, inert polyethylene plastic jacket.
2. Foil Thickness: Minimum 0.35 mils.
3. Laminate Thickness: Minimum 5 mils.
4. Width: 3 inches.
5. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
6. Joining Clips: Tin or nickel-coated furnished by tape manufacturer.
7. Manufacturers and Products:
   a. Reef Industries; Terra Tape, Sentry Line Detectable.
   b. Mutual Industries; Detectable Tape.
   c. Presco; Detectable Tape.

B. Color: In accordance with APWA Uniform Color Code for Temporary Marking of Underground Facilities.

Color*	**Facility**
Red	Electric power lines, cables, conduit, and lightning cables
Orange	Communicating alarm or signal lines, cables, or conduit
Yellow	Gas, oil, steam, petroleum, or gaseous materials
Green	Sewers and drain lines
Blue	Potable water
Purple	Reclaimed water, irrigation, and slurry lines
*As specified in NEMA Z535.1, Safety Color Code.	

2.03 TRENCH STABILIZATION MATERIAL

A. Granular Backfill: Shall be 2-1/2 inches minus crushed rock, reasonably well-graded from coarse to fine, and free from excessive dirt or other organic material with no more than 2 percent by weight passing the No. 200 sieve. The material shall be nonplastic.

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2.04 BEDDING MATERIAL AND PIPE ZONE MATERIAL

A. Unfrozen, friable, and no clay balls, roots, or other organic material.

B. Crushed gravel or crushed rock, free from dirt, conforming to size No. 89 (per FDOT Standard Specifications) gradation or similar accepted material and shall be imported, if necessary, at the Contractor's own expense. Lime rock screenings or material resulting from trench excavation, except for lime rock which has been crushed and graded to size as specified, will not be accepted for pipe bedding materials.

2.05 TRENCH BACKFILL

A. Under Pavement: Same as specified in Paragraph 2.04 above for Bedding Material and Pipe Zone Material.

B. In Beach Area: Within the beach area, trench backfill shall be from the salvaged beach sand excavated during trenching.

2.06 CONCRETE ENCASEMENT

A. Concrete encasement will be used where, in the opinion of the Engineer, there is insufficient cover over the pipe for proper cover and protection.

B. Mix: ASTM C94, Alternate 3.

1. Use a minimum of five sacks of cement per cubic yard of concrete.
2. Design for Minimum Compressive Strength at 28 Days: 2,500 psi.

2.07 SOURCE QUALITY CONTROL

A. Contractor's testing laboratory to perform gradation analysis in accordance with ASTM C136:

B. Certify Laboratory Performance of Mix Designs: Concrete.

PART 3 EXECUTION

3.01 TRENCH PREPARATION

A. Water Control:

1. As specified in Section 31 23 19.01, Dewatering.
2. Remove water in a manner that minimizes soil erosion from trench sides and bottom.
3. Provide continuous water control until trench backfill is complete.

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B. Remove foreign material and backfill contaminated with foreign material that falls into trench.

3.02 TRENCH BOTTOM

A. Firm Subgrade: Grade with hand tools, remove loose and disturbed material, and trim off high areas and ridges left by excavating bucket teeth. Allow space for bedding material if shown or specified.

B. Soft Subgrade: If subgrade is encountered that may require removal to prevent pipe settlement, notify Engineer. Engineer will determine depth of overexcavation, if any required.

3.03 TRENCH STABILIZATION MATERIAL INSTALLATION

A. Rebuild trench bottom with trench stabilization material.

B. Place material over full width of trench in 6-inch lifts to required grade, providing allowance for bedding thickness.

C. Compact each lift so as to provide a firm, unyielding support for the bedding material prior to placing succeeding lifts.

3.04 BEDDING

A. Furnish imported bedding material where, in the opinion of Engineer, excavated material is unsuitable for bedding or insufficient in quantity.

B. Place over the full width of the prepared trench bottom in two equal lifts when the required depth exceeds 8 inches.

C. Hand grade and compact each lift to provide a firm, unyielding surface.

D. Minimum Thickness: As follows

1. Pipe 18 Inches to 36 Inches: 6 inches.
2. Conduit: 4 inches.
3. Direct-Buried Cable: 4 inches.
4. Duct Banks: 4 inches.

E. Check grade and correct irregularities in bedding material. Loosen top 1 inch to 2 inches of compacted bedding material with a rake or by other means to provide a cushion before laying each section of pipe, conduit, direct-buried cable, or duct bank.

F. Install to form continuous and uniform support except at bell holes, if applicable, or minor disturbances resulting from removal of lifting tackle.

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G. Bell or Coupling Holes: Excavate in bedding at each joint to permit proper assembly and inspection of joint and to provide uniform bearing along barrel of pipe or conduit.

3.05 BACKFILL PIPE ZONE

A. Upper limit of pipe zone shall not be less than following:

1. Pipe: 12 inches or to elevation plus 2.5 feet NGVD, whichever is higher.
2. Conduit: 3 inches, unless shown otherwise.
3. Direct-Buried Cable: 3 inches, unless shown otherwise.
4. Duct Bank: 3 inches, unless shown otherwise.

B. Restrain pipe, conduit, cables, and duct banks as necessary to prevent their movement during backfill operations.

C. Place material simultaneously in lifts on both sides of pipe and, if applicable, between pipes, conduit, cables, and duct banks installed in same trench.

1. Pipe 10-Inch and Smaller Diameter: First lift less than or equal to 1/2 pipe diameter.
2. Pipe Over 10-Inch Diameter: Maximum 6-inch lifts.

D. Thoroughly tamp each lift, including area under haunches, with handheld tamping bars supplemented by “walking in” and slicing material under haunches with a shovel to ensure that voids are completely filled before placing each succeeding lift.

E. After the full depth of the pipe zone material has been placed as specified, compact the material by a minimum of three passes with a vibratory plate compactor only over the area between the sides of the pipe and the trench walls.

F. Do not use power-driven impact compactors to compact pipe zone material. Care shall be taken to prevent damage to the pipe. Deflection of pipe shall be kept to a minimum and in no case shall it exceed 5 percent of the pipe inside diameter.

3.06 MARKING TAPE INSTALLATION

A. Continuously install marking tape along centerline of all buried piping, on top of last lift of pipe zone material. Coordinate with piping installation drawings.

1. Detectable Marking Tape: Install with nonmetallic piping and waterlines.

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3.07 BACKFILL ABOVE PIPE ZONE

A. General:

1. Process excavated material to meet specified gradation requirements.
2. Adjust moisture content as necessary to obtain specified compaction.
3. Do not allow backfill to free fall into the trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over the top of pipe.
4. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
5. Backfill to grade with proper allowances for crushed rock surfacing, and pavement thicknesses, wherever applicable.
6. Backfill around structures with same class backfill as specified for adjacent trench unless otherwise shown or specified.

B. Trench Backfill: Place in lifts not to exceed 6 inches. Compact each lift to a minimum of 95 percent relative compaction prior to placing succeeding lifts.

C. Concrete Encasement:

1. Place above bedding.
2. Minimum Concrete Thickness: 12 inches on top and sides of pipe.
3. Do not allow dirt or foreign material to become mixed with concrete during placement.
4. Allow sufficient time for concrete to reach initial set before additional backfill material is placed in trench.
5. Prevent flotation of pipe.
6. Begin and end concrete backfill within 4 inches of a pipe joint on each end.
7. Do not encase pipe joints except within the limits of the concrete backfill.

3.08 UTILITY LINE CROSSINGS

A. Crushed stone backfill in accordance with Paragraph Bedding Material and Pipe Zone Material shall be used under all culverts, water, gas, gravity sewer lines, force mains, buried telephone conduit, and any other miscellaneous buried pipelines that cross the excavated trench. Crushed stone backfill shall be carried a minimum of 2 feet beyond the edge of the buried utility. Crushed stone backfill beneath these facilities shall be considered incidental to the work and no additional payment will be made to the Contractor.

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3.09 PLACEMENT ABOVE FILTRATION GEOTEXTILE

A. For placement of backfill above filtration geotextile, place the first lift of fill in a 12-inch lift to protect the geotextile material. Place additional trench backfill in 6-inch lifts and compact each lift to 95 percent relative compaction.

B. The Contractor shall take precautions so the operation will not damage the geotextile material.

3.10 MAINTENANCE OF TRENCH BACKFILL

A. After each section of trench is backfilled, maintain the surface of the backfilled trench even with the adjacent ground surface until final surface restoration is completed.

B. Asphaltic Pavement: Replace settled areas or fill with asphalt as specified in Section 32 12 16, Asphalt Paving.

C. Other Areas: Add excavated material where applicable and keep the surface of the backfilled trench level with the adjacent ground surface.

3.11 SETTLEMENT OF BACKFILL

A. Settlement of trench backfill, or of fill, or facilities constructed over trench backfill will be considered a result of defective compaction of trench backfill and shall be corrected at no cost to the Owner. Structures damaged by settlement shall be restored to their original condition by the Contractor at no cost to the Owner.

END OF SECTION

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SECTION 31 32 00
SOIL STABILIZATION

PART 1 GENERAL

1.01 MAINTENANCE

A. Operations: Inspect, repair, and replace as necessary all erosion control measures during the time period from start of construction to completion of construction.

1.02 TURBIDITY

A. Contractor shall control and confine turbidity to the immediate work area. This cost shall be included in the cost proposal. A turbidity control plan must be submitted prior to beginning work. The turbidity control plan must provide details of measures to control turbidity within the outfall work zone at the Site. The turbidity control plan shall include monitoring sufficient to ensure compliance with State water quality standards contained in Chapter 62-302 of the Florida Administrative Code.

1. At a minimum testing shall be done:
   a. Base test prior to beginning work each day.
   b. Before Lunch 11:30 a.m.
   c. Afternoon 2:00 p.m.
   d. At the end of the work day 5:00 p.m.
   e. At the request of City Representative onsite.
   f. A breach of the turbidity control measures.

B. Turbidity screens with floats and anchored bases shall be used to contain turbidity at the Site provided that the Contractor determines that the current regime will allow their placement and maintenance.

C. Floating Turbidity Barriers, and Staked Turbidity Barriers: This work shall consist of installing, maintaining, and removal of turbidity barriers to necessary contain turbidity that may occur as the result of pile installation, filling, excavation, or other construction activities which may cause turbidity to occur in the waters of the State. This may entail the deployment of turbidity barriers around isolated areas of concern such as wetlands, etc., both within as well as, outside the right of way limits. Such areas will be identified by the City and barriers will be put in-place prior to the commencement of any work that could impact the area of concern. The type barrier used, the deployment, and maintenance of the barrier will be such as to minimize dispersion of turbid waters from the construction site. Alternate methods or materials may be approved by the City provided that compliance with applicable permit conditions and State water quality standards are maintained.

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D. Turbidity barriers will be used when necessary and as directed by City Representative. Turbidity barriers will only be used under conditions where they are effective and where there is an impact on the surrounding waters. This will not relieve the Contractor of the responsibility for operating in such a manner as to avoid or minimize the degradation of the water quality of the surrounding waters. Note; the Florida Keys are within the Outstanding Florida Waters OFW. Contractor shall consider this in the plan. Any fine(s) resulting from violations shall be paid directly by the Contractor. Cost of turbidity control shall be included in the lump sum cost.

PART 2 PRODUCTS

2.01 TYPE II FLOATING TURBITIDY BARRIERS

A. In accordance with FDOT Design Standard Index 103.

2.02 SILT FENCE

A. Geotextile: Per Florida Department of Transportation (FDOT) Index 102 and FDOT Standard Specifications.

B. Support Posts: Per FDOT Index 102 and FDOT Standard Specifications.

C. Fasteners: Per FDOT Index 102 and FDOT Standard Specifications.

PART 3 EXECUTION

3.01 TYPE II FLOATING TURBIDITY BARRIERS

A. In accordance with FDOT Design Standard Index 103 and FDOT Standard Specification 104-6.4.9.

3.02 SILT FENCE

A. In accordance with FDOT Design Standard Index 102 and FDOT Standard Specification 104-6.4.8.

3.03 CLEANUP

A. Sediment trapped in erosion control devices shall be removed from the Site. Do not flush sediment laden water into the drainage system.

B. After site restoration is complete and when approved by the Engineer, all temporary erosion control measures shall be completely removed and disposed off site to locations that are approved by federal, state, and local authorities.

END OF SECTION

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SECTION 31 37 00
RIPRAP

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
   a. C94/C94M, Standard Specification for Ready-Mixed Concrete.
   b. C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
   c. C150, Standard Specification for Portland Cement.
   d. C535, Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

1.02 DEFINITIONS

A. Standard Specifications, as used in this section, refer to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

1.03 QUALITY ASSURANCE

A. Riprap Source: Quarry that has produced riprap and has performed satisfactorily on other projects for at least 5 years.

PART 2 PRODUCTS

2.01 RIPRAP

A. As specified in Standard Specification 530-2.2.1 Rubble (Bank and Shore Protection).

PART 3 EXECUTION

3.01 PLACING RIPRAP

A. In accordance with Standard Specification 530-3.2.

END OF SECTION

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SECTION 32 11 23
BASE COURSE

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO):
   a. T180, Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18-inch) Drop.
   b. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction (Standard Specifications).

1.02 DEFINITIONS

A. Completed Course: Compacted, unyielding, free from irregularities, with smooth, tight, even surface, true to grade, line, and cross-section.

B. Completed Lift: Compacted with uniform cross-section thickness.

C. Standard Specifications: When referenced in this section, shall mean the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Current Edition.

PART 2 PRODUCTS

2.01 FLOWABLE FILL

A. Provide flowable fill with the following specifications:

1. 28-day compressive field strength of 150 psi.
2. Aggregate gradations must be submitted for review and approval. Maximum size No. 4 stone.
3. Slump Range: Flowable.

PART 3 EXECUTION

3.01 CONSTRUCTION OF COURSES

A. The Contractor shall provide a minimum 12 inches of 150 psi flowable fill.

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3.02 SURFACE TOLERANCES

A. Finished Surface of Base Course: Within plus or minus 0.05 foot of grade shown at any individual point.

3.03 CLEANING

A. Remove excess material from the Work area.

END OF SECTION

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SECTION 32 12 16
ASPHALT PAVING

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO):
   a. M17, Standard Specification for Mineral Filler for Bituminous Paving Mixtures.
   b. M81, Standard Specification for Cut-Back Asphalt (Rapid Curing Type).
   c. M82, Standard Specification for Cut-Back Asphalt (Medium Curing Type).
   d. M140, Standard Specification for Emulsified Asphalt.
   e. M208, Standard Specification for Cationic Emulsified Asphalt.
   f. T166, Standard Method of Test for Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens.
   g. T176 Standard Method of Test for Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.
   h. T230, Standard Method of Test for Determining Degree of Pavement Compaction of Bituminous Aggregate Mixtures.
   i. T245, Standard Method of Test for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
   j. T246, Standard Method of Test for Resistance to Deformation and Cohesion of Bituminous Mixtures by Means of Hveem Apparatus.
   k. T247, Standard Method of Test for Preparation of Test Specimens of Bituminous Mixtures by Means of California Kneading Compactor.
   l. T283, Standard Method of Test for Resistance of Compacted Bituminous Mixture to Moisture Induced Damage.
   m. T304, Standard Method of Test for Uncompacted Void Content of Fine Aggregate (Method A).
2. Asphalt Institute (AI):
   a. Manual Series No. 2 (MS-2), Mix Design Methods for Asphalt Concrete.
   b. Superpave Series No. 2 (SP-2), Superpave Mix Design.

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3. ASTM International (ASTM):
   a. D2041, Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
   b. D4318, Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
   c. D4791, Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
   d. D5821, Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate.
   e. E329, Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

1.02 DEFINITIONS

A. Combined Aggregate: All mineral constituents of asphalt concrete mix, including mineral filler and separately sized aggregates.

B. RAP: Reclaimed asphalt pavement.

C. Standard Specifications: Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

1.03 DESIGN REQUIREMENTS

A. Prepare asphalt concrete mix design, meeting the design criteria, tolerances, and other requirements of Section 334 of the Standard Specifications.

1.04 SUBMITTALS

A. Informational Submittals:

1. Asphalt Concrete Mix Formula:
   a. Submit minimum of 15 days prior to start of production.
   b. Submittal to include the following information: Properties as stated in Section 334 of the Standard Specifications.
2. Manufacturer’s Certificate of Compliance, in accordance with Section 01 43 33, Manufacturers’ Field Services, for the following materials:
   a. Aggregate: Gradation, source test results as defined in Section 334 of the Standard Specifications.
   b. Asphalt for Binder: Type, grade, and viscosity-temperature curve.
   c. Prime Coat: Type and grade of asphalt.
   d. Tack Coat: Type and grade of asphalt.
   e. Additives.
   f. Mix: Conforms to job-mix formula.

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3. Statement of qualification for independent testing laboratory.
4. Test Results:
   a. Mix design.
   b. Asphalt concrete core.
   c. Gradation and asphalt content of uncompacted mix.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Independent Testing Laboratory: In accordance with ASTM E329.
2. Asphalt concrete mix formula shall be prepared by approved certified independent laboratory under the supervision of a certified asphalt technician.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Moisture: Do not apply asphalt materials or place asphalt mixes when application surface is wet.

PART 2 PRODUCTS

2.01 MATERIALS

A. Prime Coat: Cut-back asphalt, conform to Section 300 of the Standard Specifications.

B. Tack Coat: Emulsified asphalt, conform to Section 300 of the Standard Specifications.

2.02 ASPHALT CONCRETE MIX

A. General:

1. Mix formula shall not be modified except with written approval of Engineer.
2. Source Changes:
   a. Should material source(s) change, establish new asphalt concrete mix formula before new material(s) is used.
   b. Make adjustments in gradation or asphalt content as necessary to meet design criteria.

B. Asphalt Concrete: as specified on the Drawings in accordance with Section 334 of the Standard Specifications.

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C. Composition: Hot-plant mix of aggregate, mineral filler, if required, and paving grade asphalt cement. The several aggregate fractions shall be sized, uniformly graded, and combined in such proportions that resulting mixture meets grading requirements of mix formula.

D. Aggregate:

1. General: As specified in Section 334 of the Standard Specifications

E. Mineral Filler: In accordance with Section 334 of the Standard Specifications.

F. Asphalt Cement: Paving Grade as shown on the Drawings in accordance with Section 334 of the Standard Specifications.

PART 3 EXECUTION

3.01 GENERAL

A. Traffic Control:

1. In accordance with Section 01 50 00, Temporary Facilities and Controls.
2. Minimize inconvenience to traffic, but keep vehicles off freshly treated or paved surfaces to avoid pickup and tracking of asphalt.

B. Driveways: Repave asphalt driveways from which pavement was removed. Leave driveways in as good or better condition than before start of construction.

3.02 LINE AND GRADE

A. Provide and maintain intermediate control of line and grade, independent of underlying base, to meet finish surface grades and minimum thickness.

B. Shoulders: Construct to line, grade, and cross-section shown.

3.03 APPLICATION EQUIPMENT

A. In accordance with Section 320 of the Standard Specifications.

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3.04 PREPARATION

A. Existing Roadway:

1. Modify profile by grinding, milling, or overlay methods as approved, to provide meet lines and surfaces and to produce smooth riding connection to existing facility.
2. Remove existing material to a minimum depth of 25 millimeters (1 inch).
3. Paint edges of meet line with tack coat prior to placing new pavement.

B. Thoroughly coat edges of contact surfaces (curbs, manhole frames) with emulsified asphalt or asphalt cement prior to laying new pavement. Prevent staining of adjacent surfaces.

3.05 PAVEMENT APPLICATION

A. General: Place asphalt concrete mixture on approved, prepared base in conformance with Section 32 11 23, Aggregate Base Course.

B. Prime Coat:

1. Heat cut-back asphalt as specified in Section 330 of the Standard Specifications, prior to application.
2. Apply uniformly to clean, dry surfaces avoiding overlapping of applications.
3. Do not apply when moisture content of upper 75 millimeters (3 inches) of base exceeds optimum moisture content of base, or if free moisture is present.
4. Remove or redistribute excess material.
5. Allow a minimum of 5 full days for curing of primed surface before placing asphalt concrete.

C. Tack Coat:

1. Prepare material, as specified in Section 330 of the Standard Specifications, prior to application.
2. Apply uniformly to clean, dry surfaces avoiding overlapping of applications.
3. Do not apply more tack coat than necessary for the day’s paving operation.
4. Touchup missed or lightly coated surfaces and remove excess material.

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D. Pavement Mix:

1. Prior to Paving:
   a. Sweep primed surface free of dirt, dust, or other foreign matter.
   b. Patch holes in primed surface with asphalt concrete pavement mix.
   c. Blot excess prime material with sand.
2. Place asphalt concrete pavement mix as specified on the Drawings.
3. Total Compacted Thickness: As shown.
4. Apply such that meet lines are straight and edges are vertical.
5. Collect and dispose of segregated aggregate from raking process. Do not scatter material over finished surface.
6. Joints:
   a. Offset edge of each layer a minimum of 150 millimeters (6 inches) so joints are not directly over those in underlying layer.
   b. Offset longitudinal joints in roadway pavements so longitudinal joints in wearing layer coincide with pavement centerlines and lane divider lines.
   c. Form transverse joints by cutting back on previous day's run to expose full vertical depth of layer.
7. Succeeding Lifts: Apply tack coat to pavement surface between each lift.
8. After placement of pavement, seal meet line by painting a minimum of 150 millimeters (6 inches) on each side of joint with cut-back or emulsified asphalt. Cover immediately with sand.

E. Compaction: In accordance with Section 330 of the Standard Specifications.

F. Tolerances:

1. General: In accordance with Section 330 of the Standard Specifications.

3.06 FIELD QUALITY CONTROL

A. General: Provide services of approved certified independent testing laboratory to conduct tests.

B. Field Density Tests:

1. Perform tests from cores or sawed samples in accordance with AASHTO T230 and AASHTO T166.
2. Measure with properly operating and calibrated nuclear density gauge in accordance with ASTM D2950.
3. Maximum Density: In accordance with ASTM D2041, using sample of mix taken prior to compaction from same location as density test sample.

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C. Testing Frequency:

1. Quality Control Tests:
   a. Asphalt Content, Aggregate Gradation: Once per every 400 mg (500 tons) of mix or once every 4 hours, whichever is greater.
   b. Mix Design Properties, Measured Maximum (Rice's) Specific Gravity: Once every 900 mg (1,000 tons) or once every 8 hours, whichever is greater.
2. Density Tests: Once every 450 mg (500 tons) of mix or once every 4 hours, whichever is greater.

END OF SECTION

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SECTION 32 17 23
PAVEMENT MARKINGS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO):
   a. M237, Standard Specification for Epoxy Resin Adhesives for Bonding Traffic Markers to Hardened Portland Cement and Asphalt Concrete.
   b. M248, Standard Specification for Ready-Mixed White and Yellow Traffic Paints.
   c. M249, Standard Specification for White and Yellow Reflective Thermoplastic Striping Material (Solid Form).
2. ASTM International (ASTM): D4280, Standard Specification Extended Life Type, Nonplowable, Prismatic, Raised, Retroreflective Pavement Markers.
3. Federal Specifications (FS):
   a. A-A-2886A, Paint, Traffic, Solvent Based.
   b. TT-B-1325C, Beads (Glass Spheres); Retroreflective.

1.02 DEFINITIONS

A. Standard Specifications: Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
   a. Product Data:
      1) Paint.
      2) Reflective markers.
      3) Epoxies, resins, and primers to be used.

PART 2 PRODUCTS

2.01 GENERAL

A. All products shall be in accordance with Section 710 of the Standard Specifications.

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2.02 PAINT

A. Color: White or yellow.

B. Traffic paint in accordance with Section 710 of the Standard Specifications.

C. Homogeneous, easily stirred to smooth consistency, with no hard settlement or other objectionable characteristics during storage period of 6 months.

PART 3 EXECUTION

3.01 GENERAL

A. Surface Preparation, Application, and Protection: In accordance with Section 710 of the Standard Specifications.

B. All areas having traffic stripes and reflective markers prior to paving shall be repainted and replaced. Temporary traffic painting shall be applied immediately after asphalt pavement has been placed. Permanent traffic painting may be applied only after the proper curing time for the asphalt.

END OF SECTION

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SECTION 32 31 14
ALUMINUM FENCE AND GATE

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work necessary for the aluminum fence and gate at the generator site.

1.02 GENERAL

A. Like items of materials provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, maintenance, and replacement.

B. See Conditions of the Contract and Section 01 01 00, General Requirements, which contain information and requirements that apply to the work specified herein and are mandatory for this Project.

1.03 SUBMITTALS

A. Submittals shall be made in accordance with Section 01 01 00, General Requirements. In addition, the following specific information shall be provided:

1. Shop Drawings: Submit Shop Drawings and installation drawings for the Engineer's review prior to fabrication and delivery. These Drawings shall provide detailed information and Specifications for all materials, finishes, dimensions, and erection instructions.

1.04 REFERENCE STANDARDS

A. Aluminum fence style, gauge, height shall be per City of Key West Specifications and match fencing from the City’s existing stormwater pumping stations.

PART 2 PRODUCTS

2.01 GENERAL

A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired only. Products of other manufacturers will be considered in accordance with the General Conditions.

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B. Materials shall be new and products of recognized, reputable manufacturers. Used, rerolled, or regalvanized materials are not acceptable.

2.02 GATES

A. Gates shall be swing complete with latches, stops, keepers, hinges.

B. Gate fabric shall be the same type as used in the fence construction. The fabric shall be attached securely to the gate frame at intervals not exceeding 15 inches.

C. Gate hinges shall be of adequate strength for gate and with large bearing surfaces for clamping in position. The hinges shall not twist or turn under the action of the gate. The gates shall be capable of being opened and closed easily by one person.

D. Gate latches, stops, and keepers shall be provided for all gates.

2.03 CONCRETE

A. Materials as specified in Section 03 30 10, Structural Reinforced Concrete. Proportions shall be 1:2:4. Compressive strength shall not be less than 2,000 psi at 28 days.

PART 3 EXECUTION

3.01 INSTALLATION

A. Installation of fencing shall meet the requirements of ASTM F567.

3.02 CLEANUP

A. Upon completion of the fence installation, clean up all waste material resulting from the operation.

END OF SECTION

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SECTION 33 44 13.13
STORMWATER STRUCTURES

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. American Welding Society (AWS): Code for Welding in Building Construction.
2. ASTM International (ASTM):
   a. A36/A36M, Standard Specification for Carbon Structural Steel.
   b. A48, Standard Specification for Gray Iron Castings.
   c. A615/A615M, Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
   d. C94/C94M, Standard Specification for Ready-Mixed Concrete.
   e. C387, Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
   f. C478, Standard Specification for Precast Reinforced Concrete Manhole Sections.
3. FDOT: Florida Department of Transportation.

PART 2 PRODUCTS

2.01 UNITS

A. Structure dimensions and details of construction shall conform to FDOT Standard Specifications for Road and Bridge Construction and the FDOT Design Standards. All structures shall be H-20 load rated.

2.02 CONCRETE

A. Concrete shall be ready-mixed, conforming to ASTM C94/C94M, Alternate 2. Compressive field strength shall be not less than 2,500 psi at 28 days. Maximum size of aggregate shall be 1-1/2 inch. Slump shall be between 2 and 4 inches. Field strength shall be assumed as equal to 85 percent of strength of laboratory-cured cylinders.

2.03 FORMS

A. Exposed surfaces shall be plywood. Others shall be steel, matched boards, plywood, or other acceptable material. Form vertical surfaces. Provide fillets on re-entrant angles. Trench walls, large rock, or earth will not be acceptable form material.

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2.04 REINFORCING STEEL

A. Reinforcing steel shall conform to ASTM A615/A615M, Grade 60, deformed bars.

2.05 PRECAST UNITS

A. At the option of Contractor, approved precast units may be substituted for cast-in-place units. Precast units shall conform to ASTM C478 except dimensions shall be as shown. Submit details of proposed units to Engineer for review. Concrete risers for extensions shall be a maximum of 6 inches high and of same quality as sections. Risers shall be reviewed by Engineer before installation.

2.06 MORTAR

A. Standard premixed mortar conforming to ASTM C387, Type S, or proportion 1 part portland cement to 2 parts clean, well-graded sand which will pass a 1/8-inch screen. Admixtures may be used not exceeding the following percentages of weight of cement: Hydrated lime, 10 percent; diatomaceous earth or other inert materials, 5 percent. Consistency of mortar shall be such that it will readily adhere to concrete. Only potable water shall be used for mixing. No groundwater is allowed.

PART 3 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. Excavate as required to accomplish construction. Backfill shall be as specified for adjoining pipe trench.

3.02 CONSTRUCTION OF STRUCTURES

A. Construct structures at locations shown and in accordance with Drawings. Construct forms to dimensions and elevations required. Forms shall be tight and well braced. Chamfer corners of forms.

B. Prior to placing concrete, remove water and debris from forms. Moisten forms just prior to placing concrete. Handle concrete from transporting vehicle to forms in a continuous manner as rapidly as practical without segregation or loss of ingredients. Immediately after placing, compact concrete with mechanical vibrator. Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation.

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C. Screed top surface of exposed slabs and walls. When initial water has been absorbed, float surfaces with wood float and lightly trowel with steel trowel to smooth finish free from marks or irregularities. Finish exposed edges with steel edging tool. Remove forms and patch defects in concrete with mortar mixed in same proportions as original concrete mix.

D. Cure concrete by preventing loss of moisture for a period of 7 days. Accomplish with a membrane-forming curing compound. Apply curing compound immediately after removal of forms or finishing of slabs. Protect concrete from damage during 7-day curing period.

3.03 PLACING PRECAST UNITS

A. Excavate and backfill as specified in Section 31 23 13, Subgrade Preparation. Set units to grade at locations shown.

3.04 CLEANING

A. Upon completion, clean each structure of all silt, debris, and foreign matter.

END OF SECTION

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SECTION 40 27 00
PROCESS PIPING-GENERAL

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section and any supplemental Data Sheets:

1. American Association of State Highway and Transportation Officials (AASHTO): Standard Specifications for Highway Bridges.
2. American National Standards Institute (ANSI):
   a. A21.52, Ductile Iron Pipe, Centrifugally Cast, for Gas.
   b. B1.20.1, Pipe Threads, General Purpose (Inch).
   c. B16.1, Cast Iron Pipe Flanges and Flanged Fittings.
   d. B16.3, Malleable Iron Threaded Fittings.
   e. B16.5, Pipe Flanges and Flanged Fittings.
   f. B16.11, Forged Fittings, Socket-Welding and Threaded.
   g. B16.21, Nonmetallic Flat Gaskets for Pipe Flanges.
   h. B16.42, Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300.
3. American Petroleum Institute (API): 5L, Specification for Line Pipe.
4. American Society of Mechanical Engineers (ASME):
   a. Boiler and Pressure Vessel Code, Section VIII, Division 1, Pressure Vessels.
   b. Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications.
   c. B31.1, Power Piping.
   d. B31.3, Chemical Plant and Petroleum Refinery Piping.
   e. B36.10M, Welded and Seamless Wrought Steel Pipe.
5. American Society for Nondestructive Testing (ASNT): SNT-TC-1A, Recommended Practice for Nondestructive Testing Personnel Qualifications.
6. American Society for Testing and Materials (ASTM):
   a. A47, Standard Specification for Ferritic Malleable Iron Castings.
   b. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
   c. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware (R1987).
   d. A193/A193M Rev A, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
   e. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.
   f. A197, Standard Specification for Cupola Malleable Iron.

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g. A276, Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
h. A312/A312M, Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
i. A320/A320M, Standard Specification for Alloy Steel Bolting Materials for Low-Temperature Service.
j. A403/A403M Rev A, Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings.
k. A536, Standard Specification for Ductile Iron Castings.
l. A774/A774M, Standard Specification for As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures.
m. A778 Rev A, Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products.
n. B61, Standard Specification for Steam or Valve Bronze Castings.
o. B62, Standard Specification for Composition Bronze or Ounce Metal Castings.
p. D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
q. D413, Standard Test Methods for Rubber Property-Adhesion to Flexible Substrate (R1993).
r. D1248, Standard Specification for Polyethylene Plastics Molding and Extrusion Materials (R1989).
s. D1784, Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
t. 1785, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
u. D2000, Standard Classification System for Rubber Products in Automotive Applications.
v. D2464, Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
w. D2467, Standard Specification for Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
x. D2564, Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.

7. American Welding Society (AWS):
   a. A5.8, Specification for Filler Metals for Brazing and Braze Welding.
   b. QC 1, Standard for AWS Certification of Welding Inspectors.
8. American Water Works Association (AWWA):
   a. C104/A21.4, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
   b. C110/A21.10, Ductile-Iron and Gray-Iron Fittings, 3 Inches Through 48 Inches for Water and Other Liquids.

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c. C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
d. C115/A21.15, Flanged Ductile-Iron Pipe with Threaded Flanges.
e. C151/A21.51, Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
f. C153/A21.53, Ductile-Iron Compact Fittings 3 Inches through 16 Inches, for Water and Other Liquids.
g. C214, Fusion Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.

9. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS): SP43, Wrought Stainless Steel Butt-Welding Fittings Including Reference to Other Corrosion Resistant Materials.
10. National Fire Protection Association (NFPA): 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

1.02 SYSTEM DESIGN REQUIREMENTS

A. General:

1. The Specifications and Drawings are not all inclusive of explicit piping details; provide piping in accordance with laws and regulations and intended use, including:
   a. Sanitary Building Drainage and Vent Systems: ICBO/IAPMO Uniform Plumbing Code.
2. Pressure Ratings and Materials Specified: Represent minimum acceptable standards for piping systems.
3. Piping Systems: Suitable for the services specified and intended.

B. Buried Piping: Provide to be suitable for design conditions as follows:

1. H20-S16 traffic load (AASHTO Standard Specifications for Highway Bridges) with 1.5 impact factor.
2. Piping both with and without internal pressure.

1.03 DEFINITIONS

A. Submerged or Wetted:

1. Zone below elevation of:
   a. Top face of channel walls and cover slabs.
   b. Liquid surface or within 2 feet above top of liquid surface.
   c. Top of tank wall or under tank cover.
2. Exposed or Atmospherically Exposed Piping: All piping exposed to the atmosphere (not buried, submerged, or embedded). This designation includes piping insulated or hidden from visual inspection.

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1.04 SUBMITTALS

A. Shop Drawings: Furnish the following:

1. Detail installation drawings, catalog information, and complete component specifications for pipe, fittings, couplings, as well as metal framing pipe support systems, trenches, and other locations employing metal framing pipe support systems.
2. Manufacturer’s certification that supplied piping materials meet the Detail Piping Specifications.

B. Quality Control Submittals:

1. Manufacturer's Certification of Compliance.
2. Laboratory Testing Equipment: Certified calibrations, manufacturer's product data, and test procedures.
3. Manufacturer's Certification of Compliance: Pipe and fittings.

1.05 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 01 61 00, Common Product Requirements and:

1. Flanges: Securely attach metal, hardboard, or wood protectors over entire gasket surface.
2. Linings and Coatings: Prevent excessive drying.
3. Handling: Use heavy canvas or nylon slings to lift pipe and fittings. Pipe manufacturer’s requirements for lift and handling shall take precedence.
4. Exterior Exposure: In accordance with manufacturer’s recommendations.

PART 2 PRODUCTS

2.01 PIPING

A. As specified on Piping Data Sheet(s) and Piping Schedule located at the end of this section as Supplement.

B. Diameters Shown:

1. Standardized Products: Nominal size.
2. Fabricated Steel Piping (Except Cement-Lined): Outside diameter, ASME B36.10M.

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2.02 JOINTS FOR BURIED PIPING

A. General:

1. Gravity, Nonpressure, and Pressure Services: Provide joint thrust restraint designed for the test pressures shown in the Piping Schedule at the end of this section. Restrain all pipe joints and connections to fittings.
2. Thrust restraint of new piping with retainer glands employing set screws or tie-rod devices is unacceptable and is prohibited. Field welding of ductile iron pipe is also unacceptable and is prohibited.
3. Joint deflection for piping shall be limited to 75 percent of the manufacturer’s recommended maximum value.

B. Ductile Iron Fittings:

1. New Ductile Iron Fittings: For new fittings use mechanical joint anchor glands and restraint harness systems. Acceptable restrained joint systems are specified in Section 40 27 00.01,
DS - Cement-Mortar-Lined Ductile Iron Fittings.
2. Connections to Existing Piping System (Existing Push-On Joints):
    1) At fitting cut-in locations where push-on joint piping is found to exist, tie-rod assemblies and thrust harnesses shall be used to restrain all pipe joints of existing unrestrained pipe against thrust forces. Existing pipe joints within the restrained length identified in the Thrust Restraint Schedule/Table for the test pressure specified shall be restrained.
    2) Tie rod assemblies and harnesses shall be the products of the following manufacturer:
        a) EBAA Iron, Inc., MEGALUG Series 2200 Style.
    3) All restraint systems shall be shop primed with final field coating with System No. 8 as specified in Section 09 90 00, Painting and Coating.

C. PVC Pipe (C-905):

1. For all piping utilize the following:
    a. Fitting Restraint: EBBA “Restraint Pipe Systems,” Series 2200.
    b. Joint Restraint: EBBA “Restraint Pipe Systems,” Series 2800.
2. All restraint systems shall be shop primed with final field coating with System No. 8 as specified in Section 09 90 00, Painting and Coating.

2.03 GASKET LUBRICANT

A. Lubricant shall be supplied by pipe manufacturer and no substitute or "or-equal" will be allowed.

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2.04 FABRICATION

A. Mark Each Pipe Length on Outside:

1. Size or diameter and class.
2. Manufacturer's identification and pipe serial number.
3. Location number on laying drawing.
4. Date of manufacture.

B. Code markings according to approved Shop Drawings.

2.05 FINISHES

A. Factory prepare, prime, and finish coat in accordance with Section 40 27 05, Pipe Corrosion Protection.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify size, material, joint types, elevation, horizontal location, and pipe service of existing pipelines to be connected to new pipelines or new equipment.

B. Inspect size and location of structure penetrations to verify adequacy of wall pipes, sleeves, and other openings.

3.02 PREPARATION

A. Notify Engineer at least 2 weeks prior to field fabrication of pipe or fittings.

B. Inspect pipe and fittings before installation, clean ends thoroughly, and remove foreign matter and dirt from inside.

C. Damaged Coatings and Linings: Repair using original coating and lining materials in accordance with manufacturer's instructions.

3.03 INSTALLATION-GENERAL

A. Join pipe and fittings in accordance with manufacturer's instructions, unless otherwise shown or specified.

1. All exposed piping to be installed in a workmanship like manner with centerlines plumb and/or level to adjacent structure or piping.

B. Remove foreign objects prior to assembly and installation.

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C. Threaded and Coupled Joints:

1. Conform with ANSI B1.20.1.
2. Produce sufficient thread length to ensure full engagement when screwed home in fittings.
3. Countersink pipe ends, ream and clean chips and burrs after threading.
4. Make connections with not more than three threads exposed.
5. Lubricate male threads only with thread lubricant or tape as specified on Piping Data Sheets.

D. Couplings:

1. General:
   a. Install in accordance with manufacturer's written instructions.
   b. Before coupling, clean pipe holdback area of oil, scale, rust, and dirt.
   c. Remove pipe coating if necessary to present smooth surface.
2. Application:
   a. Metallic Piping Systems: Flexible couplings, transition couplings, and flanged coupling adapters.
   b. Nonmetallic Piping Systems: Teflon bellows connector.
   c. Concrete Encased Couplings: Sleeve type coupling.
   d. Corrosive Service Piping: Elastomer bellows connector.
3. Locations: At all equipment connections.

3.04 INSTALLATION-BURIED PIPE

A. Joints:

1. Dissimilar Buried Pipes:
   a. Provide flexible mechanical compression joints for pressure pipe.
   b. Provide concrete closure collar for gravity and low pressure (maximum 10 psi) piping or as shown.
2. Concrete Encased or Embedded Pipe: Do not encase joints in concrete unless specifically shown.

B. Placement:

1. Pipe Base and Pipe Zone: As specified in Section 31 23 23.15, Trench Backfill.
2. Exercise care when lowering pipe into trench to prevent twisting or damage to pipe.
3. Measure for grade at pipe invert, not at top of pipe.
4. Excavate trench bottom and sides of ample dimensions to permit visual inspection and testing of entire flange, valve, or connection.
5. Prevent foreign material from entering pipe during placement.

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6. Close and block open end of last laid pipe section when placement operations are not in progress and at close of day's work.
7. Lay pipe upgrade with bell ends pointing in direction of laying.
8. Install closure sections and adapters for gravity piping at locations where pipe laying changes direction.
9. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of spigot into bell. If joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment, provide:
   a. Shorter pipe lengths.
   b. Special mitered joints.
   c. Standard or special fabricated bends.
10. After joint has been made, check pipe alignment and grade.
11. Place sufficient pipe zone material to secure pipe from movement before next joint is installed.
12. Prevent uplift and floating of pipe prior to backfilling.

C. PVC Pipe Placement:

1. Lay pipe snaking from one side of trench to other.
2. Offset: As recommended by manufacturer for maximum temperature variation between time of solvent welding and during operation.
3. Do not lay pipe when temperature is below 40 degrees F, or above 90 degrees F when exposed to direct sunlight.
4. Shield ends to be joined from direct sunlight prior to and during the laying operation.
5. Store all pipe out of direct sunlight. Cover and maintain temperatures not to exceed manufacturer’s recommendations.

D. Tolerances:

1. Deflection from Horizontal Line: Maximum 2 inches.
2. Deflection From Vertical Grade: Maximum 1/4 inch.
3. Joint Deflection: Maximum of 75 percent of manufacturer's recommendation.
4. Horizontal position of pipe centerline on alignment around curves maximum variation of 1.75 feet from position shown.
5. Pipe Cover: Minimum 3 feet, unless otherwise shown.

3.05 THRUST RESTRAINT

A. All buried AWWA C905 piping shall be restrained joint, as specified in this Section and further specified in the Detail Pipe Specifications.

B. Location:

1. Buried Piping: All joints and connections to fittings.

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C. Thrust Ties:

1. As specified herein.
2. Anchoring of retainer glands or thrust ties with setscrews is unacceptable.

D. Mechanical Joint Valve Restraint in Proprietary Restrained Joint Piping: Install pipe joint manufacturer's adapter gland follower and pipe end retainer, or thrust tie-rods and socket clamps.

3.06 BRANCH CONNECTIONS

A. When line of lower pressure connects to a line of higher pressure, requirements of Piping Data Sheet for higher pressure rating prevails up to and including the first block valve in the line carrying the lower pressure, unless otherwise shown.

3.07 CLEANING

A. Following assembly and testing, and prior to disinfection and final acceptance, flush pipelines (except as stated below) with water at 2.5 fps minimum flushing velocity until foreign matter is removed.

B. If impractical to flush large diameter pipe at 2.5 fps or blow at 4,000 fpm velocity, clean in-place from inside by brushing and sweeping, then flush or blow line at lower velocity.

C. Insert cone strainers in flushing connections to attached equipment and leave in-place until cleaning is complete.

3.08 FIELD FINISHING

A. Notify Engineer at least 3 days prior to start of any surface preparation or coating application work.

B. As specified in Section 09 90 00, Painting and Coating and Section 40 27 05, Pipe Corrosion Protection.

3.09 FIELD QUALITY CONTROL

A. Pressure Leakage Testing: As specified in Section 40 80 01, Piping Leakage Testing.

B. Test the leak detection system in accordance with the system manufacturer's instructions and recommendations to verify proper operation.

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3.10 SUPPLEMENTS

A. The supplements listed below, following "END OF SECTION," are part of this Specification.

1. Piping Schedule.
2. Data Sheets:

NUMBER	TITLE
-01	DS—Cement-Mortar-Lined Ductile Iron Fittings
-14	DS—Polyvinyl Chloride (PVC – AWWA C900/C905) Pipe and Fittings

END OF SECTION

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CITY OF KEY WEST
SIMONTON STREET OUTFALL
PIPING SCHEDULE

Service/Flowstream Designation	Pipe Size (Inches)	Piping Material	Specification Section	Installation	Pressure (psig)		Remarks
					Maximum Operating	Test	
Drainage Force Main or DFM	24 - 36	PVC–C905	40 27 00.14	BUR	20	50 H	See Note 1.

NOTES:

1. Buried PVC C905 pipe shall be restrained in accordance with Section 40 27 00, Piping - General, Section 40 27 00.14, DS-Polyvinyl Chloride PVC (AWWA C905) Pipe and Fittings, and as detailed on the Mechanical Legend of the Drawings.

LEGEND

INSTALLATION:

BUR = Buried

TESTING:

H = Hydrostatic Test

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SECTION 40 27 00.01 CEMENT-MORTAR-LINED DUCTILE IRON FITTINGS	
Item	**Description**
Lining	Double Cement-Mortar-Lined and Seal Coated: AWWA C104/A21.4.
Fittings	Lined and coated. Mechanical: AWWA C110/A21.10, C111/A21.11, and C153/A21.53 gray or ductile iron, 250 psi minimum working pressure. Follower glands shall be ductile iron.
Bolting	Mechanical and Pipe Manufacturer's Proprietary Restrained Joints: Manufacturer's standard. For Flange Joints: Type 304 stainless steel, ASTM A193, Grade B8M hex head bolts and ASTM A194, Grade 8M hex head nuts. For Mechanical Joint: High strength, low alloy steel (Cor-Ten) "T" bolts. Cor-Ten bolts, nuts, and accessories shall be manufactured by NSS Industries, EBAA Iron, Inc., or equal. The bolt manufacturer's certificate of compliance must accompany each shipment of fasteners to the site.
Gaskets	Push-On, Mechanical, and Proprietary Restrained Joints: Rubber conforming to AWWA C111/A21.11. Flanged, Water and Sewage Service: 1/8-inch thick, red rubber (SBR), hardness 80 (Shore A), rated to 200 degrees F, conforming to ANSI B16.21, AWWA C207, and ASTM D1330, Grades 1 and 2. Full face for 125-pound flat-faced flanges. Blind flanges shall be gasketed covering the entire inside face with the gasket cemented to the blind flange. Gasket pressure rating to equal or exceed the system hydrostatic test pressure.
Joint Lubricant	Manufacturer's standard.

END OF SECTION

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SECTION 40 27 00.14
POLYVINYL CHLORIDE (PVC – AWWA C905) PIPE AND FITTINGS

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the work necessary for furnishing and installing the polyvinyl chloride (PVC) bell-and-spigot pipe specified herein, and as specified further in Section 40 27 00, Process Piping-General.

PART 2 PRODUCTS

2.01 GENERAL

A. PVC bell-and-spigot pipe shall be manufactured in accordance with the latest edition of AWWA C905 (14 inches and larger), except as modified herein. The PVC bell-and-spigot pipe shall have ductile iron pipe outside dimensions.

2.02 BASIC PIPE MATERIAL

A. The rigid PVC pipe used shall have a cell classification of 12454 A or B as identified by ASTM D1784, Rigid Polyvinyl Chloride Compounds and Chlorinated Polyvinyl Chloride Compounds.

2.03 MANUFACTURER/PRODUCTS

A. J M Eagle Series “Big Blue” AWWA C900/905 C.I.O.D. Transmission Pipe.

B. Or equal.

2.04 DESIGN REQUIREMENTS

A. Pressure AWWA C905 Pipe:

1. The pressure design of each length of AWWA C905 pipe (greater than 12 inches) shall be based upon pressure classification of 100 psi plus a surge allowance of 40 psi (approximately 2 feet per second instantaneously interrupted flow velocity).
2. The dimension ratio (DR), the ratio of the outside pipe diameter divided by the minimum wall thickness shall be DR41, minimum.
3. The DR of the bell at any point between the ring groove and the pipe barrel shall be the same as the DR of the pipe. The wall thickness in the groove and in the bell entry section shall be at least great as that of the pipe barrel. The wall thickness at any point of PVC couplings designed for joint assembly using elastomeric seals shall be at least as great as that of the class of pipe barrel for which the couplings are designed.

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B. Impact Strength: Each length of pipe shall be designed to meet the test requirements as specified under Paragraph Impact Resistance.

2.05 DETAIL REQUIREMENTS

A. Pipe and Fitting Test Requirements at the Plant: Conditions of specimens prior to test at 23 plus or minus 2 degrees C (73.4 plus or minus 3.6 degrees F), and 50 plus or minus 5 percent relative humidity for not less than 40 hours in accordance with procedure of ASTM D618, Conditioning Plastics and Electrical Insulating Materials For Testing.

B. Hydrostatic Routine Test of Pipe: Each standard and random length of pipe shall be tested at the plant to four times the class pressure of the pipe for a minimum dwell of 5 seconds. When the pipe has an integral bell or a coupling affixed to the pipe, the bell or coupling shall be tested with the pipe.

C. Hydrostatic Routine Test of Couplings: Each coupling shall be tested at the plant to four times the class pressure of the pipe for a minimum dwell of 5 seconds.

D. Impact Resistance: Using mix test specimens per shift, conduct tests in accordance with ASTM D2444, Tests For Impact Resistance of Thermoplastic Pipe and Fittings By Means of A Tup (Falling Weight) Using Tup A. The specimens shall not crack or split when impacted with a minimum of 100 foot-pounds.

2.06 PIPE MARKING AT THE PLANT

A. Standard and Random Lengths: Each standard and random length of pipe shall be clearly marked on the outside surface with the manufacturer's name with the appropriate designation code (e.g., PVC 1120), DR, nominal size, pressure classification, date, and shift of manufacture as required by AWWA C900.

B. Couplings: All component parts of each coupling shall be clearly marked for use with the pipe which they are intended. Each coupling shall also be marked with the letter T to indicate that it has been hydrostatically tested.

C. Special Marking: If factory inspection is made by the Owner or his authorized inspector, each pipe and each coupling may receive an additional special marking of no more than three letters, as required by the Owner's inspector.

D. Preparation at the Plant for Shipment: All pipe and couplings shall, unless otherwise specified, be prepared for standard commercial shipment.

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E. Pipe Lengths:

1. Pipe shall be produced in standard and random lengths. At least 85 percent of the total footage of pipe of any class and size shall be furnished in standard lengths. The remaining 15 percent may be in random lengths.
2. Standard laying lengths shall be 20 feet plus or minus 1 inch for all sizes.
3. Random lengths shall not be less than 10 feet long.

F. Sockets and Couplings: The integral socket bell of the PVC pipe or the separate coupling for use with the same size and class as that of the pipe shall be furnished with each length of pipe.

2.07 RUBBER RINGS

A. Rubber rings shall conform to requirements of the latest edition of ASTM D3139 or ASTM F477; as applicable.

2.08 PRESSURE FITTINGS FOR C905 PIPE

A. Fittings shall be double cement-mortar-lined ductile iron as specified in Section 40 27 00.01, DS-Cement-Mortar-Lined Ductile Iron Fittings.

2.09 JOINT LUBRICANT

A. A nontoxic vegetable soap lubricant shall be supplied with the pipe in sufficient quantities for installing the pipe. No lubricant shall be used that will damage the pipe or the rings.

2.10 THRUST RESTRAINT

A. As specified in Section 40 27 00, Process Piping – General.

2.11 BACKFILL

A. Specified under Section 31 23 23.5, Trench Backfill.

PART 3 EXECUTION

3.01 MANUFACTURE OF PIPE

A. Surfaces: The inside and the outside surface of each length of pipe shall be free from nicks, scratches, and other surface defects and blemishes. The pipe shall be homogeneous throughout, free of any bubbles, voids, or inclusions.

B. Jointing Areas: The jointing areas of the barrel of each length of pipe shall be free from dents and gouges.

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3.02 INSPECTION AT THE PLANT

A. Inspection by the Owner or his representative shall not relieve the responsibility to furnish material performing in all respects to the requirements of this Specification.

B. If plant inspection is requested by the Owner, the manufacturer shall notify the Owner in advance of the date, time, and place of testing of the pipe, so that the Owner may be represented at the test.

C. The Owner's Representative shall have free access to those parts of the manufacturer's plant that are involved in work performed under this Specification. The manufacturer shall afford the Owner's Representative, without charge, all reasonable facilities for determining whether the pipe meets the requirements of this Specification.

3.03 PIPE UNLOADING AT THE SITE

A. Inspect each shipment of pipe and fittings and make provisions for a timely replacement of any damaged material. Unload by hand or use canvas or nylon slings to avoid scratching the pipe. Do not slide or drag PVC pipe over an abrasive surface. Pipe with deep scratches shall be replaced with new pipe and removed from the Site.

B. Stack pipe no higher than 5 feet and provide support for the pipe barrel to prevent bending of the PVC pipe. Pipe stockpiled for more than 30 days shall be covered to protect it from the sun's rays. Provide for air circulation through the stockpile.

C. Store rubber rings in a cool, dark place out of the direct rays of the sun.

3.04 DISTRIBUTING PIPE ALONG THE TRENCH

A. Distribute pipe by hand. Do not drop or drag pipe. Distribute sufficient pipe for 1 days’ work, and place with bell end in the direction of pipe laying. Prevent dirt and contaminates from entering the pipe.

3.05 ASSEMBLING THE PIPE

A. Closely follow the manufacturer's recommended procedure for cleaning, setting the ring, lubricating the spigot end of pipe, and assembling.

3.06 MAKING SPECIAL JOINTS

A. Follow manufacturer's recommended procedure, and use only the recommended tools for cutting and beveling.

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3.07 PLACING PIPE IN TRENCH

A. Provide pockets in the pipe bed material to accommodate bell ends and eliminate a concentration of load at these points.

3.08 PREVENTING TRENCH WATER FROM ENTERING PIPE

A. When pipe laying is not in progress, close the open ends of pipe with a watertight plug and allow no water or other objectionable materials to enter the pipe. Provide sufficient backfill over the pipe to prevent flotation if trench water exists.

3.09 BACKFILLING THE PIPE

A. Backfilling the pipe is specified under Section 31 23 23.15, Trench Backfill.

3.10 HYDROSTATIC TESTING

A. Hydrostatic test shall be performed in accordance with Section 40 80 01, Piping Leakage Testing.

END OF SECTION

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SECTION 40 27 02
VALVES AND OPERATORS

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section covers the Work necessary for furnishing and installing the various valves in the piping systems, complete.

1.02 GENERAL

A. Like items of equipment specified herein shall be the end products of one manufacturer in order to achieve standardization for operation, maintenance, spare parts, and manufacturer's service.

B. See Conditions of the Contract and Division 1, General Requirements, which contain information and requirements that apply to the work specified herein and are mandatory for this project.

1.03 SUBMITTALS

A. Shop Drawings:

1. Product data sheets for make and model with valve type number in the right hand corner of each cut sheet.
2. Complete catalog information, descriptive literature, specifications, outline drawings, and identification of materials of construction. Data on all valve appurtenances.
3. Power and control wiring diagrams, including terminals and numbers.
4. Complete motor nameplate data.
5. Open/close and throttle actuators sizing calculations.

B. Quality Control Submittals:

1. Certificate of Compliance for:
   a. Electric operators; full compliance with AWWA C540.
   b. Butterfly valves; full compliance with AWWA C504.
2. Tests and inspection data.
3. Manufacturer's Certificate of Proper Installation.
4. Operation and Maintenance Manual.
5. Manufacturer's certificate coating provided conforms to Section 09 90 00, Painting and Coating, and AWWA C550.

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PART 2 PRODUCTS

2.01 GENERAL

A. Valve to include operator, actuator, handwheel, chain wheel, extension stem, floor stand, worm and gear operator, operating nut, chain, wrench, and accessories for a complete operation.

B. Valve to be suitable for intended service. Renewable parts not to be of a lower quality than specified.

C. Valve same size as adjoining pipe.

D. Valve ends to suit adjacent piping.

E. Size operator to operate valve for the full range of pressures and velocities.

F. Valve to open by turning counterclockwise.

G. Factory mount operator, actuator, and accessories.

2.02 MATERIALS

A. Brass and bronze valve components and accessories that have surfaces in contact with water to be alloys containing less than 16 percent zinc and 2 percent aluminum.

B. Approved alloys are of the following ASTM designations:

1. B61, B62, B98 (Alloy UNS No. C65100, C65500, or C66100), B139 (Alloy UNS No. C51000), B584 (Alloy UNS No. C90300 or C94700), B164, B194, and B127.
2. Stainless steel Alloy 18-8 may be substituted for bronze.
3. All gland bolts on iron body valves shall be bronze and fitted with silicon bronze nuts.

2.03 FACTORY FINISHING

A. Epoxy Lining and Coating:

1. Buried or Submerged Valves:
   a. Except where other linings and coatings are specifically identified in the detail valve specifications, interior ferrous metal surfaces of buried or submerged valves shall be coated in accordance with System No. 29 as specified in Section 09 90 00, Painting and Coating. Exterior ferrous metal surfaces shall be coated with System No. 8 as specified in Section 09 90 00, Painting and Coating.

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b. Heat-activated (fusion) bonded coatings are required. Two-part or nonheat activated coatings are not acceptable.
c. Minimum 12-mil dry film thickness except where limited by valve operating tolerances.

2.04 VALVES

A. Plug Valves:

1. Type V405 Eccentric Plug Valves, 4 Inches through 72 Inches:
a. Round-ported full port style valves of the nonlubricated type with totally enclosed, geared, manual handwheel operators for valves 6 inches and larger. Valves shall be rated 150-pound WOG minimum, and shall have cast iron body with mechanical joint ends, balanced plug coated with Buna-N elastomer, Buna-Vee packing or O-ring seals, corrosion-resistant bearings and nickel seats. Flanges shall meet 125-pound ANSI Standards.
b. Manufacturers and Products:
1) DeZurik; Series 100, Figure 118.
2) Pratt/Keystone, Ballcentric Series.
3) Or equal.

2.05 OPERATORS

A. Manual Operator:

1. General:
a. Operator force not to exceed 40 pounds under any operating condition, including initial breakaway. Gear reduction operator when force exceeds 40 pounds.
b. Operator self-locking type or equipped with self-locking device.
c. Position indicator on quarter-turn valves.
d. Worm and gear operators one-piece design worm-gears of gear bronze material. Worm hardened alloy steel with thread ground and polished. Traveling nut type operators with threaded steel reach rods with internally threaded bronze or ductile iron nut.
2. Buried Operator:
a. Buried service operators on valves larger than 2-1/2 inches shall have a 2-inch AWWA operating nut. Buried operators on valves 2 inches and smaller shall have cross handle for operation by forked key. Enclose moving parts of valve and operator in housing to prevent contact with the soil.

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b. Design buried service operators for quarter-turn valves to withstand 450 foot-pounds of input torque at the FULLY OPEN or FULLY CLOSED positions, grease packed and gasketed to withstand a submersion in water to 10 psi.
c. Buried valves shall have extension stems, torque tubes, bonnets, and valve boxes.

2.06 ACCESSORIES

A. Tagging: 1-1/2-inch diameter heavy brass or stainless steel tag for each valve operator, bearing the valve tag number shown on the Electrically Actuated Valve Schedule.

B. T-Handled Operating Wrench:

1. One galvanized operating wrench, 4 feet long for every six valves with square nut operator.
2. Manufacturers and Products:
   a. Mueller; No. A-24610.
   b. Clow; No. F-2520.
   c. Or equal.

C. Extension Bonnet for Valve Operator: Complete with stem and accessories for valve and operator.

1. Manufacturers and Products:
   a. Henry Pratt Co.
   b. Or equal.

D. Floor Stand and Extension Stem:

1. Nonrising, indicating type.
2. Complete with stem, coupling, handwheel, stem guide brackets, and yoke attachment.
3. Stem Guide: Space such that stem L/R ratio does not exceed 200.
4. Anchor Bolts: As specified in Section 05 50 00, Metal Fabrications.
5. Manufacturers and Products:
   a. Clow; Figure F-5515.
   b. Mueller, Figure A-26426.
   c. Or equal.

E. Floor Box and Stem:

1. Plain type, for support of nonrising type stem.
2. Complete with stem, operating nut, and stem guide brackets.
3. Stem Guide: Space such that stem L/R ratio does not exceed 200.
4. Anchor Bolts: As specified in Section 05 50 00, Metal Fabrications.

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5. Manufacturers and Products:
   a. Neenah Foundry; R 7506.
   b. Clow; No. F5690.
   c. Or equal.

F. Cast Iron Valve Box: Designed for traffic loads, sliding type, with minimum of 5-1/4-inch ID shaft.

1. Box: Cast iron with minimum depth of 9 inches.
2. Lid: Cast iron, minimum depth 3 inches, marked SEWER.
3. Extensions: Cast iron.
4. Manufacturers and Products:
   a. Tyler Pipe Corp.; Series 6865.
   b. Or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Flange Ends:

1. Flanged valve boltholes shall straddle vertical centerline of pipe.
2. Clean flanged faces, insert gasket and bolts, and tighten nuts progressively and uniformly.

B. Screwed Ends:

1. Clean threads by wire brushing or swabbing.
2. Apply joint compound.

C. Valve Orientation:

1. Install operating stem vertical when valve is installed in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above finished floor, unless otherwise shown.
2. Install operating stem horizontal in horizontal runs of pipe having centerline elevations between 4 feet 6 inches and 6 feet 9 inches above finish floor, unless otherwise shown.
3. Orient butterfly valve shaft so that unbalanced flows or eddies are equally divided to each half of the disc, i.e., shaft is in the plane of rotation of the eddy.
4. If no plug valve seat position is shown, locate as follows:
   a. Horizontal Flow: The flow shall produce an "unseating" pressure, and the plug shall open into the top half of valve.
   b. Vertical Flow: Install seat in the highest portion of the valve.

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D. Locate valve to provide accessibility for control and maintenance. Install access doors in finished walls and plaster ceilings for valve access.

E. Extension Stem for Operator: Where the depth of the valve is such that its centerline is more than 3 feet below grade, furnish an operating extension stem with 2-inch operating nut to bring the operating nut to a point 6 inches below the surface of the ground and/or box cover.

F. Torque Tube: Where operator for quarter-turn valve is located on floor stand, furnish extension stem torque tube of a type properly sized for maximum torque capacity of the valve.

G. Floor Box and Stem: Steel extension stem length shall locate operating nut in floor box.

3.02 TESTS AND INSPECTION

A. Valve may be either tested while testing pipelines, or as a separate step.

B. Test that valves open and close smoothly with operating pressure on one side and atmospheric pressure on the other, in both directions for two-way valve and applications.

C. Inspect air and vacuum valves as pipe is being filled to verify venting and seating is fully functional.

D. Count and record number of turns to open and close valve; account for any discrepancies with manufacturer's data.

E. Set, verify, and record set pressures for all relief and regulating valves.

3.03 MANUFACTURER'S FIELD SERVICES

A. Manufacturer's Representative: Present at site for minimum person-days listed below, travel time excluded:

1. 1/2 person-day for installation assistance and inspection, functional testing and completion of Manufacturer's Certificate Performance of Proper Installation and training of Owner personnel in valve operation and/or maintenance.

B. See Section 01 43 33, Manufacturers' Field Services and Section 01 91 14, Equipment Testing and Facility Startup.

END OF SECTION

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SECTION 40 27 05
PIPE CORROSION PROTECTION

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American National Standards Institute (ANSI):
   a. B31.1, Power Piping.
   b. B31.9, Building Services Piping.
2. American Water Works Association (AWWA): C105, Polyethylene Encasement for Ductile Iron Pipe Systems.

1.02 DEFINITIONS

A. See Section 40 27 00, Process Piping – General, for definitions applicable to this section.

1.03 SUBMITTALS

A. Shop Drawings: Manufacturer's descriptive literature.

B. Contract Closeout Submittals: Maintenance and operation information.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 INSTALLATION

A. Preparation:

1. See the individual piping sections for information on interior linings and coatings. Coatings in this section refer to exterior protective coatings.
2. See Piping Schedule supplement for Section 40 27 00, Process Piping – General and Section 09 90 00, Painting and Coating, for additional requirements.
3. Repair abraded areas of coatings on pipe to be buried, submerged, or embedded by cleaning to bare metal and repainting to provide a protective covering equal to the original and acceptable to Engineer.

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B. Ductile Iron Fittings:

1. Buried: As specified in Section 09 90 00, Painting and Coating, System No. 2.
2. Submerged or Embedded: Coat as specified in Section 09 90 00, Painting and Coating, System No. 2.

C. PVC:

1. Buried: No coatings are required for buried nonmetallic piping.

D. Piping Accessories:

1. Buried:
   a. Ferrous metal and stainless steel components: Coat as specified in Section 09 90 00, Painting and Coating, System No. 8.
   b. Bolts, Nuts, and Similar Items: Coat as specified in Section 09 90 00, Painting and Coating, System No. 8.
   c. Flexible Couplings, Grooved Couplings, and Similar Items: Coat as specified in Section 09 90 00, Painting and Coating, System No. 8.
   d. Buried Valves and Similar Elements: Coat as specified in Section 09 90 00, Painting and Coating, System No. 8.

3.02 PIPE PAINTING AND COLOR CODING

A. Paint and identify piping systems by color code as specified in the Piping Schedule of Section 40 27 00, Process Piping-General.

END OF SECTION

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SECTION 40 80 01
PIPING LEAKAGE TESTING

PART 1 GENERAL

1.01 SUBMITTALS

A. Quality Control Submittals:

1. Testing Plan: Submit prior to testing and include at least the information that follows.
   a. Testing dates.
   b. Piping systems and section(s) to be tested.
   c. Test type.
   d. Method of isolation.
   e. Calculation of maximum allowable leakage for piping section(s) to be tested.
2. Certifications of Calibration: Testing equipment.
3. Certified Test Report.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 PREPARATION

A. Notify Engineer in writing 5 days in advance of testing. Perform testing in presence of Engineer.

B. Pressure Piping:

1. Install temporary thrust restraint as necessary to protect adjacent piping or equipment and make taps in piping prior to testing.
2. Wait 5 days minimum after concrete thrust blocking is installed to perform pressure tests.
3. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.
4. New Piping Connected to Existing Piping:
   a. Isolate new piping with grooved-end pipe caps, spectacle blinds, blind flanges, or as acceptable to Engineer.
   b. Test joint between new piping and existing piping by methods that do not place entire existing system under test load, as approved by Engineer.
5. Items that do not Require Testing Include: Equipment seal drains, tank overflows to atmospheric vented drains, tank atmospheric vents.
6. Test Pressure: As indicated on Piping Schedule.

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C. Test section may be filled with water and allowed to stand under low pressure prior to testing.

3.02 HYDROSTATIC TEST FOR PRESSURE PIPING

A. Fluid: Clean water of such quality to prevent corrosion of materials in piping system.

B. Buried Piping:

1. Test after backfilling has been completed.
2. Expel air from piping system during filling.
3. Apply and maintain specified test pressure with hydraulic force pump. Valve off piping system when test pressure is reached.
4. Maintain hydrostatic test pressure continuously for 2 hours minimum, reopening isolation valve only as necessary to restore test pressure.
5. Determine actual leakage by measuring quantity of water necessary to maintain specified test pressure for duration of test.
6. Maximum Allowable Leakage:

$$L = \frac{SD(P)^{1/2}}{133{,}200}$$

where:

L	=	Allowable leakage, in gallons per hour.
S	=	Length of pipe tested, in feet.
D	=	Nominal diameter of pipe, in inches.
P	=	Test pressure during leakage test, in pounds per square inch.

7. Correct leakage greater than allowable, and retest as specified.

3.03 FIELD QUALITY CONTROL

A. Test Report Documentation:

1. Test date.
2. Description and identification of piping tested.
3. Test fluid.
4. Test pressure.
5. Remarks, including:
   a. Leaks (type, location).
   b. Repair/replacement performed to remedy excessive leakage.
6. Signed by Contractor and Engineer to represent that test has been satisfactorily completed.

END OF SECTION

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SECTION 40 90 01
INSTRUMENTATION AND CONTROL FOR PROCESS SYSTEMS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
   a. A182, Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
   b. A276, Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
   c. A312, Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
   d. B32, Standard Specification for Solder Metal.
   e. B88, Standard Specification for Seamless Copper Water Tube.
2. Instrumentation, Systems, and Automation Society (ISA):
   a. S5.1, Instrumentation Symbols and Identification (NRC ADOPTED).
   b. PR12.6, Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations.
   c. S5.4, Standard Instrument Loop Diagrams.
   d. S20, Specification Forms for Process Measurement and Control Instruments, Primary Elements and Control Valves.
   e. S50.1, Compatibility of Analog Signals for Electronic Industrial Process Instruments.
3. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
   b. ICS 1, General Standards for Industrial Control and Systems.
4. National Institute of Standards and Technology (NIST).
5. Underwriters Laboratory, Inc. (UL): 508A, Standard for Safety, Industrial Control Panels.

1.02 SUMMARY

A. Work Includes:

1. Engineering, furnishing, installing, calibrating, adjusting, testing, documenting, starting up, and Owner training for complete Process Instrumentation and Control (PIC) for pump station.

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2. Major parts are:
   a. A Data Flow Systems (DFS) radio system including control panel with remote telemetry unit (RTU) and antenna assemblies to monitor and control the pump station.
   b. Relocating the existing radio antenna and tower from the existing location to the new location as shown on the Drawings.
   c. Coordination between DFS and the Contractor, on the installation and testing of the DFS radio system antenna at the remote pump station. Coordinate with DFS the testing of the radio communications between the RTU unit located in the pump control panel and the existing supervisor computer system central telemetry unit (CTU) at the existing Key West Richard A. Heyman Environmental Protection Facility. Verify proper operation, from the DFS provided HMI screen over the radio system, of all pump station commands and status indications as outlined in the performance acceptance test (PAT). DFS will furnish and install the radio system antenna.
   d. Provide software modifications at the existing TAC II supervisor computer system at the Key West Richard A. Heyman Environmental Protection facility to incorporate the generator control functions at the pump station and any required changes to go from the pump control module (PCM) module to the TAC Pack TCU RTU.

B. Detailed Design: PIC as shown and specified includes functional and performance requirements and component specifications. Complete detailed PIC design.

1.03 DEFINITIONS

A. Abbreviations:

1. AI: Analog Input.
2. AO: Analog Output.
3. CS: Computer Subsystem.
4. CTU: Central Telemetry Unit.
5. DI: Discrete Input.
6. DO: Discrete Output.
7. I/O: Input/Output.
8. PAT: Performance Acceptance Test.
9. PIC: Process Instrumentation and Control.
10. RTU: Remote Telemetry Unit.
11. TS: Telemetry Subsystem.

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B. Rising/Falling: Terms used to define actions of discrete devices about their set points.

1. Rising: Contacts close when an increasing process variable rises through set point.
2. Falling: Contacts close when a decreasing process variable falls through set point.

C. Signal Types:

1. Analog Signals, Current Type:
   a. 4 mA to 20 mA dc signals conforming to ISA S50.1.
   b. Unless otherwise indicated for specific PIC Subsystem components, use the following ISA 50.1 options:
      1) Transmitter Type: Number 2, two-wire.
      2) Transmitter Load Resistance Capacity: Class L.
      3) Fully isolated transmitters and receivers.
2. Analog Signals, Voltage Type: 1 to 5 volts dc within panels where a common high precision dropping resistor is used.
3. Discrete signals, two-state logic signals using dc or 120V ac sources as indicated.
4. Pulse Frequency Signals:
   a. Direct current pulses whose repetition rate is linearly proportional to process variable.
   b. Pulses generated by contact closures or solid state switches as indicated.
   c. Power source less than 30V dc.
5. Special Signals: Other types of signals used to transmit analog and digital information between field elements, transmitters, receivers, controllers, and digital devices.

D. Instrument Tag Numbers:

1. A shorthand tag number notation is used in the Loop Specifications. For example: AI-1-2(2)(3)[pH].

Notation	Explanation
AI	ISA designator for Analysis Indicator.
1	Unit process number.
2	Loop number.
(2)	First unit number; number of same component types in a given loop; -1 and -2 in this example.

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Notation	Explanation
(3)	Second unit number; number of same component types with same first unit number in a given loop; -1, -2, and –3 in this example.
[pH]	Same notation shown at 2 o'clock position on ISA circle symbol on P&ID.

2. In this example, AI-1-12(2)(3)[pH] is shorthand for:

   AI-1-12-1-1[pH], AI-1-12-1-2[pH], AI-1-12-1-3[pH]
   AI-1-12-2-1[pH], AI-1-12-2-2[pH], AI-1-12-2-3[pH]

1.04 SUBMITTALS

A. Action Submittals:

1. General:
   a. Shop Drawings, full-scaled details, wiring diagrams, catalog cuts, and descriptive literature.
   b. Identify proposed items and options. Identify installed spares and other provisions for future work (for example, reserved panel space; unused components, wiring, and terminals).
   c. Legends and Abbreviation Lists: Complete definition of symbols and abbreviations used on this Project (for example, engineering units, flow streams, instruments, structures, and other process items used in nameplates, legends, and data sheets).
2. Overview Block Diagram: Show major assemblies and interrelationships of the TS and CS, including CS/RTU and CS/Remote Peripheral communication links. Diagram similar in content and format as shown on Drawings. Identify each major assembly with the same name and tag numbers as on Overview Equipment List.
3. Overview Description: Comprehensively describe function, operations, and interrelationship of the TS and CS. Emphasize explanation of overview block diagram in minimum of five 8-1/2-inch by 11-inch pages.
4. CS/RTU Communication Link Definition:
   a. Protocol definition of the following:
      1) Control.
      2) Functions.
      3) Format.
      4) Message security techniques.
      5) Message sequences.
   b. Timing definition of the following:
      1) Station scan timing.

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2) TS data base update timing.
3) TS output command timing.

5. Bill of Materials: List of required equipment.
   a. Group equipment items by enclosure and field, and within an enclosure, as follows:
      1) I&C Components: By component identification code.
      2) Other Equipment: By equipment type.
   b. Data Included:
      1) Equipment tag number.
      2) Description.
      3) Manufacturer, complete model number, and all options not defined by model number.
      4) Quantity supplied.
      5) Component identification code where applicable.
6. Catalog Cuts: I&C Components, Electrical Devices, and Mechanical Devices:
   a. Catalog information, mark to identify proposed items and options.
   b. Descriptive literature.
   c. External power and signal connections.
   d. Scaled drawings showing exterior dimensions and locations of electrical and mechanical interfaces.
7. Component Data Sheets: Data sheets for I&C components.
   a. Format and Level of Detail: In accordance with ISA-S20.
   b. Include component type identification code and tag number on data sheet.
   c. Specific features and configuration data for each component:
      1) Location or service.
      2) Manufacturer and complete model number.
      3) Size and scale range.
      4) Set points.
      5) Materials of construction.
      6) Options included.
   d. Name, address, and telephone number of manufacturer's local office, representative, distributor, or service facility.
8. Sizing and Selection Calculations:
   a. Primary Elements: Complete calculations plus process data used. Example, for flow elements, minimum and maximum values, permanent head loss, and assumptions made.
   b. Controlling, Computing and Function Generating Modules: Actual scaling factors with units and how they were computed.
9. Panel Construction Drawings:
   a. Scale Drawings: Show dimensions and location of panel mounted devices, doors, louvers, and subpanels, internal and external.

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b. Panel Legend: List front of panel devices by tag numbers, nameplate inscriptions, service legends, and annunciator inscriptions.
c. Bill of Materials: List devices mounted within panel that are not listed in panel legend. Include tag number, description, manufacturer, and model number.
d. Construction Details: NEMA rating, materials, material thickness, structural stiffeners and brackets, lifting lugs, mounting brackets and tabs, door hinges and latches, and welding and other connection callouts and details.
e. Construction Notes: Finishes, wire color schemes, wire ratings, wire and terminal block, numbering and labeling scheme.

10. Panel Control Diagrams: For discrete control and power circuits.
    a. Diagram Type: Ladder diagrams in format same as shown on Drawings. Include devices, related to discrete functions, that are mounted in or on the panel and that require electrical connections. Show unique rung numbers on left side of each rung.
    b. Item Identification: Identify each item with attributes listed.
        1) Wires: Wire number and color. Cable number if part of multiconductor cable.
        2) Terminals: Location (enclosure number, terminal junction box number, or MCC number), terminal strip number, and terminal block number.
        3) Discrete Components:
            a) Tag number, terminal numbers, and location (“FIELD”, enclosure number, or MCC number).
            b) Switching action (open or close on rising or falling process variable), set point value and units, and process variable description (for example, Sump Level High).
        4) Relay Coils:
            a) Tag number and its function.
            b) On right side of run where coil is located, list contact location by ladder number and sheet number. Underline normally closed contacts.
        5) Relay Contacts: Coil tag number, function, and coil location (ladder rung number and sheet number).
    c. Show each circuit individually. No “typical” diagrams or “typical” wire lists will be permitted.
    d. Ground wires, surge protectors, and connections.
    e. Circuit Names: Show names corresponding to Circuit and Raceway Schedule for circuits entering and leaving a panel. Refer to Division 26, Electrical.
11. Panel Wiring Diagrams: Show point-to-point and terminal-to-terminal wiring within panel.

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12. Loop Diagrams: Individual wiring diagram for each analog or pulse frequency loop.
    a. Conform to the minimum requirements of ISA S5.4.
    b. Under Paragraph 5.3 of ISA S5.4, include the information listed under subparagraphs 2 and 6.
    c. Drawing Size: Individual 11-inch by 17-inch sheet for each loop.
    d. Divide each loop diagram into areas for panel face, back-of-panel, and field.
    e. Show:
        1) Terminal numbers, location of dc power supply, and location of common dropping resistors.
        2) Switching contacts in analog loops and output contacts of analog devices. Reference specific control diagrams where functions of these contacts are shown.
        3) Tabular summary on each diagram:
            a) Transmitting Instruments: Output capability.
            b) Receiving Instruments: Input impedance.
            c) Loop Wiring Impedance: Estimate based on wire sizes and lengths shown.
            d) Total loop impedance.
            e) Reserve output capacity.
        4) Circuit and raceway schedule names.
13. Interconnecting Wiring Diagrams:
    a. Diagrams, device designations, and symbols in accordance with NEMA ICS 1.
    b. Diagrams shall bear electrical Subcontractor’s signature attesting diagrams have been coordinated with Division 26, Electrical.
    c. Show:
        1) Electrical connections between equipment, consoles, panels, terminal junction boxes, and field mounted components.
        2) Component and panel terminal board identification numbers, and external wire and cable numbers.
        3) Circuit names matching Circuit and Raceway Schedule.
        4) Intermediate terminations between field elements and panels (for example, to terminal junction boxes and pull boxes).
        5) Pull boxes.
14. Installation Details: Include modifications or further details required to adequately define installation of I&C components.
15. List of spares, expendables, test equipment and tools.
16. Additional Equipment Recommended: List of, and descriptive literature for, additional spares, expendables, test equipment and tools recommended. Include unit prices and total costs as specified in Section 01 29 00, Payment Procedures.

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B. Informational Submittals: For PIC equipment, provide Manufacturer's Certificate of Proper Installation and readiness for operation.

1. Operation and Maintenance (O&M) Manuals: In accordance with Section 01 78 23, Operation and Maintenance Data, unless otherwise specified in this section.
   a. Content and Format:
      1) Complete sets O&M manuals.
      2) Sufficient detail to allow operation, removal, installation, adjustment, calibration, maintenance and purchasing replacements for each PIC component.
      3) Final versions of Legend and Abbreviation Lists.
      4) Manual format in accordance with Section 01 78 23, Operation and Maintenance Data.
   b. Include:
      1) Refer to paragraph Shop Drawings for the following items:
         a) Bill of Materials.
         b) Catalog Cuts.
         c) Component Data Sheets.
         d) Panel Control Diagrams.
         e) Panel Wiring Diagrams, one reproducible copy.
         f) Panel Plumbing Diagrams, one reproducible copy.
         g) Loop Diagrams, one reproducible copy.
         h) Interconnecting Wiring Diagrams, one reproducible copy.
         i) Application Software Documentation.
      2) Device O&M manuals for components, electrical devices, and mechanical devices include:
         a) Operations procedures.
         b) Installation requirements and procedures.
         c) Maintenance requirements and procedures.
         d) Troubleshooting procedures.
         e) Calibration procedures.
         f) Internal schematic and wiring diagrams.
         g) Component Calibration Sheets from field quality control calibrations.
      3) List of spares, expendables, test equipment and tools provided.
      4) List of additional spares, expendables, test equipment and tools recommended.
2. Unwitnessed Factory Test: No Submittals required.

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3. Performance Acceptance Tests (PAT) Submittals:
   a. Preliminary Test Procedures: Outlines of proposed tests, forms, and checklists.
   b. Final Test Procedures: Proposed test procedures, forms, and checklists.
   c. Test Documentation: Copy of signed off test procedures when tests are completed.

1.05 QUALITY ASSURANCE

A. Calibration Instruments: Each instrument used for calibrating PIC equipment shall bear the seal of a reputable laboratory certifying that instrument has been calibrated within the previous 12 months to a standard endorsed by the NIST.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Provide Site and warehouse storage facilities for PIC equipment.

B. Prior to shipment, include corrosive-inhibitive vapor capsules in shipping containers, and related equipment as recommended by the capsule manufacturer.

C. Prior to installation, store items in dry indoor locations. Provide heating in storage areas for items subject to corrosion under damp conditions.

D. Cover panels and other elements that are exposed to dusty construction environments.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Environmental Design Requirements: Following defines the types of environments referred to in the above.

1. Outside:
   a. Temperature: 50 to 104 degrees F.
   b. Relative Humidity: 10 to 95 percent noncondensing, rain.
   c. NEC Classification: Nonhazardous.
2. Outside, Corrosive:
   a. Temperature: 50 to 104 degrees F.
   b. Relative Humidity: 10 to 95 percent noncondensing, rain.
   c. Corrosive Environment**:** Sea air.
   d. NEC Classification: Nonhazardous.

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1.08 SEQUENCING AND SCHEDULING

A. Activity Completion: The following is a list of key activities and their completion criteria:

1. Shop Drawings: Reviewed and approved.
2. Quality Control Submittals: Reviewed and accepted.
3. Hardware Delivery: Hardware delivered to Site and inventoried by Owner.
4. PAT: Completed and required test documentation accepted.

B. PIC Substantial Completion: When Engineer issues Certificate of Substantial Completion.

1. Prerequisites:
   a. All PIC Submittals have been completed.
   b. PIC has successfully completed PAT.
   c. All spares, expendables, and test equipment have been delivered to Owner.

C. PIC Acceptance: When Engineer issues a written notice of Final Payment and Acceptance.

1. Prerequisites:
   a. Certificate of Substantial Completion issued for PIC.
   b. Punch-list items completed.
   c. Final revisions to O&M manuals accepted.
   d. Maintenance service agreements for PIC accepted by Owner.

D. Prerequisite Activities and Lead Times: Do not start the following key Project activities until the prerequisite activities and lead times listed below have been completed and satisfied:

Activity	**Prerequisites and Lead Times**
Submittal reviews by Engineer	Engineer acceptance of Submittal breakdown and schedule.
Hardware purchasing, fabrication, and assembly	Associated Shop Drawing Submittals completed.
Shipment	Completion of PIC Shop Drawing Submittals and preliminary O&M manuals.
PAT	Startup, Owner training, and PAT procedures completed; notice 4 weeks prior to start.

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PART 2 PRODUCTS

2.01 GENERAL

A. PIC functions as shown on Drawings and as required for each loop. Furnish equipment items as required. Furnish all materials, equipment, and software, necessary to effect required system and loop performance.

B. First Named Manufacturer: PIC design is based on first named manufacturers of equipment and materials.

1. If an item is proposed from other than first named manufacturer, obtain approval from Engineer for such changes in accordance with Article Submittals.
2. If using proposed item requires other changes, provide work and equipment to implement these changes. Changes that may be required include, but are not limited to: different installation, wiring, raceway, enclosures, connections, isolators, intrinsically safe barriers, software, and accessories.

C. Like Equipment Items:

1. Use products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer's services.
2. Implement all same or similar functions in same or similar manner. For example, control logic, sequence controls, and display layouts.

2.02 DATA FLOW SYSTEMS TELEMETRY SYSTEM EXPANSION

A. Includes all work to provide a complete and functioning telemetry system expansion as specified and shown.

B. The Contractor shall provide a complete radio telemetry system as specified herein for the pump station. The telemetry system shall consist of the following components at a minimum: RTU control panel housing TAC Pack TCU with Radio RTU, RTU surge suppression, three-phase surge suppression, coaxial surge suppression, RIO032 rail input/ouput device, din-mount power supply, backup battery, and antenna system. The system shall integrate into an existing system manufactured by Data Flow System Inc., 605 N. John Rodes Blvd., Melbourne, FL 32934, Phone: 321/259-5009.

C. RTU Control Panel: Provide the following panel:

1. Material: Type 316 stainless steel.
2. NEMA Rating: 4X.

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3. As a minimum, provide the following within the control panel: Main circuit breaker, TCU with Radio RTU, RTU surge suppression, coaxial surge suppression, RIO032 rail input/output device, din-mount power supply, backup battery, and accessories.

D. Remote Terminal Unit (RTU): Provide the telemetry control unit (TCU) pump controller with integral radio. As a minimum, the TCU shall include the following features:

1. General:
   a. Type: The TCU shall be a microprocessor-based multi-pump controller module designed for automatic pump station control.
   b. Components: Integral radio, RIO032 fail input/output device, backup battery, installation kit, power supply, 3-phase surge suppressor, RF pigtail, RTU surge protection kit, coaxial surge suppressor.
2. Operator Indicators and Controls:
   a. Three H/O/A hand switches.
   b. LCD Display and Keypad:
      1) 4x20-character LCD display.
      2) 12-button keypad.
      3) Configuration parameters adjustable via the 12-button keypad or RS-232 port.
   c. LCD shall display the following minimum information:
      1) Elapsed runtime of each pump.
      2) Average runtime of each pump.
      3) Flow of each pump.
      4) Pump station flow.
      5) Time of day.
3. Control Features:
   a. Configurable for duplex pump control via on-board keyboard.
   b. Integral pump alternation.
   c. The unit shall provide local automatic level control from bubbler input.
4. Electrical:
   a. Power Input: 120V ac.
   b. Includes on-board 480V ac 3-phase power monitor. Power monitor shall be transformer-isolated and detect loss of phase, phase reversal, low phase and high phase faults. All phase monitor adjustments shall be adjustable from the keypad.
   c. The unit's internal power supply shall keep the backup battery at a float charge.
5. Signal Interface: Provide the following signal interface:
   a. Accept the following discrete inputs:
      1) Pump ON status, one per pump.

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2) Pump FAIL status, one per pump.
3) Three-phase power monitor status.
4) LOW level.
5) HIGH level.
6) Alarm silence.
7) Generator ON status.
8) Generator FAIL alarm.
9) Generator LOW fuel alarm.
10) Generator Overcrank alarm.
11) Generator Overspeed alarm.
12) Generator LOW oil alarm.
13) Generator HIGH temperature alarm.
14) Panel intrusion alarm.
15) ATS status normal.
16) ATS status generator.

b. Provide the following discrete outputs:
1) Pump run command, one per pump.
2) Alarm horn ON output.
3) Alarm light ON output.
4) Main circuit breaker shunt trip.
5) Generator Disable.
6) Generator override.

c. Accept the following analog inputs (4-20 mA): Wet well level.

d. All inputs and outputs shall be optically or magnetically isolated.

6. Enclosure:
a. UL listed.
b. Surge tested for EMI Susceptibility to IEC 61000-4-5 Surge Immunity Tests.

7. Ports: One RS-232.

8. Environmental:
a. Operating temperature (with Battery Backup): 14 to 122 degrees F.

9. Integral Radio:
a. Includes a radio transceiver and associated electronics.
b. Mounted inside the TCU radio compartment.
c. Minimum features:
1) Surge protected radio power.
2) On-board communications and firmware.
3) Watchdog timer.
4) On-board voltage regulation and radio power supply control.
5) System diagnostics including radio current, receiver sensitivity, and operating temperature.

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10. RIO032 Rail Input/Output Device:
    a. Input/Output capacity:
        1) Discrete Inputs: 8.
        2) Discrete Outputs: 8.
        3) Analog Inputs: 8 (12 bit resolution).
        4) Analog Outputs: 8 (12 bit resolution).
    b. Ports:
        1) One RS-232.
        2) One RS-485.
11. Accessories:
    a. Backup battery:
        1) 3.0 AHr backup.
        2) Manufacturer and model: Portalac, PE12V3A.
    b. Din-Mount power supply.
    c. 3-phase surge protector kit.
    d. RTU surge protection kit.
    e. Snap-in installation kit with harness.
    f. Coaxial Surge Suppressor:
        1) Manufacturer and Model: Polyphaser, model IS-B50LN-C2.
12. Model: TAC Pack TCU with Radio RTU.

E. Relocate existing radio antenna system from the existing location to the new location shown on the Drawings. Refer to Drawings for location and additional requirements.

F. Antenna System: Provide new coaxial cabling and connectors for the relocated antenna system. Provide with the following minimum features:

1. Type N connectors shall be utilized at both ends of the coax. The Type N connectors shall be sealed with 3-inch sections of Alpha FIT321-1-0 sealant shrink tubing. The coax cable shall be secured to the mast/pole with E.V.A.-coated Type 316 stainless steel cable ties. The cable ties shall meet or exceed the quality, reliability and performance of AE112 cable ties manufactured by Band-It.
2. The coaxial cable utilized shall be provided and shall be the type that utilizes an inert semiliquid compound to flood the copper braid. The coax cable shall be of the RG-8 construction type and have the RF loss characteristic of foam flex. The coax cable shall be RTC 400 as supplied by Data Flow Systems, Inc.

G. Warranty: In accordance with General Conditions Section 13.07 and as amended in Supplemental Conditions.

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H. Sequence relocation to minimally impact existing operations of the DFS equipment. Notify Owner before beginning DFS equipment relocation activities and provide Owner with a schedule of estimated down times.

I. All work done to relocate and modify DFS equipment must be coordinated with DFS and supervised by DFS. All existing cable connections must be disconnected and re-connected by DFS. DFS to determine exact installation location, antenna type, and mounting height of antenna for re-installation at the new location based upon radio signal path verification acceptable to the Owner. DFS to provide coax cable suitable for the application from the RTU to the antenna.

J. Coordinate with DFS prior to bid to verify requirements for physical equipment and antenna removal and re-installation. Re-install existing or new antenna in accordance with standard details on Drawings. Use antenna height provided by DFS. Determine what work will be performed by DFS.

K. Test equipment with DFS after relocation and certify that all equipment is operational and that the radio system is completely functional.

L. Provide modifications to the existing HMI screen at the existing CTU workstation. Provide modifications to change from the pump control module (PCM) RTU to the TAC Pack TCU as well as incorporate signals from the generator and ATS.

M. Manufacturer: Data Flow Systems, 605 N John Rodes Blvd., Melbourne, FL 32934, 321-259-5009.

2.03 NAMEPLATES AND TAGS

A. Panel Nameplates: Enclosure identification located on the enclosure face.

1. Location and Inscription: As shown.
2. Materials: Laminated plastic attached to panel with stainless steel screws.
3. Letters: 1/2-inch white on black background, unless otherwise noted.

B. Component Nameplates—Panel Face: Component identification located on panel face under or near component.

1. Location and Inscription: As shown.
2. Materials: Laminated plastic attached to panel with stainless steel screws.
3. Letters: 3/16-inch white on black background, unless otherwise noted.

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C. Component Nameplates—Back of Panel: Component identification located on or near component inside of enclosure.

1. Inscription: Component tag number.
2. Materials: Adhesive backed, laminated plastic.
3. Letters: 3/16-inch white on black background, unless otherwise noted.

D. Legend Plates for Panel Mounted Pushbuttons, Lights, and Switches.

1. Inscription: Refer to:
   a. Table under paragraph Standard Pushbutton Colors and Inscriptions.
   b. Table under paragraph Standard Light Colors and Inscriptions.
   c. P&IDs in Drawings.
2. Materials: Stainless steel, keyed legend plates. Secured to panel by mounting nut for pushbutton, light, or switch.
3. Letters: Black on gray or white background.

E. Service Legends: Component identification nameplate located on face of component.

1. Inscription: As shown.
2. Materials: Adhesive backed, laminated plastic.
3. Letters: 3/16-inch white on black background, unless otherwise noted.

F. Nametags: Component identification for field devices.

1. Inscription: Component tag number.
2. Materials: 16-gauge, Type 304 stainless steel.
3. Letters: 3/16-inch imposed.
4. Mounting: Affix to component with 16- or 18-gauge stainless steel wire or stainless steel screws.

2.04 ELECTRICAL REQUIREMENTS

A. In accordance with Division 26, Electrical.

B. I&C and electrical components, terminals, wires, and enclosures: UL recognized or UL listed.

C. Wires within Enclosures:

1. ac Circuits:
   a. Type: 300-volt, Type MTW stranded copper.
   b. Size: For current to be carried, but not less than 18 AWG.

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2. Analog Signal Circuits:
   a. Type: 300-volt stranded copper, twisted shielded pairs.
   b. Size: 18 AWG, minimum.
3. Other dc Circuits.
   a. Type: 300-volt, Type MTW stranded copper.
   b. Size: For current carried, but not less than 18 AWG.
4. Special Signal Circuits: Use manufacturer's standard cables.
5. Wire Identification: Numbered and tagged at each termination.
   a. Wire Tags: Machine printed, heat shrink.
   b. Manufacturers:
      1) Brady PermaSleeve.
      2) Tyco Electronics.

D. Wires entering or leaving enclosures, terminate and identify as follows:

1. Analog and discrete signal, terminate at numbered terminal blocks.
2. Special signals, terminated using manufacturer's standard connectors.
3. Identify wiring in accordance with Section 26 05 01, Electrical.

E. Terminal Blocks for Enclosures:

1. Quantity:
   a. Accommodate present and spare indicated needs.
   b. Wire spare RTU I/O points to terminal blocks.
   c. One wire per terminal for field wires entering enclosures.
   d. Maximum of two wires per terminal for 18-WG wire for internal enclosure wiring.
   e. Spare Terminals: 20 percent of all connected terminals, but not less than 5 per terminal block.
2. General:
   a. Connection Type: Screw compression clamp.
   b. Compression Clamp:
      1) Complies with DIN-VDE 0611.
      2) Hardened steel clamp with transversal grooves that penetrate wire strands providing a vibration-proof connection.
      3) Guides strands of wire into terminal.
   c. Provide a 35mm DIN rail mounted plastic drawer to hold spare fuses.
   d. Screws: Hardened steel, captive, and self-locking.
   e. Current Bar: Copper or treated brass.
   f. Insulation:
      1) Thermoplastic rated for minus 55 degrees C to plus 110 degrees C.
      2) Two funneled shaped inputs to facilitate wire entry.

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g. Mounting:
   1) Standard DIN rail.
   2) Terminal block can be extracted from an assembly without displacing adjacent blocks.
   3) End Stops: Minimum of one at each end of rail.
h. Wire Preparation: Stripping only permitted.
i. Jumpers: Allow jumper installation without loss of space on terminal or rail.
j. Marking System:
   1) Terminal number shown on both sides of terminal block.
   2) Allow use of preprinted and field marked tags.
   3) Terminal strip numbers shown on end stops.
   4) Mark terminal block and terminal strip numbers as shown on panel control diagrams and loop diagrams.
   5) Fuse Marking for Fused Terminal Blocks: Fuse voltage and amperage rating shown on top of terminal block.
k. Test Plugs: Soldered connections for 18 AWG wire.
   1) Pin Diameter: 0.079 inch.
   2) Manufacturer and Product:
      a) Entrelec; Type FC2.
      b) Weidmuller.
      c) Allen-Bradley.

3. Terminal Block, General Purpose:
   a. Rated Voltage: 600V ac.
   b. Rated Current: 30 amps.
   c. Wire Size: 24 AWG to 10 AWG.
   d. Rated Wire Size: 10 AWG.
   e. Color: Gray body.
   f. Spacing: 0.25 inch, maximum.
   g. Test Sockets: One screw test socket 0.079-inch diameter.
   h. Manufacturer and Product:
      1) Entrelec; Type M4/6.T.
      2) Weidmuller.
      3) Allen-Bradley.
4. Terminal Block, Ground:
   a. Wire Size: 24 AWG to 10 AWG.
   b. Rated Wire Size: 10 AWG.
   c. Color: Green and yellow body.
   d. Spacing: 0.25 inch, maximum.
   e. Grounding: Electrically grounded to mounting rail.
   f. Manufacturer and Product:
      1) Entrelec; Type M4/6.P.
      2) Weidmuller.
      3) Allen-Bradley.

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5. Terminal Block, Blade Disconnect Switch:
    a. Rated Voltage: 600V ac.
    b. Rated Current: 10 amps.
    c. Wire Size: 22 AWG to 10 AWG.
    d. Rated Wire Size: 10 AWG.
    e. Color: Gray body, orange switch.
    f. Spacing: 0.25 inch, maximum.
    g. Manufacturer and Product:
        1) Entrelec; Type M4/6.SNT.
        2) Weidmuller.
        3) Allen-Bradley.
6. Terminal Block Diode:
    a. Rated Voltage: 24V dc.
    b. Rated Current: 30 ma.
    c. Wire Size: 16 AWG.
    d. Manufacturer and Product:
        1) Phoenix Contact ST-IN.
        2) Weidmuller.
        3) Allen-Bradley.
7. Terminal Block, Fused, 24V dc:
    a. Rated Voltage: 600V dc.
    b. Rated Current: 25 amps.
    c. Wire Size: 22 AWG to 10 AWG.
    d. Rated Wire Size: 10 AWG.
    e. Color: Gray body.
    f. Fuse: 0.25 inch by 1.25 inches.
    g. Indication: LED diode 24V dc.
    h. Spacing: 0.512 inch, maximum.
    i. Manufacturer and Product:
        1) Entrelec; Type ML10/13.SFD.
        2) Weidmuller.
        3) Allen-Bradley.
8. Terminal Block, Fused, 120V ac:
    a. Rated Voltage: 600V ac.
    b. Rated Current: 25 amps.
    c. Wire Size: 22 AWG to 10 AWG.
    d. Rated Wire Size: 10 AWG.
    e. Color: Gray body.
    f. Fuse: 0.25 inch by 1.25 inches.
    g. Indication: Neon lamp, 110V ac.
    h. Leakage Current: 1.8 mA, maximum.
    i. Spacing: 0.512 inch, maximum.
    j. Manufacturer and Product:
        1) Entrelec; Type ML10/13.SFL.
        2) Weidmuller.
        3) Allen-Bradley.

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9. Terminal Block, Fused, 120V ac, High Current:
    a. Rated Voltage: 600V ac.
    b. Rated Current: 35 amps.
    c. Wire Size: 18 AWG to 8 AWG.
    d. Rated Wire Size: 8 AWG.
    e. Color: Gray.
    f. Fuse: 13/32 inch by 1.5 inches.
    g. Spacing: 0.95 inch, maximum.
    h. Manufacturer and Product:
        1) Entrelec; Type MB10/24.SF.
        2) Weidmuller.
        3) Allen-Bradley.

F. Grounding of Enclosures:

1. Furnish isolated copper grounding bus for signal and shield ground connections.
2. Ground bus grounded at a common signal ground point in accordance with National Electrical Code requirements.
3. Single Point Ground for Each Analog Loop:
    a. Locate at dc power supply for loop.
    b. Use to ground wire shields for loop.
    c. Group and connect shields in following locations:
        1) Locate signal ground at dc power supply for loop.
        2) Use to ground wire shields for loops.
4. Ground terminal block rails to ground bus.

G. Analog Signal Isolators: Furnish signal isolation for analog signals that are sent from one enclosure to another. Do not wire in series instruments on different panels, cabinets, or enclosures.

H. Power Distribution within Panels:

1. Feeder Circuits:
    a. One or more 120V ac, 60-Hz feeder circuits as shown on Drawings.
    b. Make provisions for feeder circuit conduit entry.
    c. Furnish terminal board for termination of wires.
    d. Power Panel: Furnish main circuit breaker and circuit breaker on each individual branch circuit distributed from power panel.
        1) Locate to provide clear view of and access to breakers when door is open.
        2) Breaker Sizes: Coordinate such that fault in branch circuit will blow only branch breaker, but not trip main breaker.
            a) Branch Circuit Breakers: 15 amps at 250V ac.
    e. Provide UL 489 listed breakers.

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f. Breaker Manufacturers and Products:
   1) Square D; Multi 9 Series.
   2) Allen-Bradley; 1489-A Series.
   3) Or approved equal.

2. Circuit Wiring: P&IDs and Control Diagrams on Drawings show function only. Use following rules for actual circuit wiring:
   a. Devices on Single Circuit: 20, maximum.
   b. Multiple Units Performing Parallel Operations: To prevent failure of any single branch circuit from shutting down entire operation, do not group all units on same branch circuit.
   c. Branch Circuit Loading: 12 amperes continuous, maximum.
   d. Panel Lighting and Service Outlets: Put on separate 15-amp, 120V ac branch circuit.
   e. Provide 120V ac plugmold for panel components with line cords.

I. Signal Distribution:

1. Within Panels: 4 mA to 20 mA dc signals may be distributed as 1 to 5V dc.
2. Outside Panels: Isolated 4 mA to 20 mA dc only.
3. All signal wiring twisted in shielded pairs.

J. Signal Switching:

1. Use dry circuit type relays or switches.
2. No interruption of 4 mA to 20 mA loops during switching.
3. Switching Transients in Associated Signal Circuit:
   a. 4 mA to 20 mA dc Signals: 0.2 mA, maximum.
   b. 1 to 5V dc Signals: 0.05V, maximum.

K. Relays:

1. General:
   a. Relay Mounting: Plug-in type socket.
   b. Relay Enclosure: Furnish dust cover.
   c. Socket Type: Screw terminal interface with wiring.
   d. Socket Mounting: Rail.
   e. Provide holddown clips.
2. Signal Switching Relay:
   a. Type: Dry circuit.
   b. Contact Arrangement: 2 Form C contacts.
   c. Contact Rating: 5 amps at 28V dc or 120V ac.
   d. Contact Material: Gold or silver.
   e. Coil Voltage: As noted or shown.
   f. Coil Power: 0.9 watt (dc), 1.2VA (ac).
   g. Expected Mechanical Life: 10,000,000 operations.

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h. Expected Electrical Life at Rated Load: 100,000 operations.
i. Indication Type: Neon or LED indicator lamp.
j. Seal Type: Hermetically sealed case.
k. Manufacturer and Product:
1) Potter and Brumfield; Series KH/KHA.
2) Idec.
3) Allen-Bradley.

3. Control Circuit Switching Relay, Nonlatching:
a. Type: Compact general purpose plug-in.
b. Contact Arrangement: 3 Form C contacts.
c. Contact Rating: 10A at 28V dc or 120V ac, and 6.6A at 240V ac.
d. Contact Material: Silver cadmium oxide alloy.
e. Coil Voltage: As noted or shown.
f. Coil Power: 1.8 watts (dc), 2.7VA (ac).
g. Expected Mechanical Life: 10,000,000 operations.
h. Expected Electrical Life at Rated Load: 100,000 operations.
i. Indication Type: Neon or LED indicator lamp.
j. Push-to-test button.
k. Manufacturer and Product:
1) Potter and Brumfield; Series KUP.
2) Idec.
3) Allen-Bradley.

4. Control Circuit Switching Relay, Latching:
a. Type: Dual coil mechanical latching relay.
b. Contact Arrangement: 2 Form C contacts.
c. Contact Rating: 10A at 28V dc or 120V ac.
d. Contact Material: Silver cadmium oxide alloy.
e. Coil Voltage: As noted or shown.
f. Coil Power: 2.7 watts (dc), 5.3VA (ac).
g. Expected Mechanical Life: 500,000 operations.
h. Expected Electrical Life at Rated Load: 50,000 operations.
i. Manufacturer and Product:
1) Potter and Brumfield; Series KB/KBP.
2) Idec.
3) Allen-Bradley.

5. Control Circuit Switching Relay, Time Delay:
a. Type: Adjustable time delay relay.
b. Contact Arrangement: 2 Form C contacts.
c. Contact Rating: 10A at 30V dc or 277V ac.
d. Contact Material: Silver cadmium oxide alloy.
e. Coil Voltage: As noted or shown.
f. Operating Temperature: Minus 10 degrees C to 55 degrees C.
g. Repeatability: Plus or minus 2 percent.
h. Delay Time Range: Select range such that time delay set point fall between 20 percent to 80 percent of range.

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i. Time Delay Set Point: As noted or shown.
j. Mode of Operation: As noted or shown.
k. Adjustment Type: Integral potentiometer with knob external to dust cover.
l. Manufacturer and Products:
   1) Potter and Brumfield; Series CB for 0.1-second to 100-minute delay time ranges, Series CK for 0.1-second to 120-second delay time ranges.
   2) Idec.
   3) Tyco/Agastat.

L. Power Supplies:

1. Furnish to power instruments requiring external dc power, including two-wire transmitters and dc relays.
2. Convert 120V ac, 60-Hz power to dc power of appropriate voltage(s) with sufficient voltage regulation and ripple control to assure that instruments being supplied can operate within their required tolerances.
3. Provide output over voltage and over current protective devices to:
   a. Protect instruments from damage due to power supply failure.
   b. Protect power supply from damage due to external failure.
4. Enclosures: NEMA 1 in accordance with NEMA 250.
5. Mount such that dissipated heat does not adversely affect other components.
6. Fuses: For each dc supply line to each individual two-wire transmitter.
   a. Type: Indicating.
   b. Mount so fuses can be easily seen and replaced.

M. Internal Panel Lights and Service Outlets for Smaller Panels:

1. Internal Panel Light: Switched fluorescent light package with protective cover, 18-Watt minimum.
2. Service Outlet: Breaker protected 120-volt, 15-amp, GFCI duplex receptacle. Provide non-GFCI receptacles for panels fed from GFI breakers.
3. Required for panels.
4. Manufacturer and Product: Hoffman ALF series, or equal.

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N. Standard Pushbutton Colors and Inscriptions: Use following color code and inscriptions for pushbuttons, unless otherwise noted.

Tag Function	Inscription(s)	Color
OO	ON OFF	Red Green
OC	OPEN CLOSE	Red Green
SS	START STOP	Red Green
RESET	RESET	Black
EMERGENCY STOP	EMERGENCY STOP	Red

a. Lettering Color:
   1) Black on white and yellow buttons.
   2) White on black, red, and green buttons.

O. Standard Light Colors and Inscriptions: Use following color code and inscriptions for service legends and lens colors for indicating lights, unless otherwise.

Tag Function	Inscription(s)	Color
ON	ON	Red
OFF	OFF	Green
OPEN	OPEN	Red
CLOSED	CLOSED	Green
LOW	LOW	Amber
FAIL	FAIL	Amber
HIGH	HIGH	Amber
AUTO	AUTO	White
MANUAL	MANUAL	Blue
LOCAL	LOCAL	Blue
REMOTE	REMOTE	White

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1. Lettering Color:
   a. Black on white and amber lenses.
   b. White on red and green lenses.

2.05 ELECTRICAL TRANSIENT PROTECTION

A. General:

1. Function: Protect elements of PIC against damage due to electrical transients induced in interconnecting lines by lightning and nearby electrical systems.
2. Implementation: Provide, install, coordinate, and inspect grounding of surge suppressors at:
   a. Connection of ac power to PIC equipment including panels, consoles assembles, and field mounted analog transmitters and receivers.
   b. At the field and panel, console, or assembly connection of signal circuits that have portions of the circuit extending outside of a protective building.
3. Construction: First-stage high energy metal oxide varistor and second-stage bipolar silicon avalanche device separated by series impedance. Includes grounding wire, stud, or terminal.
4. Response: 5 nanoseconds maximum.
5. Recovery: Automatic.
6. Temperature Range: Minus 20 degrees C to plus 85 degrees C.

B. Suppressors on 120V ac Power Supply Connections:

1. Occurrences: Tested and rated for a minimum of 50 occurrences of IEEE 587 Category B test waveform.
2. First-Stage Clamping Voltage: 350 volts or less.
3. Second-Stage Clamping Voltage: 210 volts or less.
4. Continuous Operation: Power supplies for one four-wire transmitter or receiver: 5 amps minimum at 130V ac. All other applications: 30 amps minimum at 130V ac.

C. Suppressors on Analog Signal Lines:

1. Test Waveform: Linear 8 microsecond rise in current form 0 amps to a peak current value followed by an exponential decay of current reaching one half the peak value in 20 microseconds.
2. Surge Rating: Tested and rated for 50 occurrences of 2,000-amp peak test waveform.
   a. dc Clamping Voltage: 20 to 40 percent above operating voltage for circuit.

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b. dc Clamping Voltage Tolerance: Less than plus or minus 10 percent.
c. Maximum Loop Resistance: 18 ohms per conductor.

D. Physical Characteristics:

1. Mounted in Enclosures: Encapsulated inflame retardant epoxy.
2. For Analog Signals Lines: EDCO PC-642 or SRA-64 series.
3. For 120V ac Lines: EDCO HSP-121.

E. Installation and Grounding of Suppressors: Grounding equipment, installation of grounding equipment, and terminations for field mounted devices are provided under Division 26, Electrical.

2.06 SPARE PARTS

A. General:

1. Provide the following spare parts for the RTU control cabinet in addition to other manufacturer recommended spare parts:
   a. One TAC Pack TCU with Radio RTU.
   b. One RIO032 module.

2.07 EXPENDABLES

Item	Quantity
Corrosion-inhibiting vapor capsules	Manufacturer's recommended 2-year supply

2.08 FABRICATION

A. General:

1. Panels with external dimensions and instruments arrangement as shown on Drawings.
2. Panel Construction and Interior Wiring: In accordance with the National Electrical Code, state and local codes, NEMA, ANSI, UL, and ICECA.
3. Fabricate panels, install instruments, wire, and plumb, at the PIC factory.
4. Electrical Work: In accordance with Division 26, Electrical.

B. Factory Assembly: Assemble panels at the manufacturer's factory. No fabrication other than correction of minor defects or minor transit damage shall be done on panels at Site.

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C. UL Listing Mark for Enclosures: Mark stating “Listed Enclosed Industrial Control Panel” per UL 508A.

D. Wiring Within PIC Panels:

1. Restrain by plastic ties or ducts or metal raceways.
2. Hinge Wiring: Secure at each end so that bending or twisting will be around longitudinal axis of wire. Protect bend area with sleeve.
3. Arrange wiring neatly, cut to proper length, and remove surplus wire.
4. Abrasion protection for wire bundles which pass through holes or across edges of sheet metal.
5. Connections to Screw Type Terminals:
   a. Locking-fork-tongue or ring-tongue lugs.
   b. Use manufacturer’s recommended tool with required sized anvil to make crimp lug terminations.
   c. Wires terminated in a crimp lug, maximum of one.
   d. Lugs installed on a screw terminal, maximum of two.
6. Connections to Compression Clamp Type Terminals:
   a. Strip, prepare, and install wires in accordance with terminal manufacturer’s recommendations.
   b. Wires installed in a compression screw and clamp, maximum of one for field wires entering enclosure, otherwise maximum of two.
7. Splicing and tapping of wires, allowed only at device terminals or terminal blocks.
8. Terminate 24V dc and analog signal circuits on separate terminal block from ac circuit terminal blocks.
9. Separate analog and dc circuits by at least 6 inches from ac power and control wiring, except at unavoidable crossover points and at device terminations.
10. Arrange wiring to allow access for testing, removal, and maintenance of circuits and components.
11. Plastic Wire Ducts Fill: Do not exceed manufacturer’s recommendation.

E. Temperature Control: As Noted.

F. Nonfreestanding Panel Construction:

1. Based on environmental design requirements required and referenced in Article Environmental Requirements, provide the following:
   a. For panels listed as inside, air conditioned:
      1) Enclosure Type: NEMA 12 in accordance with NEMA 250.
      2) Materials: Steel.

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b. For all other panels:
1) Enclosure Type: NEMA 4X in accordance with NEMA 250.
2) Materials: Type 316 stainless steel.

2. Metal Thickness: 14-gauge, minimum.
3. Doors:
a. Rubber-gasketed with continuous hinge.
b. Stainless steel lockable quick-release clamps.
4. Manufacturers:
a. Hoffman Engineering Co.
b. Rittal.

G. Factory Finishing:

1. Enclosures:
a. Stainless Steel and Aluminum: Not painted.
b. Nonmetallic Panels: Similar to steel panels.
c. Steel Panels:
1) Sand panel and remove mill scale, rust, grease, and oil.
2) Fill imperfections and sand smooth.
3) Paint panel interior and exterior with one coat of epoxy coating metal primer, two finish coats of two-component type epoxy enamel.
4) Sand surfaces lightly between coats.
5) Dry Film Thickness: 3 mils, minimum.
6) Color: As noted.

2. Manufacturer’s standard finish color, except where specific color is indicated. If manufacturer has no standard color, finish equipment with light gray color.

2.09 CORROSION PROTECTION

A. Corrosion-Inhibiting Vapor Capsule Manufacturers:

1. Northern Instruments; Model Zerust VC.
2. Hoffmann Engineering Co; Model A-HCI.

2.10 SOURCE QUALITY CONTROL

A. Scope: Inspect and test entire PIC to ensure it is ready for shipment, installation, and operation.

B. Location: Manufacturer’s factory or Engineer approved staging Site.

C. Test: Exercise and test all functions.

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PART 3 EXECUTION

3.01 EXAMINATION

A. For equipment not provided by PIC, but that directly interfaces with the PIC, verify the following conditions:

1. Proper installation.
2. Calibration and adjustment of positioners and I/P transducers.
3. Correct control action.
4. Switch settings and dead bands.
5. Opening and closing speeds and travel stops.
6. Input and output signals.

3.02 INSTALLATION

A. Material and Equipment Installation: Retain a copy of manufacturers' instructions at Site, available for review at all times.

B. Electrical Wiring: As specified in Division 26, Electrical.

C. Removal or Relocation of Materials and Equipment:

1. Remove from Site materials that were part of the existing facility but are no longer used, unless otherwise directed by Engineer to deliver to Owner.
2. Repair affected surfaces to conform to type, quality, and finish of surrounding surface.

3.03 FIELD FINISHING

A. Refer to Section 09 90 00, Painting and Coating.

3.04 FIELD QUALITY CONTROL

A. Startup and Testing Team:

1. Thoroughly inspect installation, termination, and adjustment for components and systems.
2. Complete onsite tests.
3. Complete onsite training.
4. Provide startup assistance.

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B. Operational Readiness Inspections and Calibrations: Prior to startup, inspect and test to ensure that entire PIC is ready for operation.

1. Loop/Component Inspections and Calibrations:
   a. Check PIC for proper installation, calibration, and adjustment on a loop-by-loop and component-by-component basis.
   b. Prepare component calibration sheet for each active component (except simple hand switches, lights, gauges, and similar items).
      1) Project name.
      2) Loop number.
      3) Component tag number.
      4) Component code number.
      5) Manufacturer for elements.
      6) Model number/serial number.
      7) Summary of functional requirements, for example:
         a) Indicators and recorders, scale and chart ranges.
         b) Transmitters/converters, input and output ranges.
         c) Computing elements' function.
         d) Controllers, action (direct/reverse) and control modes (PID).
         e) Switching elements, unit range, differential (fixed/adjustable), reset (auto/manual).
      8) Calibrations, for example:
         a) Analog Devices: Actual inputs and outputs at 0, 10, 50, and 100 percent of span, rising and falling.
         b) Discrete Devices: Actual trip points and reset points.
         c) Controllers: Mode settings (PID).
      9) Space for comments.
   c. These inspections and calibrations do not require witnessing.
2. Verify flawless communication of signals and data between the remote RTU and the CTU at the Richard A. Heyman Environmental Protection Facility.

C. Unwittnessed Factory Test (UFT):

1. Scope: Inspect and test RTU to ensure it is operational.
2. Location: RTU supplier Factory.
3. Integrated Test:
   a. Interconnect and test.
   b. Exercise and test all functions.
   c. Provide stand alone testing for each panel.
   d. Simulate inputs and outputs for primary elements and final control elements.

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D. Performance Acceptance Tests (PAT): These are the activities that Section 01 91 14, Equipment Testing and Facility Startup, refers to as Performance Testing.

1. General:
   a. Test all PIC elements to demonstrate that PIC satisfies all requirements.
   b. Test the radio communication link between the supervisor computer system at the Key West Richard A. Heyman Environmental Protection Facility and the new RTU radio system.
   c. Test Format: Cause and effect.
      1) Person conducting test initiates an input (cause).
      2) Specific test requirement is satisfied if correct result (effect) occurs.
   d. Procedures, Forms, and Checklists:
      1) Conduct tests in accordance with, and documented on, Engineer accepted procedures, forms, and checklists.
      2) Describe each test item to be performed.
      3) Have space after each test item description for sign off by appropriate party after satisfactory completion.
   e. Required Test Documentation: Test procedures, forms, and checklists. All signed by Engineer and Contractor.
   f. Conducting Tests:
      1) Provide special testing materials, equipment, and software.
      2) Wherever possible, perform tests using actual process variables, equipment, and data.
      3) If it is not practical to test with real process variables, equipment, and data, provide suitable means of simulation.
      4) Define simulation techniques in test procedures.
   g. Coordinate PIC testing with Owner and affected Subcontractors.
      1) Excessive Test Witnessing: Refer to Supplementary Conditions.
2. Test Requirements:
   a. Once facility has been started up and is operating, perform a witnessed PAT on complete PIC to demonstrate that it is operating as required. Demonstrate each required function on a paragraph-by-paragraph and loop-by-loop basis.
   b. Perform local and manual tests for each loop before proceeding to remote and automatic modes.
   c. Where possible, verify test results using visual confirmation of process equipment and actual process variable. Unless otherwise directed, exercise and observe devices supplied by others, as needed to verify correct signals to and from such devices and to confirm overall system functionality. Test verification by means of disconnecting wires or measuring signal levels is acceptable only where direct operation of plant equipment is not possible.

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d. Make updated versions of documentation required for PAT available to Engineer at Site, both before and during tests.
e. Make one copy of O&M manuals available to Engineer at the Site both before and during testing.
f. Refer to referenced examples of PAT procedures and forms in Article Supplements.

3.05 MANUFACTURER'S SERVICES

A. Specialty Equipment: For following equipment, provide the services of a qualified manufacturer's representative during installation, startup, and demonstration testing and Owner training. Provide original equipment manufacturer's services for: Remote Telemetry Unit (RTU) and antenna**.**

3.06 CLEANING/ADJUSTING

A. Repair affected surfaces to conform to type, quality, and finish of surrounding surface.

B. Cleaning:

1. Prior to closing system using tubing, clear tubing of interior moisture and debris.
2. Upon completion of Work, remove materials, scraps, and debris from interior and exterior of equipment.

3.07 PROTECTION

A. Protect enclosures and other equipment containing electrical, instrumentation and control devices, including spare parts, from corrosion through the use of corrosion-inhibiting vapor capsules.

B. Periodically replace capsules in accordance with capsule manufacturer's recommendations. Replace capsules just prior to Final Payment and Acceptance.

3.08 SUPPLEMENTS

A. Supplements listed below, following "End of Section," are part of this Specification.

1. Performance Acceptance Test Sheet: Describes the PAT for a given loop. The format is mostly free form.
   a. Lists the requirements of the loop.
   b. Briefly describes the test.
   c. Cites expected results.
   d. Provides space for check off by witness.

END OF SECTION

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CH2M HILL **PERFORMANCE ACCEPTANCE TEST SHEET** ***Rev.06.05.92***

Project Name:	Project No.:

Demonstration Test(s): For each functional requirement of the loop:
(a) List and number the requirement. (b) Briefly describe the demonstration test.
(c) Cite the results that will verify the required performance. (d) Provide space for signoff.

Forms/Sheets Verified	By	Date	**Loop Accepted By Owner**
Loop Status Report			By:
Instrument Calibration Sheet			Date:
I&C Valve Calibration Sheet			
Performance Acceptance Test	By	Date	
Performed			
Witnessed			Loop No.:

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CH2M HILL **PERFORMANCE ACCEPTANCE TEST SHEET** **Rev.06.05.92**

EXAMPLE

Project Name: *SFO SEWPCP Plant Expansion*	Project No.: *SFO12345.C1*

Demonstration Test(s): For each functional requirement of the loop:
(a) List and number the requirement. (b) Briefly describe the demonstration test.
(c) Cite the results that will verify the required performance. (d) Provide space for signoff.

1. MEASURE EFFLUENT FLOW

1.a With no flow, water level over weir should be zero and

FIT indicator should read zero. *Jun-20-92 BDG*

2. FLOW INDICATION AND TRANSMISSION TO LP & CCS

With flow, water level and FIT indicator should be related by expression

*Q(MGD) = 429*H**(2/3) (H = height in inches of water over weir).*

Vary H and observe that following.

2.a Reading of FIT indicator. *Jun-6-92 BDG*

2.b Reading is transmitted to FI on LP-521-1. *Jun-6-92 BDG*

2.c Reading is transmitted and displayed to CCS. *Jun-6-92 BDG*

H(measured)	*0*	*5*	*10*	*15*
Q(computed)	*0*	*47.96*	*135.7*	*251.7*
Q(FIT indicator)	*0*	*48.1*	*137*	*253*
Q(LI on LP-521-1)	*0*	*48.2*	*138*	*254*
Q(display by CCS)	*0*	*48.1*	*136.2*	*252.4*

Forms/Sheets Verified	By	Date	**Loop Accepted By Owner**
Loop Status Report	*J.D. Sewell*	*May-18-92*	By: *J.D. Smith*
Instrument Calibration Sheet	*J.D. Sewell*	*May-18-92*	Date: *Jun-6-92*
I&C Valve Calibration Sheet	*N.A.*		
Performance Acceptance Test	By	Date	
Performed	*J. Blow MPSDC Co.*	*Jun-6-92*	
Witnessed	*B.deGlanville*	*Jun-6-92*	Loop No.: *30-12*

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PART 4

DRAWINGS
(BOUND SEPARATELY)